Soil Survey Investigations Report No. 24

Soil Survey Laboratory Data and Descriptions for Some Soils of...

...CALIFORNIA

SOIL CONSERVATION SERVICE • U.S. DEPARTMENT OF AGRICULTURE
in cooperation with
CALIFORNIA AGRICULTURAL EXPERIMENT STATION

Soil survey investigations reports already published:

SSIR No. 1	Soil Survey Laboratory Methods and Procedures for Collecting Soil Samples
	Soil Survey Laboratory Data and Descriptions for Some Soils of:
SSIR No. 2	North Dakota
SSIR No. 3	Iowa
SSIR No. 4	Kansas
SSIR No. 5	Nebraska
SSIR No. 6	Arkansas, Louisiana, and Missouri
SSIR No. 7	Montana
SSIR No. 8	Wyoming
SSIR No. 9	Minnesota
SSIR No. 10	Colorado
SSIR No. 11	Oklahoma
SSIR No. 12	Puerto Rico and the Virgin Islands
SSIR No. 13	Mississippi
SSIR No. 14	Kentucky
SSIR No. 15	Tennessee
SSIR No. 16	North Carolina, South Carolina, and Georgia
SSIR No. 17	Wisconsin
SSIR No. 18	Indiana
SSIR No. 19	Illinois
SSIR No. 20	New England States
SSIR No. 21	A Toposequence of Soils in Tonalite Grus in the Southern California Peninsular Range
	Soil Survey Laboratory Data and Descriptions for Some Soils of:
SSIR No. 22	Alabama and Florida
SSIR No. 23	Nevada

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June 1973

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METHODS CODE SYMBOLS

1. SAMPLE COLLECTION AND PREPARATION
   - A. Field sampling
     1. Site selection
     2. Soil sampling
        - a. Stony soils
        - b. Marsh and swamp soils
   - B. Laboratory preparation
     1. Standard (airdry)
        - a. Square-hole 2-mm sieve
        - b. Round-hole 2-mm sieve
     2. Field moist
     3. Carbonate-containing material
     4. Carbonate-indurated material
2. CONVENTIONS
   - A. Size-fraction base for reporting
     1. <2-mm
     2. < size specified
   - B. Data sheet symbols
     - tr: trace, not measurable by quantitative procedure used or less than reportable amount
     - -: analysis run but none detected
     - blank: analysis not run
     - nd: analysis not run
     - <: less than reported amount or none present
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   - A. Particles <2-mm (pipet method)
     1. Airdry samples
        - a. Carbonate and noncarbonate clay
        - b. Fine clay
        - c. Water-dispersible clay
     2. Moist samples
        - a. Carbonate and noncarbonate clay
        - b. Fine clay
        - c. Water-dispersible clay
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        - b. From volume and weight estimates
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        - f. 1/3-bar desorption III
        - g. 1/10-bar desorption
        - h. Ovendry
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   - B. Water retention
     1. Pressure-plate extraction (1/3 or 1/10 bar)
        - a. Sieved samples
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        - c. Natural clods
        - d. Cores
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     4. Field state
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     1. Dry to moist
   - F. Plasticity index
     1. Liquid limit
     2. Upper plastic limit
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   - A. Cation-exchange capacity
     1. NH_4OAc, pH 7.0
        - a. Direct distillation
     2. NaOAc, pH 8.2
        - a. Centrifuge method

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   - 3. Sum of cations
     - a. Acidity by $BaCl_2$-TEA, pH 8.2; bases by NH_4OAc, pH 7.0
     - b. Sum of bases plus Al
   - 6. NH_4OAc, pH 7.0, leaching tube
     - a. Direct distillation
   - B. Extractable bases
     1. NH_4OAc extraction
        - a. Uncorrected
        - b. Corrected (exchangeable)
        - c. See 5B4
     3. KCl-TEA, pH 8.2 (revised)
        - a. Uncorrected
        - b. Corrected (exchangeable)
     4. NH_4OAc, pH 7.0 (modified)
        - a. Uncorrected
        - b. Corrected (exchangeable)
   - C. Base saturation
     1. NH_4OAc, pH 7.0
     2. NaOAc, pH 8.2
     3. Sum of cations
   - D. Sodium saturation (exchangeable Na pct.)
     1. NaOAc, pH 8.2
     2. NH_4OAc, pH 7.0
   - E. Sodium-adsorption ratio
   - F. Calcium saturation
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     1. Kjeldahl digestion
        - a. Ammonia distillation
   - C. Iron
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        - a. Dichromate titration
        - b. EDTA titration
     2. Dithionite-citrate extraction
        - a. Orthophenanthroline colorimetry
        - b. Atomic absorption
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     6. Ammonium oxalate extraction
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        - b. Manometric
     3. H_2SO_4 treatment
        - a. Weight gain
   - F. Gypsum
     1. Water extract
        - a. Precipitation in acetone
        - b. Indirect estimate
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        - b. EDTA titration
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     2. To noncarbonate clay
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     5. Estimated total salt
   - E. Soil resistivity
     1. Saturated paste

* "Solution" or "resin" pretreatment

PREFACE

The Soil Survey Investigations Report (SSIR) series was established to preserve and make available technical information resulting from soil survey investigations. SSIR No. 1 "Soil Survey Laboratory Methods and Procedures for Collecting Soil Samples," revised April 1972, describes in detail the methods used in the soil survey laboratories. Most of the remaining reports are a collection of pedon descriptions and laboratory data for pedons from individual states and groups of states. SSIR No. 21 is a technical report on a specific study. The reports already published are listed on the inside front cover.

This report contains data from soil survey investigations in California. These investigations have been going on since 1945 but most of these data have been accumulated since 1955. Some of the data and descriptions have appeared in technical journals, in regional bulletins, in USDA technical bulletins, and in the text of published soil surveys. But most have been distributed in unpublished form to those immediately concerned and were not available to all who might use them.

This report contains all the data from the soil survey laboratories that form reasonably complete characterization of soils in California. While these data were being accumulated there were many changes in laboratory methods. Consequently, laboratory data for different soils cannot always be directly compared without allowance for the method. For data collected since 1955, however, these changes have been minor. The methods used are identified by symbol in the column headings of the data tables. The codes are identified briefly on the opposite page.

Ways of describing soils have also changed. The soil descriptions published here were prepared as working documents. The soil scientist who wrote them had no idea they would be published. Editing has been limited for the most part to that necessary for conformance to the "Soil Survey Manual," AD 18. Field estimates of texture have been retained, even though some are at variance with laboratory data, because the field estimates themselves are important data.

Many pedons are no longer representative of the soil series with which they were identified at the time of sampling. Hence, during the winter of 1972-73 all pedons for California were classified in existing series and in families and higher categories. Taxonomic criteria were applied rigorously, and a pedon was considered outside a given series if it failed to meet the limits of this series as defined now by a few tenths of 1 percent. If the departures are small, the pedon is listed as taxadjunct to the series it resembles most closely. If it differs significantly from any series as defined now, it is classified at the family but not at the series level.

Soil Survey
Soil Conservation Service

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49. Sonoma
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57. Yolo

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Wright loam (taxadjunct) **LOCATION** Sonoma County, California

SOIL FAMILY: Typic Albaqualf, fine, montmorillonitic, mesic

SOIL NOS. S61Calif-49-1 **LAB. NOS.** 61377 - 61386

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0- 7	A1	0.9	2.2	4.8	19.1	15.8	45.8	11.4	52.3	22.0	4	1
7-14	A21	1.1	2.5	4.7	18.0	15.9	45.6	12.2	52.0	21.6	2	1
14-22	A23	0.5	3.1	4.7	18.9	15.7	45.3	11.8	51.1	22.7	3	1
22-34	B21tg	0.4	0.9	2.2	8.8	8.6	35.4	43.7	29.2	20.6	0	c
34-45	B22tg	0.1	0.4	1.0	3.9	4.4	42.9	47.3	20.0	30.0	0	sic
45-52	B23tg	0.1	0.1	0.5	3.9	7.4	53.8	34.2	31.5	32.7	0	sicl
52-69	B24tg	0.1	0.1	0.4	9.2	15.2	49.7	25.3	47.3	25.5	0	l-sil
69-79	C1g	0.0	0.1	0.3	9.1	19.6	49.8	21.1	51.7	25.6	0	l-sil
79-84	IIC2g	0.1	0.2	0.4	1.7	4.0	46.6	47.0	18.4	33.4	0	sic
84-90+	IIC3g	0.0	0.0	0.1	0.5	1.1	40.0	58.3	7.8	33.6	0	sic-c

pH 8C1a H_2O 1:1	pH 8C1c KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	Bulk Density 4A3a g/cc	Ext. Iron as % Fe 6C1b	4B2 Soil water 15 atmos. Pct.
5.5	4.3	1.21	0.106	11		0.7	5.9
5.7	4.3	0.49	0.055	9		0.8	5.2
5.7	4.3	0.31	0.041			0.7	5.4
4.8	3.6	0.25	0.027			0.3	20.4
5.1	3.8	0.19				0.6	23.8
5.7	4.1	0.12			1.68	0.9	21.5
6.0	4.2	0.07			1.73*	1.0	17.1
6.2	4.3	0.06			1.66	0.8	15.6
6.3	4.7	0.03				0.6	22.5
6.3	4.8	0.04			1.63	0.1	25.3

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K	5B1a BASE SAT. % 5C3	Sum of Cations 5A3a	MOISTURE AT SATURATION
	milliequivalents per 100g. soil →						meq/100g.	%
11.6	3.1	1.5	7.5	0.2	0.4	41	12.7	
11.2	3.7	2.0	6.1	0.2	0.2	50	12.2	
11.1	3.4	2.4	5.6	0.2	0.2	52	11.7	
40.2	13.6	16.8	8.2	1.1	0.4	80	40.0	
47.6	18.8	23.8	6.9	2.2	0.4	87	52.2	
40.9	19.3	22.9	5.2	2.2	0.4	90	50.0	
39.0	15.9	18.5	4.4	1.7	0.3	89	40.8	
36.8	14.8	17.5	3.8	1.7	0.9	90	38.8	
51.6	18.7	24.5	3.4	2.1	0.5	93	49.1	
52.7	20.0	27.4	3.1	2.3	0.5	94	53.3	

* Single determination

WRIGHT LOAM (taxadjunct) 1/
S61Calif-49-1

Location: Sonoma County, California. Gold Ridge SCD - Laguna Addition 1000 feet north, 1700 feet west of junction of Todd and Llano Roads. SW1/4, SW1/4, section 5, projected, T. 6 N., R. 8 W. (Neles Ranch). Date of Sampling: June 19, 1961.
Collectors: Reuben Nelson, Leo C. Klameth, V. C. Miller, G. Lambert, J. H. Kashiwagi, F. Graham.
Classification: Typic Albaqualf, fine, montmorillonitic, mesic.
Vegetation: Native: Annual grasses and scattered oak. Cult: Oat hay; dryland improved pasture and some irrigated pasture. Use: Dryland pasture. Climate: Annual precipitation 29.4 inches, average temperature 57.6° F., average January temperature 46.5°F., average July temperature 66.7°F.
Parent Material: Old alluvium - mainly from sedimentary and volcanic rocks. Elevation: 83 feet - taken from Sebastopol Quad. Relief: Slightly hummocky (hog wallow) - 1 to 2 percent slope. Drainage: Imperfect - surface water ponding in pockets. Biological Activity: Some worm and rodent activity in A horizon.

HORIZON	DESCRIPTION
A1 * RSL No. 61377	0 to 7 inches, light brownish gray (10YR 6/2) very fine sandy loam, dark grayish brown (10YR 4/2) when moist; medium subangular blocky structure; slightly hard when dry, friable when moist, nonsticky and slightly plastic when wet; abundant very fine and fine roots; common very fine and fine interstitial and tubular pores; strongly acid, pH 5.2; clear, smooth boundary.
A21 RSL No. 61378	7 to 14 inches, light brownish gray (10YR 6/2) loam, very dark grayish brown (10YR 3/2) when moist, massive; hard when dry, very friable when moist, slightly sticky, slightly plastic when wet; abundant very fine and fine roots; many very fine and fine tubular and interstitial pores; strongly acid, pH 5.5; clear, wavy boundary.
A23 * RSL No. 61379	14 to 22 inches, light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) when moist; massive; hard when dry, friable when moist, slightly sticky and slightly plastic when wet; abundant very fine and fine roots; many medium interstitial and tubular pores; strongly acid, pH 5.5; abrupt, wavy boundary.
B21tg RSL No. 61380	22 to 34 inches, mixed light brownish gray (10YR 6/2) and grayish brown (10YR 5/2) clay, dark brown (7.5YR 4/2) when moist; moderate coarse prismatic structure; extremely hard when dry, very firm when moist, very sticky and very plastic when wet; abundant fine and very fine roots; common very fine discontinuous pores; many moderately thick clay films on ped faces; very strongly acid, pH 5.0; roots follow ped faces; clear, smooth boundary.
B22tg RSL No. 61381	34 to 45 inches, mixed grayish brown (10YR 5/2) and pale brown (10YR 6/3) clay with few, fine, very dark gray (10YR 3/1) (manganese) stains when dry, dark brown (7.5YR 4/2) with few, fine, black (N 2/) (manganese) stains when moist; moderate coarse prismatic structure; extremely hard when dry, very firm when wet, very sticky and very plastic when wet; plentiful very fine and fine roots on ped faces; few fine discontinuous pores; many moderately thick clay films on ped faces; strongly acid, pH 5.5; clear, wavy boundary.
B23tg RSL No. 61382	45 to 52 inches, pale brown (10YR 6/3) clay with a few, fine distinct very dark gray (10YR 3/1) (manganese) mottles when dry, dark grayish brown (10YR 4/2) when moist; weak coarse prismatic structure; very hard when dry, very firm when moist, sticky and very plastic when wet; plentiful very fine and fine roots on ped faces; few fine discontinuous pores; many moderately thick clay films on ped faces; medium acid, pH 6.0; clear, wavy boundary.
B24tg RSL No. 61383	52 to 69 inches, light brown (7.5YR 6/4) clay with common, fine, distinct mottles of reddish yellow (7.5YR 6/8) and very dark gray (10YR 3/1) when dry; brown (10YR 5/3) with common fine black mottles when moist; weak coarse prismatic structure; extremely hard when dry, very firm when moist, sticky and very plastic when wet; few fine and very fine roots on ped faces; common fine, discontinuous pores; many moderately thick clay films on ped faces; slight acid, pH 6.2; clear, wavy boundary.
C1g * RSL No. 61384	69 to 79 inches, pale brown (10YR 6/3) silty clay loam with common fine distinct mottles of dark gray (10YR 4/1) when dry; dark brown (10YR 4/3) with common fine distinct black (10YR 2/1) mottles when moist; weak coarse prismatic structure; hard when dry, firm when moist, slightly sticky and slightly plastic when wet; few medium and fine roots on ped faces; few fine and discontinuous pores; few thin clay films on ped faces; many fine quartz grains; slightly acid, pH 6.3; clear, wavy boundary.
IIC2g RSL No. 61385	79 to 84 inches, pale brown (10YR 6/3) clay with common fine, distinct dark gray (10YR 4/1) mottles when dry, dark grayish brown (10YR 4/2) with common fine distinct black (10YR 2/1) (manganese) mottles when moist; moderate coarse prismatic structure; hard when dry, very firm when moist, sticky and very plastic when wet; very few fine roots; few fine and discontinuous tubular pores; continuous moderately thick clay films on ped faces; slightly acid, pH 6.3; clear, wavy boundary.
IIC3g RSL No. 61386	84 to 92 inches, light brownish gray (10YR 6/2) clay with fine dark gray (10YR 4/1) (manganese) stains when dry; dark grayish brown (10YR 4/2) with very dark gray (10YR 3/1) (manganese) stains when moist; moderate coarse prismatic structure; extremely hard when dry, extremely firm when moist, sticky and nonplastic when wet; weakly cemented; no roots; common fine and discontinuous tubular pores; continuous thick clay films on ped faces and in pores; prominent slickensides and a few white noncalcareous specks; slightly acid, pH 6.4.

* Horizons sampled for B.P.R.

1/ **The Wright series is in a fine, mixed, mesic family of Mollic Albaqualfs. This pedon has an epipedon with a moist color value of 4 and montmorillonite is the dominant clay mineral in the argillic horizon.**

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Wright loam (Taxadjunct) **LOCATION** Sonoma County, California

SOIL FAMILY: Mollic Albaqualf, fine, montmorillonitic, mesic

SOIL NOS. S61Calif-49-2 **LAB. NOS.** 61387 - 61397

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-7	A1	0.6	1.8	4.5	20.9	14.1	46.4	11.7	48.4	25.8	2	1
7-15	A21	0.6	1.9	4.4	20.6	14.6	46.1	11.8	48.6	25.8	0	1
15-25	A22g	0.3	1.8	4.4	20.2	14.8	44.8	13.7	49.1	24.1	1	1
25-32	B21tg	0.4	1.4	3.5	13.2	8.5	31.1	41.9	29.3	18.7	0	c
32-42	B22tg	0.3	1.6	3.0	11.9	9.2	33.3	40.7	30.1	20.2	0	c-cl
42-47	B23tg	0.1	0.8	3.3	13.8	12.7	39.8	29.5	40.0	22.1	0	cl
47-62	B24tg	0.1	0.6	2.8	26.8	17.8	30.4	21.5	53.5	14.7	0	l
62-73	B31g	0.1	0.6	5.5	38.8	15.0	22.8	16.4	52.3	9.9	0	fsl
73-89	B32g	0.0	0.5	4.0	27.3	15.7	36.2	16.3	64.6	5.2	0	l
89-98	B33g	0.1	0.8	4.3	26.1	16.1	35.4	17.2	52.4	16.4	0	l
98-110	C1g	1.0	5.4	11.3	25.2	10.8	28.1	18.2	38.0	14.2	0	fsl

pH 8C1a H_2O 1:1	pH 8C1c KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	Bulk Density 4A3a g/cc	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C.	6C1b Ext. Iron % Fe	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
6.0	5.1	2.73	0.188	14	1.54		0.4				7.6
6.2	5.0	0.48	0.050	10	1.51		0.4				5.2
5.8	4.3	0.16	0.023		1.70		0.5				6.2
4.4	3.4	0.19	0.023		1.76		0.3				20.9
5.3	3.9	0.13			1.70		0.4				20.8
6.5	4.8	0.06			1.62		0.6				18.8
6.7	4.9	0.02			1.73		0.8				14.7
6.5	4.5	0.03			1.72		0.8				11.1
6.4	4.4	0.02			1.71		0.8				13.1
6.4	4.3	0.03			1.65		0.7				13.9
6.3	4.4	0.07			1.60		0.8				13.2

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K	5B1a BASE SAT. % 5C3	Sum of Cations 5A3a	MOISTURE AT SATURATION
	milliequivalents per 100g. soil →						me./100g.	%
15.5	8.0	1.7	6.1	0.2	0.5	63	16.4	
11.7	4.9	1.7	3.5	0.1	0.3	66	10.4	
11.9	4.6	3.0	3.5	0.2	0.2	69	11.4	
44.1	15.0	14.2	9.5	0.5	0.4	76	39.7	
45.2	20.2	19.0	9.4	0.7	0.5	81	49.8	
42.7	20.1	17.7	2.7	0.8	0.4	94	41.7	
33.8	16.6	14.5	2.6	0.7	0.4	93	34.8	
30.1	13.4	11.9	2.8	0.5	0.9	91	29.5	
34.1	14.9	14.0	3.2	0.6	0.3	90	33.0	
33.8	14.7	14.5	3.1	0.5	0.4	91	33.2	
31.2	13.1	13.8	3.2	0.5	0.4	90	31.1	

WRIGHT LOAM (taxadjunct) 1/
S61Calif-49-2

Location: Sonoma County, California. Gold Ridge SCD, Laguna Addition. 100 feet west and 1200 feet south of junction of Sebastopol and Llano Roads. Northwest corner of NW1/4, SW1/4, section 31, projected, T. 7 N., R. 8 W. (Buehler Ranch). Date of Sampling: June 20, 1961.
Collectors: Reuben Nelson, Leo C. Klameth, V. C. Miller, G. Lambert, J. H. Kashiwagi, F. Graham.
Classification: **Mollic Albaqualf, fine, montmorillonitic, mesic.**
Vegetation: Native: Annual grasses and scattered oak. Cult: Oat hay; some irrigation pasture and some improved dryland pasture. Use: Dryland pasture. Climate: Annual precipitation 29.4 inches, average temperature 57.6°F., average January temperature 46.5°F., average July temperature 66.7°F. Parent Material: Old alluvium - mainly from sedimentary and volcanic rock sources. Elevation: 82 feet - from Sebastopol Quad. Relief: Slightly hummocky (hog wallow) to gently undulating - 1 to 2 percent slope. Drainage: Imperfect - surface water ponding in concave areas. Biological Activity: Some worm and rodent activity to about 2 feet.

HORIZON	DESCRIPTION
A1 * RSL No. 61387	0 to 7 inches, light brownish gray (10YR 6/2) very fine sandy loam, very dark grayish brown (10YR 3/2) when moist; massive; hard when dry, friable when moist, nonsticky and nonplastic when wet; abundant fine and very fine roots; many fine and medium tubular and interstitial pores; medium acid, pH 5.7; gradual, smooth boundary.
A21 RSL No. 61388	7 to 15 inches, light brownish gray (10YR 6/2) loam, very dark grayish brown (10YR 3/2) when moist; massive; hard when dry, friable when moist, slightly sticky and slightly plastic when wet; abundant fine and very fine roots; many fine and medium tubular and interstitial pores; medium acid, pH 6.0; gradual, smooth boundary.
A22g RSL No. 61389	15 to 25 inches, light brownish gray (10YR 6/2) and light gray (10YR 7/2) sandy clay loam with few fine faint mottles of yellowish brown when dry, dark grayish brown (10YR 4/2) when moist; massive; hard when dry, friable when moist, sticky and slightly plastic when wet; abundant fine and very fine roots; many fine and medium tubular and interstitial pores; strongly acid, pH 5.5; abrupt, smooth boundary.
B21tg RSL No. 61390	25 to 32 inches, mixed light brownish gray (10YR 6/2) and light gray (10YR 7/2) clay with common medium, distinct dark grayish (10YR 4/2) (manganese) stains when dry, dark grayish brown (10YR 4/2) with common medium distinct mottles of very dark brown (10YR 2/2) when moist; weak, coarse prismatic structure; hard when dry, very firm when moist, sticky and very plastic when wet; plentiful very fine and fine roots; common very fine and fine tubular pores; continuous thick clay films on ped faces and in pores; very strongly acid, pH 5.0; gradual, smooth boundary.
B22tg RSL No. 61391	32 to 42 inches, mixed light brownish gray (10YR 6/2) and light gray (10YR 7/2) clay, with common medium distinct mottles of light yellowish brown (10YR 6/4) when dry, dark grayish brown (10YR 4/2) with faint mottles of dark yellowish brown (10YR 4/4) when moist; weak, coarse prismatic structure; very hard when dry, very firm when moist, sticky and very plastic when wet; plentiful very fine and fine roots; common very fine and fine tubular pores; continuous thick clay films on ped faces and in pores; strongly acid, pH 5.5; gradual, smooth boundary; some fine (manganese) stains.
B23tg RSL No. 61392	42 to 47 inches, light brownish gray (10YR 6/2) clay, dark brown (10YR 4/3) when moist; weak, coarse and very coarse prismatic structure; very hard when dry, firm when moist, sticky and very plastic when wet; few very fine and fine roots; common very fine and fine tubular pores; continuous moderately thick clay films on ped faces and in bridges; slightly acid, pH 6.5; gradual, smooth boundary.
B24tg RSL No. 61393	47 to 62 inches, pale brown (10YR 6/3) clay with common medium distinct mottles of brown (10YR 5/3) when dry, dark grayish brown (10YR 4/2) with faint mottles of dark brown (10YR 3/3) when moist; weak, coarse prismatic structure; hard when dry, firm when moist, sticky and very plastic when wet; few very fine and fine roots; common fine tubular pores; continuous moderately thick clay films on ped faces and in pores; neutral, pH 7.0; gradual, smooth boundary; abundant fine dark (manganese) stains.
B31g * RSL No. 61394	62 to 73 inches, light brownish gray (10YR 6/2) sandy clay loam with common medium distinct mottles of brown (10YR 5/3) when dry, olive brown (2.5Y 4/4) with common, medium, distinct mottles of strong brown when moist; weak, coarse prismatic structure; hard when dry, firm when moist, sticky and very plastic when wet; very few fine roots; common tubular pores; continuous moderately thick clay films on ped faces and in pores; slightly acid, pH 6.5; clear, wavy boundary.
B32g RSL No. 61395	73 to 89 inches, mixed pale brown (10YR 6/3) and light brownish gray (10YR 6/2) clay with a few, fine distinct mottles of very dark grayish brown (10YR 3/2) when dry, olive brown (2.5Y 4/4) with a few fine distinct mottles of very dark grayish brown (2.5Y 3/2) when moist; weak, coarse prismatic structure; extremely hard when dry, firm when moist, sticky and plastic when wet; few very fine roots; common very fine and fine tubular pores; continuous thick clay films on ped faces; abundant fine (manganese) dark stains; slightly acid, pH 6.5; clear, smooth boundary.
B33g RSL No. 61396	89 to 98 inches, pale brown (10YR 6/3) clay with common fine distinct mottles of brown (10YR 5/3) when dry, olive brown (2.5Y 4/4) when moist; weak, coarse prismatic structure; extremely hard when dry, firm when moist, sticky and plastic when wet; few very fine roots; common very fine and fine tubular pores; continuous moderately thick clay films on ped faces; slightly acid, pH 6.5; clear, wavy boundary.
C1g RSL No. 61397	98 to 111 inches, brown (10YR 5/3) sandy clay with common fine distinct mottles of grayish brown (2.5Y 5/2) when dry, olive brown (2.5Y 4/4) when moist; massive; hard when dry, friable when moist; very few medium and fine roots; few fine interstitial pores; continuous thin clay films in bridges and on sand grains; neutral, pH 7.0.

* Horizons sampled for B.P.R.

1/ The Wright series is in a fine, mixed, mesic family of Mollic Albaqualfs. This pedon is in a montmorillonitic family of the same subgroup.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Exeter coarse sandy loam **LOCATION** Riverside County, California

SOIL FAMILY: Typic Durixeralf, fine-loamy, mixed, thermic.

SOIL NOS. S57Calif-33-11 **LAB. NOS.** 57527 - 57533

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0-10	Ap	8.4	17.8	11.0	19.1	12.7	22.2	8.8	37.8	7.8	3	cosl
10-16	A3	8.3	15.3	8.9	14.5	10.8	26.4	15.8	33.9	11.8	2	sl
16-25	B21	9.2	12.9	7.2	12.3	10.1	29.1	19.2	33.2	13.3	2	l
25-30	B22	4.8	11.5	6.6	12.9	11.6	33.4	19.2	37.8	14.9	2	l
30-37	B3cam	7.8	14.6	9.3	17.1	13.1	31.2	6.9	40.1	14.5	5	sl
37-50	Cm1	11.9	14.2	7.4	13.2	10.1	27.4	15.8	32.1	13.2	5	cosl
50-60+	Cm2	18.1	18.4	8.6	14.2	8.2	18.5	14.0	26.9	8.0	14	cosl

8C1b SATURATED PASTE 1:1	pH 8C1a 1:10	4A3a Bulk Density 1/3 atm. g/cc	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	CO_3 6I1a Meq/l	8A1a Elec. Conduc. EC x 10^3 MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	HCO_3 6J1a Meq/l	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
5.1	5.7	1.77	0.39	0.038	10.3	0.0	4.8	0	1.0	15.4	9.2	3.0
6.4	6.5	1.72	0.19	0.028		0.0	5.3	0	1.6			5.6
6.8	7.3	1.65	0.16	0.024		0.0	4.8	0	2.3			6.8
7.0	7.2	1.53	0.07			0.0	5.0	0	2.0			7.2
7.7	8.1		0.04			0.0	2.2	5.8	2.7			6.6
7.8	8.2		0			0.0	1.5	Tr	2.0			6.3
7.8	7.8		0.01			0.0	1.3	Tr	2.2			5.5

5A2a CATION EXCHANGE CAPACITY (+(Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
5.7	4.7	1.2	2.1	0.3	0.5	76	8.6	2.5	35.4	12.9	9.4	19.8
10.8	7.7	2.5	2.8	0.7	0.3	80	12.1	0.6	33.0	12.1	27.0	24.1
16.5	12.7	4.5	1.5	0.8	0.3	92	8.4	0.1	27.9	14.5	27.8	27.8
18.2	13.6	5.2	1.3	0.8	0.2	94	8.6	0.2	32.1	17.2	30.7	29.1
15.3	19.1	4.0		0.5	0.2		5.5	0.1	10.7	5.2	13.0	29.5
11.2	10.1	3.4		0.6	0.2		4.5	0.1	5.7	2.6	7.8	27.7
10.0	6.7	3.5		0.7	0.2		5.2	0.1	3.8	1.8	5.9	23.6

1/ Percent of whole soil

EXETER COARSE SANDY LOAM
S57Calif-33-11

Location: 1200 feet west and 400 feet south of north 1/4 corner of Sec. 16, T. 4 S., R. 3 W. On the Hughes Ranch, about 2 miles northeast of Perris, Riverside County, California. Date of Sampling: June 5, 1957.
Description by: Fred Eggers. Collectors: George Borst, R. E. Nelson, Cliff Henry, and Arnold Knecht.
Classification: Typic Durixeralf, fine-loamy, mixed, thermic.
Vegetation: Fallow. This field has been in irrigated rotation many years. Precipitation: 12 inches. Parent Material: Granitic alluvial. Physiography: Lower end of alluvial fan. Probably occasionally flooded. Elevation: 1440 feet. Drainage: Well drained.

HORIZON		DESCRIPTION
S57Calif-33-11-1 Ap	0-10"	Brown (10YR 5/3 dry, dark brown 3/3 moist) coarse sandy loam; moderately defined medium subangular blocky breaking to weakly defined fine granular; hard when dry, friable when moist; nonsticky and nonplastic when wet; moderately rapid permeability; many roots; many fine pores; pH 5.5; noncalcareous; abrupt smooth lower boundary.
S57Calif-33-11-2 A3	10-16"	Dark brown (10YR 4/3 dry, dark brown 7.5YR 3/4 moist) sandy loam; moderately defined medium angular blocky breaking to weakly defined fine granular; hard when dry, friable when moist; nonsticky and slightly plastic when wet; moderately rapid permeability; many plant roots; many fine pores; pH 6.5; noncalcareous; gradual smooth lower boundary.
S57Calif-33-11-3 B21	16-25"	Brown to dark brown (7.5YR 5/4-4/4 dry, dark brown 3/2 moist) sandy clay loam; strongly defined medium angular blocky; very hard when dry, firm when moist; slightly sticky and plastic when wet; moderate permeability; occasional roots; many pores; pH 7.5; noncalcareous; weak discontinuous clay skins; gradual smooth lower boundary.
S57Calif-33-11-4 B22	25-30"	Brown (7.5YR 5/4 dry, dark brown 3/2 moist) sandy clay loam; strongly defined medium angular blocky; very hard when dry, firm when moist; sticky and plastic when wet; moderately slow permeability; occasional roots; many pores; pH 7.5; noncalcareous; weak discontinuous clay skins; manganese stainings; slight mottling just above contact; abrupt wavy lower boundary.
S57Calif-33-11-5 B3cam	30-37"	Brown (7.5YR 5/4 dry, dark brown 3/2 moist) sandy clay loam; massive, strongly cemented with lime in seams; extremely hard when dry, extremely firm when moist; slightly sticky and slightly plastic when wet; few roots; many pores; pH 8.2; strong effervescence in seams; moderately strong discontinuous clay skins; gradual wavy lower boundary.
S57Calif-33-11-6 Cm1	37-50"	Brown (7.5YR 5/4 dry, dark brown 3/2 moist) sandy clay loam; massive; weakly cemented; very hard when dry, very firm when moist; slightly sticky and plastic when wet; no roots; many pores; pH 7.5; slight effervescence in seams; diffuse irregular lower boundary.
S57Calif-33-11-7 Cm2	50-60"+	Brown (7.5 YR 5/4 dry, dark brown 3/4 moist) coarse sandy clay loam; massive, weakly cemented; very hard when dry, very firm when moist; slightly sticky and plastic when wet; no roots; many pores; pH 7.5; weak effervescence in seams.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Durixeralf, fine-loamy, mixed, thermic

SOIL Monserate loam SOIL Nos. S4557-9 LOCATION Tehama County, California

SOIL SURVEY LABORATORY LAB. Nos.

Depth (in.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Size class and particle diameter (mm) Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt (0.05–0.02)	Silt: Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)			Coarse fragments ≥ 2 Pct.	Coarse fragments 2 – 19 Pct. of < 76mm	Coarse fragments 19–76 Pct. of < 76mm
		Pct. of < 2 mm																
0-6½	Ap	45.1	45.7	9.2	7.5	7.4	4.5	9.2	16.5	23.9	21.8		28.6					
6½-17	A11	43.6	45.6	10.8	6.8	6.6	4.3	8.9	17.0	24.2	21.4		26.6					
17-25	A12	41.6	46.9	11.5	7.0	6.2	4.0	8.3	16.1	24.0	22.9		25.5					
25-31½	B21t	38.3	42.1	19.6	8.5	6.0	3.4	6.8	13.6	20.0	22.1		24.7					
31½-37	B22t	53.4	24.2	22.4	19.5	14.9	5.5	7.4	6.1	11.1	13.1		47.3					
37-38	C1m																	
38-40	C2m																	

Depth (In.)	6A1a Organic carbon Pct	6B1a Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct.		Bulk density g/cc		g/cc		Water content Pct.	Pct.	Pct.			pH	8C1a (1:1)
0-6½	0.38	0.045															5.5
6½-17	0.12	0.026															5.5
17-25	0.09	0.024															5.9
25-31½	0.05	0.022															6.6
31½-37	0.04	0.018															
37-38																	
38-40																	

Depth (in.)	Extractable bases Ca 6N2b	Mg 6O2b	Na 1/	5B1a K 2/	Sum of bases	6H2a Ext. Acidity	5A3a CEC Sum									Base saturation 5C3 Sum Pct.	
	meq/100 g															Pct.	
0-6½	1.6	0.6	0.03	0.32	2.5	2.7	5.2									49	
6½-17	1.8	1.1	0.02	0.16	3.1	2.3	5.4									57	
17-25	2.0	2.3	0.03	0.10	4.4	2.1	6.5									68	
25-31½	2.9	5.3	0.27	0.05	8.5	2.2	10.7									80	
31½-37	3.6	7.2	0.59	0.18	11.6	3.2	14.8									78	
37-38																	
38-40																	

Depth (In.)					

1/ Gravimetrically as sodium uranyl magnesium acetate

2/ Precipitated as potassium sodium cobaltinitrite and titrated as potassium permanganate

MONSERATE LOAM
84557-9

Location: Tehama County, California, 0.13 mile south and 0.03 mile west of bench mark 307 in NE¼ NW¼ Sec. 29, T25N, R3W MDB&M. Date of Sampling: April 4, 1945.

Description by: R. C. Roberts and R. A. Gardner. Collectors: R. C. Roberts, F. O. Youngs, R. A. Gardner, L. T. Alexander, H. Jenny and R. E. Storie.

Classification: Typic Durixeralf, fine-loamy, mixed, thermic.

Vegetation: Used as sheep pasture. Short annual grasses and associated herbaceous plants. Climate: Average annual precipitation is 20 inches. Average annual temperature is 62°F., average January temperature is 45°F., and average July temperature is 82°F. Parent Material: Mixed. Topography: Nearly level to undulating old terraces of mixed valley fill materials on a general slope of about 1 percent. Elevation: 310 feet. Drainage: Well drained, very slow permeability, slow runoff. Soil Moisture: Moist to 38 inches, dry below.

Remarks: This soil profile appears to be very similar to the profile of Redding gravelly loam. It has less gravel in the upper part of the profile, less clay above the hardpan, but a more indurated hardpan than Redding gravelly loam. The hardpan layer was extremely hard to excavate even with the use of a heavy pick.

HORIZON	DESCRIPTION
Ap	0 to 6.5 inches, yellowish red (5YR 5/6) light loam containing a slight amount of gravel, dark red (2.5YR 3/6) moist; weak granular structure; slightly hard, friable, slightly plastic; abundant fine roots; strongly acid (pH 5.5); distinct smooth boundary.
A11	6.5 to 17 inches, yellowish red (5YR 5/6) loam containing a slight amount of gravel, red (2.5YR 4/6) moist; weak blocky structure; consistence similar to layer above; plentiful fine roots; strongly acid (pH 5.5); distinct smooth boundary.
A12	17 to 25 inches, yellowish red (5YR 5/7) loam, red (2.5YR 4/6) moist; weak blocky structure; hard, friable, plastic; few fine roots; medium acid (pH 5.9); abrupt smooth boundary.
B21t	25 to 31.5 inches, red (2.5YR 5/6) loam containing a slight amount of gravel, red (2.5YR 4/7) moist; medium to coarse blocky structure with a tendency towards prismatic structure; compact; hard, firm, plastic; very few fine roots; neutral (pH 6.6); diffuse boundary.
B22t	31.5 to 37 inches, red gravelly sandy clay loam, color dry and moist and structure and consistence similar to layer above except weakly cemented; very few roots; medium acid (pH 6.0); about ¼ to ½ inch of lighter colored or more yellowish sandy clay loam of pH about 6.0 occurring in this boundary was not sampled; abrupt wavy boundary.
C1m	37 to 38 inches, red (10R 4/5) gravelly indurated hardpan, dusky red (10R 3/4) moist; massive; extremely hard; very few roots; medium acid (pH 6.0); diffuse boundary.
C2m	38 to 50 inches, red (10R 4/5) gravelly indurated hardpan; very similar to layer above; very few roots; slightly acid (pH 6.5).

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Monserate sandy loam **LOCATION** Riverside County, California

SOIL FAMILY: Typic Durixeralf, fine-loamy, mixed, thermic

SOIL NOS. S57Calif-33-13 **LAB. NOS.** 57542 - 57548

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0-5	A1	9.9	13.9	9.0	19.0	12.8	27.7	7.7	41.8	10.2	10	sl
5-10	A3/B1	18.6	15.5	6.7	12.4	8.5	21.4	16.9	27.8	9.5	21	cosl
10-20	B21	9.2	13.1	6.7	14.3	7.8	18.1	30.8	25.4	8.9	22	scl
20-28	B22	10.8	14.2	7.4	17.2	9.2	19.6	21.6	30.0	9.2	24	scl
28-45	Cm1	20.8	22.3	10.9	17.9	7.1	14.9	6.1	25.1	6.6	25	lcos*
45-57	Cm2	22.7	25.7	10.5	19.2	7.2	9.6	5.1	23.8	3.5	29	lcos*
57-70+	C3	77.0	4.9	1.8	2.4	0.6	8.3	5.0	6.6	3.5	29	lcos*

pH 8C1b SATURATED PASTE 1:1	pH 1:5	pH 8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	ORGANIC MATTER 6B1a NITROGEN %	ORGANIC MATTER C/N	6I1a CO_3 meq/l	8A1a Elec. Condue. mmhos/cm at 25°C	6E1b $CaCO_3$ equivalent %	6J1a HCO_3 meq/l	MOISTURE TENSIONS 4B1a 1/10 ATMOS. %	4B1a 1/3 ATMOS. %	4B2 15 ATMOS. %
6.7		6.7	0.57	0.063	9.0	0.0	0.8	0	3.5	20.3	12.1	3.8
6.7		6.4	0.29	0.032	9.1	0.0	0.4	0	1.5			5.8
6.6		6.7	0.24	0.026	9.2	0.0	0.2	0	1.6			10.2
6.9		6.8	0.12	0.015		0.0	0.5	0	1.6			7.9
7.9		7.4	0.03			0.0	0.4	Tr	2.3			4.6
7.9		7.8	0.01			0.0	0.3	Tr	2.4			3.8
7.9		7.7	0.02			0.0	0.4	Tr	2.2			3.8

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
7.3	4.3	2.2	1.8	0.3	0.7	81	0.7	1.6	3.9	1.5	1.1	26.9
9.1	5.6	2.6	2.3	0.3	0.4	79	0.6	0.3	1.5	0.9	1.0	24.2
17.8	10.9	4.8	2.6	0.5	0.3	86	1.0	0.1	1.2	0.9	0.5	33.9
18.0	11.7	4.6	1.7	0.7	0.2	91	1.9	0.1	1.7	1.2	1.5	32.1
11.0	7.2	2.5	-	0.8	0.2	100	2.2	0.1	1.1	0.6	1.0	27.5
8.9	6.4	2.1	-	0.5	0.2	100+	2.2	0.1	1.0	0.6	0.5	28.7
8.3	6.4	2.4	-	0.6	0.2	100+	2.3	0.1	1.0	0.7	0.7	27.3

1/ Percent of the whole soil

* Incompletely dispersed

MONSERATE SANDY LOAM
S57Calif-33-13

Location: 1200 feet east and 150 north of the southwest corner of Sec. 33, T. 2 S., R. 3 W. On Maxwell-Taft Ranch, about 3 miles ENE of Sunnymead, Riverside County, California. Date of Sampling: June 7, 1957.
Description by: Fred Eggers. Collectors: George Borst, R. E. Nelson, Cliff Henry, Arnold Knecht, and Fred Eggers.
Classification: Typic Durixeralf, fine-loamy, mixed, thermic.
Vegetation: California sage; wild buckwheat; salvia; turkey mullein and annual grasses. Precipitation: 12 inches. Parent Material: Granitic alluvium. Physiography: Old terrace, strongly dissected site on top of ridge about 300 feet wide. Elevation: 1870 feet. Drainage: External drainage rapid; internal very slow.

HORIZON	DESCRIPTION
S57Calif-33-13-1 A1 0-5"	Brown (7.5YR 5/4 dry, dark reddish brown 5YR 3/4 moist) sandy loam; moderately defined medium granular; slightly hard when dry, friable when moist; nonsticky and nonplastic when wet; moderately rapid permeability; many plant roots; many fine pores; pH 6.0; noncalcareous; clear smooth lower boundary.
S57Calif-33-13-2 A3 or B1 5-10"	Yellowish red (5YR 4/6 dry, dark reddish brown 2.5YR moist) loam; moderately defined medium subangular blocky with some indication of prismatic structure; hard when dry, firm when moist; slightly sticky and slightly plastic when wet; moderate permeability; occasional plant roots; many fine pores; pH 6.5; noncalcareous; clear wavy lower boundary.
S57Calif-33-13-3 B21 10-20"	Reddish brown (5YR 4/4 dry, dark reddish brown 2.5YR 3/4 moist) coarse sandy clay; strongly defined medium prismatic; extremely hard when dry, extremely firm when moist; very sticky and very plastic when wet; very slow permeability; occasional plant roots; occasional pores; pH 6.7; gradual wavy lower boundary.
S57Calif-33-13-4 B22 20-28"	Reddish brown (5YR 5/4 dry, dark reddish brown 3/4 moist) coarse sandy clay; strongly defined medium angular blocky with some indication of prismatic structure; extremely hard when dry, extremely firm when moist; very sticky and very plastic when wet; very slow permeability; occasional roots; occasional pores; pH 7.2; noncalcareous; abrupt wavy lower boundary.
S57Calif-33-13-5 Cm1 28-45"	Dark brown (10YR 4/3 dry, dark reddish brown 5 YR 3/4 moist) loamy coarse sand; massive; strongly cemented; extremely hard when dry; after crushing, loose when moist; slightly sticky and nonplastic when wet; a few roots in fissures; pH 7.7; gradual wavy lower boundary.
S57Calif-33-13-6 Cm2 45-57"	Yellowish brown (10YR 5/4 dry, dark reddish brown 5YR 3/4 moist) coarse sand; massive; weakly cemented; very hard when dry; after crushing, loose when moist; nonsticky and nonplastic when wet; few roots in fissures; pH 7.6; noncalcareous; clear wavy lower boundary.
S57Calif-33-13-7 C3 57-70"+	Yellowish brown (10YR 5/4 dry, dark reddish brown 5YR 3/4 moist) coarse sand; single grain with weakly cemented lenses; loose when dry, loose when moist; nonsticky and nonplastic when wet; very few roots; pH 7.5; noncalcareous.

Remarks: Larger than 2mm subangular blocky rock fragments throughout profile. The C horizons contain many quartz fragments which give a pepper and salt appearance.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Durixeralf, fine-loamy, mixed, thermic
SOIL Monserate loam SOIL Nos. S66Calif-37-1 LOCATION San Diego County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 66233 - 66235

Depth (In)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)			1/ Coarse fragments 1A2a: > 2	2 – 19	19 – 76	
		Pct. of < 2 mm														Pct.	Pct. of < 76mm		
0- 2	A11	49.6	35.4	15.0	2.3	13.7	16.5	12.2	4.9	16.7	18.7	26.3	44.7	0	15	13	9	4	2/
2-15	A12	46.8	34.9	18.3	1.8	11.5	15.4	12.7	5.4	15.5	19.4	26.5	41.4	0	18	12	9	3	2/
15-33	B1	46.1	32.9	21.0	2.4	11.8	15.0	11.7	5.2	14.4	18.5	24.7	40.9	0	21	12	8	4	2/

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$		Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven dry		3B2 Cm	Water content	4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH: 8C1a H_2O 1:1		
	Pct	Pct.		Pct.	Pct.		g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.	in./in.			
0- 2	2.01						1.66	1.73		0.91		13.3	6.4	0.013	0.011	5.6		
2-15	0.85						1.51	1.58		0.93		12.4	6.5	0.016	0.015	5.3		
15-33	0.56						1.60	1.67		0.92		13.5	7.6	0.015	0.014	4.4		

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	5A3a Sum	6G1d KCl Ext. Al^{+++}	Base saturation: 5C3 Sum	5C1 NH_4OAc
	meq/100 g									Pct.	Pct.
0- 2	5.8	3.3	0.5	1.0	10.6	5.5	12.3	16.1	-	66	86
2-15	5.8	3.8	0.5	0.3	10.4	4.2	11.5	14.6	0.1	71	90
15-33	4.6	3.9	0.8	0.3	9.6	6.4	12.0	16.0	0.8	60	80

Depth (In.)	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Mica	Kaolin
	X-ray			

1/ From characterization sample (5Kg)(except as noted).
2/ 2-19 mm. from characterization sample, 19-76 mm. from field weight (>50 Kg).

MONSERATE LOAM
S66Calif-37-1

Location: San Diego County, California; Miramar Transect No. 1, station 23.8; 950 feet west and 750 feet north of the southeast corner of section 24, T. 15 S., R. 3 W. Date of sampling: June 10, 1966.
Description by: George Borst, David Estrada, Gerald Kester, Reuben Nelson, and Dennis Nettleton. Samples collected by: Klaus Flach, Benny Brasher, and Dennis Nettleton.
Classification: Typic Durixeralf; fine loamy, mixed, thermic family.
Vegetation: Sparse chamise and flattop buckwheat. Climate: Weather record for San Diego, near the sampling site, is mean winter air temperature 55° F., mean summer air temperature 68° F., mean annual precipitation 10 inches. Parent Material: Stream deposit over Pleistocene marine terrace. Topography: Flat marine terrace of less than 1 percent slope. Elevation: About 425 to 450 feet. Drainage: Moderately well drained; runoff is medium; permeability is very slow. Soil Moisture: Dry.
Remarks: 15 percent rounded gravel throughout the profile.

HORIZON	DESCRIPTION
A11 RSL No. 66233	0 to 2 inches, reddish brown (5YR 5/4) loam, reddish brown (5YR 4/4) when moist; massive; slightly hard, friable, slightly sticky and plastic; abundant very fine roots; few very fine tubular pores; medium acid (pH 6.0); abrupt smooth boundary.
A12 RSL No. 66234	2 to 15 inches, reddish brown (5YR 5/4) loam, dark reddish brown (2.5YR 3/4) when moist; massive; hard, firm, sticky, very plastic; few fine to medium roots; many fine tubular pores; strongly acid (pH 5.5); many animal burrows and krotovinas, some approximately 3 inches in diameter are probably pocket gopher burrows, other approximately 3/8 inch in diameter are probably insect burrows; gradual wavy boundary.
B1 RSL No. 66235	15 to 33 inches, reddish brown (5YR 5/4) clay loam, dark reddish brown (2.5YR 3/4) when moist; massive; hard, firm, very sticky, very plastic; few fine roots mostly in krotovinas; many fine tubular pores; very strongly acid (pH 4.5); common krotovinas filled with weakly granular material resembling the surface horizon; clear wavy boundary.
B2t	33 to 35 inches, reddish brown (2.5YR 5/4) heavy clay loam, dark reddish brown (2.5YR 3/4) when moist; weak medium angular blocky structure; hard, firm, very sticky, very plastic; few fine roots; many fine tubular pores; common medium clay films line tubular pores; very strongly acid (pH 4.5); very abrupt wavy boundary.
B3sim	35 inches +, grayish brown (10YR 5/2) duripan, brown to dark brown (10YR 4/2) when moist; dusky red (10R 3/3) coatings of iron oxide on fracture planes over thin, noneffervescent white coatings, probably silica.

CONSECUTIVE PEDON NUMBER C 69 18 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES MONSERATE TAXADJUNCT SOIL NO. S69 CALI. 31-10 SAMPLE NO. 9 84-9 90 PLACER COUNTY AREA

SOIL FAMILY TYPIC DURIXERALF FINE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SAMPLE NO.		DEPTH CM.	HORZ.	SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION 2- .05	SILT .05- .002	CLAY LT .002	SANDS VCS 2-1	CS 1- .5	MS .5- .25	FS .25- .10	VFS .1- .05	CSI .05- .02	FSI .02- .002	SILTS CO. 2- .2U	CLAYS FINE .2U LT	CARBO NATE 3A1A.02	1A2A INT. COARSE FRAGMENTS OF WHOLE 20	PCT. I 75-	II 20-5	III 5-2
				PERCENT OF LESS THAN 2MM													SOIL	PCT. OF LT 75		
9	84	0- 24	AP	65.0	26.4	8.6	11.1	14.0	9.3	19.7	10.9	13.2	13.2				35.0	--A	--	--	--
9	85	24- 46	A12	59.7	28.9	11.4	4.8	10.9	8.7	21.4	13.9	14.9	14.0				41.5	--A	--	--	--
9	86	46- 60	A3	60.9	28.4	10.7	7.7	13.3	8.9	19.8	11.2	15.1	13.3				37.6	--A	--	--	--
9	87	60- 80	B2 T	53.0	21.5	25.5	6.6	10.1	8.0	18.9	9.4	10.2	11.3				30.4	--A	--	--	--
9	88	80- 92	B3 T	57.8	15.1	27.1	8.7	13.1	10.2	18.6	7.2	6.7	8.4				22.8	--A	--	--	--
9	89	92-105	C1 SM	72.5	16.8	10.7	9.5	30.1	14.1	12.9	5.9	7.3	9.5				19.0	--G	--	--	--
9	90	105-135	2C 2SM	36.6	44.6	18.8	3.4	4.6	3.8	14.0	10.8	16.6	28.0				36.2	--G	--	--	--

SAMPLE NO.		DEPTH CM.	ORG. CARBON 6A1A -PERCENT-	NITROGEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	19-2 6E1B	EXT. IRON FE 6C2B PCT.	ATTERBERG L L 4F2 PCT.	P L 4F1	L I M I T NO.40	BULK DENSITY EST 1/3 BAR 4A1F GRAMS	1/3 BAR 4A1F	DRY 4AH PER CC	CM 3B2	WATER CONTENT 1/10 BAR 4B1C -PERCENT-	1/3 BAR 4B1C	15 BAR 4B2	EXTENSBLTY LEF 4D1 -PERCENT-	LE 4D1	PH H2O 1/1 8C1A	H2O 1/10 8C1A	CACL2 8C1E
9	84	0- 24	0.47	0.042							1.60			1.00			3.6			5.9		5.3
9	85	24- 46	0.20	0.021								1.69	1.76	1.00		11.7	4.2	1.4	1.4	6.0		5.4
9	86	46- 60	0.13								1.68			1.00			4.6			6.0		5.3
9	87	60- 80	0.16									1.66	1.96	1.00		19.7	11.4	5.7	5.7	6.5		5.9
9	88	80- 92									1.67			1.00			11.2			7.0		6.4
9	89	92-105				1					1.35			1.00			9.6			7.7		7.1
9	90	105-135									1.35			1.00			13.5			7.5		7.1

SAMPLE NO.		DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6Q2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	BASE SAT. PCT.	C E C NA- OAC 5A2A -MEQ/100G	NH4- OAC 5A6A	WATER EXTRACT FROM SATURATED PASTE 8A1 EC 8A1A MMHO	CA 6N1B	MG 6Q1B	NA 6P1A	K 6Q1A -MEQ/1000 ML	CO3 6I1A	HCO3 6J1A	CL 6K1A	SO4 6L1B	B 6T1A PPM	PH SAT. PASTE 8C1B
9	84	0- 24	4.0	1.7	0.1	0.2	6.0	95		6.3											
9	85	24- 46	4.4	2.6	0.1	0.1	7.2	100+		7.1											
9	86	46- 60	4.2	2.2	0.2	0.1	6.7	96		7.0											
9	87	60- 80	9.8	6.4	0.7	0.2	17.1	98		17.5											
9	88	80- 92	10.9	8.3	0.9	0.2	20.3	100+		18.4											
9	89	92-105	16.5	7.6	1.1	0.2	25.4	100+		19.3	0.86										
9	90	105-135	16.3	9.9	1.3	0.3	27.8	100+		26.4											

SAMPLE NO.		DEPTH CM.	WATER EXCHANGBLE AT SAT. 8A PCT.	NA 5B4B MEQ.	NA 5D2 PCT.	SAR 5E	GYPSUM AMT. REQ. 6F1B 6P3A PERCENT	CLAY MINERALOGY LESS THAN 0.002 MM X RAY DTA 7A2E I	7A2E II	7A2E III	7A2E IV	7A3 PCT.	L.T. .0002 MM X RAY 7A2E I	7A2E II	7A2E III	MINERAL CODE	RELATIVE AMOUNT
9	84	0- 24		0.1	2			MI 3	KK 3							MI MICA	1 TRACE
9	85	24- 46		0.1	1			MT 3	KK 3	MI 2						KK KAOLINIT	2 SMALL
9	86	46- 60		0.2	3											MT MONTMORT	3 MODERATE
9	87	60- 80		0.7	4			MI 3	KK 3	MT 2							4 ABUNDANT
9	88	80- 92		0.9	5												5 DOMINANT
9	89	92-105		1.1	6												6 INDETER.
9	90	105-135		1.3	5												

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
G=GROUND WHOLE. HORIZON INDURATED OR GRAVEL TOO SOFT TO BE SEPARATED. ALL DATA FOR WHOLE SOIL.

MONSERATE LOAM (TAXADJUNCT) 1/
S69Calif-31-10

Location: Placer County, California. Approximately 3.5 miles southwest of Lincoln, 300 yards west of California 65 and 150 feet north of Pleasant Grove Road; 1,500 feet west and 150 feet north of the SE corner of sec. 33, T. 12 N., R. 6 E. Pit located approximately 100 feet from Trigo site (S69Calif-31-11). Date of Sampling: May 7, 1969.
Description by: G. M. Kennedy, C. B. Goudey. Collectors: K. W. Flach, W. D. Nettleton, G. M. Kennedy, L. A. Brittan, T. M. Ryan.
Classification: Typic Durixeralf, fine-loamy, mixed, thermic. *
Vegetation: Rose clover, soft chess, ripgut brome, and filaree. Climate: Average annual rainfall 17 to 32 inches. Mean annual air temperature 61°F. Parent Material: Surficial sediments deposited over Laguna Formation. Topography: Undulating terrace slope of 4 percent on southeast aspect. Elevation: 120 feet. Drainage: Moderately well drained; slow to medium runoff; very slow permeability. Soil Moisture: Dry on surface and moist below 12 inches.
Remarks: Texture of A12 horizon feels slightly finer than Ap horizon above. Roots matting out on top of C1sim horizon. Top of IIC1sim has a thin (1/8 to 1/4") silica cementation.
*Varies slightly from range of series as now defined.

HORIZON	DESCRIPTION
	(0-24 cm.)
Ap RSL 6984	0 to 9½ inches, grayish brown (10YR 5/2) loam, dark brown (10YR 3/3) moist; massive; hard, friable, slightly sticky, slightly plastic; common very fine vertical roots; common very fine tubular pores; medium acid; (pH 6.0); clear wavy boundary.
	(24-46 cm.)
A12 RSL 6985	9½ to 18 inches, brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; massive; hard, friable, slightly sticky, slightly plastic; common very fine vertical roots; common very fine and fine tubular pores; medium acid (pH 6.0); clear wavy boundary.
	(46-60 cm.)
A3 RSL 6986	18 to 23½ inches, light brownish gray (10YR 6/2) sandy clay loam, dark brown (10YR 4/3) moist; massive; hard, friable, slightly sticky, slightly plastic; few very fine random roots; common very fine tubular and interstitial pores; medium acid (pH 6.0); abrupt wavy boundary.
	(60-80 cm.)
B2t RSL 6987	23½ to 31½ inches, **brown (10YR 5/3)** sandy clay; very dark grayish brown (10YR 3/2) moist; weak coarse prismatic parting to moderate coarse angular blocky structure; very hard, firm, sticky, plastic; very few very fine random roots; few very fine interstitial pores; common thin clay films on faces of peds and bridging mineral grains; slightly acid (pH 6.2); clear wavy boundary.
	(80-92 cm.)
B3t RSL 6988	31½ to 36 inches, **brown (10YR 5/3)** sandy clay loam, dark grayish brown (10YR 4/2) moist; weak coarse angular blocky structure; very hard, firm, sticky, slightly plastic; very few very fine random roots; few very fine interstitial pores; common thin clay films on faces of peds and bridging mineral grains; slightly acid (pH 6.5); abrupt smooth boundary.
	(92-105 cm.)
C1sim RSL 6989	36 to 42 inches, light yellowish brown (10YR 6/4) strongly cemented silty material, brown (10YR 5/3) moist; common medium distinct yellowish brown (10YR 5/6) mottles; massive; extremely hard, very firm, brittle; abrupt smooth boundary.
	(105-135 cm.)
IIC2sim RSL 6990	42 to 53 inches, siltstone.

1/ The Monserate series is in a fine-loamy, mixed, thermic family of Typic Durixeralfs. This pedon is in the same family but has more silt than is typical of the series.

CONSECUTIVE PEDON NUMBER C 69 25 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES SAN JOAQUIN TAXADJUNCT SOIL NO. S69 CALI. 31-20 SAMPLE NO. 9 115-9 122 PLACER COUNTY AREA

SOIL FAMILY TYPIC DURIXERALF FINE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION <2 MM	SAND 2-.05	SILT .05-.002	CLAY LT .002	VCS 2-1	CS 1-.5	MS .5-.25	FS .25-.10	VFS .1-.05	CSI .05-.02	FSI .02-.002	CO. CLAY 2-.2U	FINE CLAY LT .2U	CARBONATE CLAY	INT. II .2-.02	COARSE FRAGMENTS- PCT. OF WHOLE SOIL 3A1A	I 75-20 PCT. OF	II 20-5 LT 75	III 5-2
				PERCENT OF LESS THAN 2MM																	
9 115	0- 28	AP	52.4	38.2	9.4		6.3	10.8	6.8	15.6	12.9	19.9	18.3	6.5	2.9		42.2	--A	--	--	--
9 116	28- 38	B11T	48.9	37.4	13.7		6.1	9.8	6.5	14.5	12.0	19.8	17.6	8.9	4.8		40.5	--A	--	--	--
9 117	38- 51	B12T	45.6	37.3	17.1		4.5	8.4	5.9	14.5	12.3	19.0	18.3	8.1	9.0		40.1	--A	--	--	--
9 118	51- 79	2B2 T	24.7	32.3	43.0		0.7	2.7	2.5	9.8	9.0	12.8	19.5	17.2	25.8		28.2	--A	--	--	--
9 119	79- 94	2B31T	33.6	66.2	26.1	7.7	10.9	16.3	9.6	19.1	10.3	12.1	14.0				33.3	--G	--	--	--
9 120	94-115	2B32T	33.9	59.0	40.8	10.2	2.6	9.6	7.9	17.6	11.3	17.0	23.8				38.4	--G	--	--	--
9 121	115-155	2B33T	33.1	31.2	51.6	17.2	1.9	4.9	4.4	10.7	9.3	16.5	35.1				31.9	--G	--	--	--
9 122	155-190	2C SI	31.9	50.4	17.7		2.0	5.2	4.7	10.9	9.1	16.5	33.9				32.0	--A	--	--	--

SAMPLE NO.	DEPTH CM.	ORG.MATTER CARBON 6A1A -PERCENT--	NITROGEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	19-2 6E1B	EXT. IRON FE 6C2B PCT.	ATTERBERG L L 4F2 PCT.	P L 4F1 NO.40	BULK DENSITY EST 1/3 BAR 4A1F GRAMS	1/3 BAR 4A1F PER	DRY 4AH CC	CM 3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C ----PERCENT----	15 BAR 4B2	EXTENSBLTY LEF 4D1 -PERCENT--	LE 4D1	PH H2O 1/1 8C1A	H2O 1/10 8C1A	CACL2 8C1E
9 115	0- 28	0.30	0.032			1.0			1.79	1.81	1.00		12.7	4.4		0.4	0.4	5.6		5.0
9 116	28- 38	0.16				1.4			1.70	1.75	1.00		13.3	5.5		1.0	1.0	5.8		5.2
9 117	38- 51	0.13				1.6			1.73	1.81	1.00		14.3	6.9		1.5	1.5	6.1		5.5
9 118	51- 79					2.0			1.62	1.97	1.00		20.4	17.4		6.7	6.7	6.7		6.3
9 119	79- 94					1.4			1.90	1.97	1.00		13.4	12.1		1.2	1.2	7.3		6.6
9 120	94-115					1.0			1.90	1.99	1.00		14.0	11.0		1.6	1.6	7.6		6.6
9 121	115-155					0.9			1.80	1.91	1.00		15.9	12.6		2.0	2.0	7.7		7.3
9 122	155-190					1.0			1.80	1.91	1.00		15.8	14.0		2.0	2.0	7.8		7.2

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6Q2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	BASE SAT. PCT.	C E C NA- OAC 5A2A	NH4- OAC 5A6A -MEQ/100G	EC 8A1A MMHO	WATER EXTRACT FROM SATURATED PASTE CA 6N1B	MG 6Q1B	NA 6P1A	K 6Q1A	CO3 6I1A	HCO3 6J1A	CL 6K1A	SO4 6L1B	8A1 B 6T1A PPM	PH SAT. PASTE 8C1B
		MEQ/100G					PCT.			MMHO	MEQ/1000 ML									
9 115	0- 28	2.9	1.1	0.1	0.1	4.2	74		5.7											
9 116	28- 38	4.0	2.0	0.1	0.1	6.2	91		6.8											
9 117	38- 51	4.6	3.1	0.1	0.1	7.9	92		8.6											
9 118	51- 79	16.5	13.4	0.5	0.3	30.7	99		31.1											
9 119	79- 94	17.9	14.4	0.6	0.2	33.1	100+		31.3											
9 120	94-115	18.1	13.0	0.5	0.2	31.8	100+		27.6											
9 121	115-155	19.3	14.3	0.5	0.3	34.4	100+		30.0											
9 122	155-190	21.2	14.8	0.6	0.3	36.9	100+		29.9											

SAMPLE NO.	DEPTH CM.	WATER AT SAT. 8A PCT.	EXCHANGBLE NA 5B4B MEQ.	NA 5D2 PCT.	SAR 5E	GYPSUM- AMT. 6F1B PERCENT	REQ. 6P3A	CLAY MINERALOGY --LESS THAN 0.002 MM--- X RAY I 7A2E	X RAY II 7A2E	X RAY III 7A2E	DTA IV 7A2E	DTA PCT. 7A3	-L.T. .0002 MM- X RAY I 7A2E	X RAY II 7A2E	X RAY III 7A2E
9 115	0- 28		0.1	2											
9 116	28- 38		0.1	1											
9 117	38- 51		0.1	1				MI 3	KK 3	MT 1					
9 118	51- 79		0.5	2											
9 119	79- 94		0.6	2											
9 120	94-115		0.5	2											
9 121	115-155		0.5	2											
9 122	155-190		0.6	2				MM 3	MT 2	MI 2	KK 2				

MINERAL CODE	RELATIVE AMOUNT
	1 TRACE
MI MICA	2 SMALL
KK KAOLINIT	3 MODERATE
MT MONTMORT	4 ABUNDANT
MM MT/MICA	5 DOMINANT
	6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
G=GROUND WHOLE. HORIZON INDURATED OR GRAVEL TOO SOFT TO BE SEPARATED. ALL DATA FOR WHOLE SOIL.

SAN JOAQUIN SANDY LOAM (TAXADJUNCT) 1/
S69Calif-31-20

Location: Placer County, California; approximately 1,250 feet west of the intersection of Fiddyment and Moore Roads; Moore Brothers property; 60 feet north of Moore Road in pasture, 60 feet north of southwest corner of sec. 19, T. 12 N., R. 6E. Date of Sampling: May 8, 1969.
Described by: L. A. Brittan, G. M. Kennedy. Collectors: K. W. Flach, W. D. Nettleton, G. M. Kennedy, T. M. Ryan, L. A. Brittan.
Classification: Typic Durixeralf, fine-loamy, mixed, thermic.
Vegetation: Ripgut brome, rose clover, soft chess, bur clover, foxtail fescue. Climate: Average annual precipitation 22 inches. Mean annual air temperature 61°F. Parent Material: Mixed granitic sediments over the Laguna Formation. Topography: Gently sloping terrace on a west slope of 2 percent. Elevation: 100 feet. Drainage: Well drained. Soil Moisture: Essentially dry to 31 inches, slightly moist below.
Remarks: Slickensides occur in the IIB2t horizon. Fragments of the IIB31tsim horizon have clay skins. The top 1 to 3 inches of the Ap horizon may have moderate medium and coarse platy structure. The IIB31tsim, the IIB32tsim, and the IIB33tsim horizons have strong medium angular blocky structure when broken. There are black manganese (Mn) stains in the IIB33sim and the IICsi horizons.

HORIZON	DESCRIPTION
	Colors are for dry soil unless otherwise indicated.
Ap RSL 69115	0-11 inches (0-28 cm.), variegated brown (7.5YR 5/4) and strong brown (7.5YR 5/6) heavy sandy loam, dark reddish brown (7.5YR 3/4) moist; massive; hard (dry), friable (moist), nonsticky and slightly plastic (wet); many very fine and common fine roots; common very fine tubular and interstitial pores; clear smooth boundary.
B11t RSL 69116	11-15 inches (28-38 cm.), strong brown (7.5YR 5/6) light loam, reddish brown (5YR 4/4) moist; massive; hard (dry), friable (moist), slightly sticky and slightly plastic (wet); common very fine roots; common very fine, fine and medium tubular pores; many thin clay skins lining pores and bridging and coating mineral grains; clear smooth boundary.
B12t RSL 69117	15-20 inches (38-51 cm.), reddish brown (5YR 4/4) loam, dark red (2.5YR 3/6) moist; massive; slightly hard (dry), friable (moist), sticky and slightly plastic (wet); few very fine roots; common very fine, fine and medium pores; many thin clay skins lining pores and bridging and coating mineral grains; abrupt smooth boundary.
IIB2t RSL 69118	20-31 inches (51-79 cm.), reddish brown (5YR 4/4 dry and moist) light clay; strong medium and coarse prismatic structure; very hard (dry), firm (moist), very sticky and very plastic (wet); very few very fine roots; few very fine tubular pores; many slickensides on ped faces; abrupt slightly wavy boundary.
IIB31tsim RSL 69119	31-37 inches (79-94 cm.), variegated light yellowish brown (10YR 6/4), light brown (7.5YR 6/4) and yellowish red (5YR 5/6) duripan; dark red (2.5YR 3/6), dark reddish brown (5YR 3/4), reddish brown (5YR 4/4) moist; massive; extremely hard (dry), extremely firm (moist), nonsticky and nonplastic (wet); gradual wavy boundary.
IIB32tsim RSL 69120	37-46 inches (94-115 cm.), variegated light yellowish brown (10YR 6/4), yellowish red (5YR 5/6), and light brown (7.5YR 6/4) duripan, dark reddish brown (5YR 3/4) moist; massive; very hard (dry), extremely firm (moist), nonsticky and nonplastic (wet); gradual wavy boundary.
IIB33tsim RSL 69121	46-61 inches (115-155 cm.), variegated light yellowish brown (10YR 6/4), yellowish red (5YR 5/6), and light brown (7.5YR 6/4) duripan, dark reddish brown (5YR 3/4) and reddish brown (5YR 4/4) moist; massive; very hard (dry), extremely firm (moist), nonsticky and nonplastic (wet); gradual wavy boundary.
IICsi RSL 69122	61-75 inches (155-190 cm.), variegated pale brown (10YR 6/3) and yellowish red (5YR 5/6 and 5/8) duripan, brown (7.5YR 4/4), dark reddish brown (5YR 3/4) and dark red (2.5YR 3/6) moist; massive; very hard (dry), very firm (moist), nonsticky and nonplastic (wet).

1/ The San Joaquin series is in a fine, kaolinitic, thermic family of Abruptic Durixeralfs. This pedon is in the Typic subgroup and has less than 35 percent clay.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Durixeralf, fine, montmorillonitic, thermic
SOIL Tusean gravelly sandy loam (taxadjunct) SOIL Nos. 84557-15 LOCATION San Diego County, California

SOIL SURVEY LABORATORY _____ LAB. Nos. _____

Depth (In.)	Horizon	3A1 Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand (2–1)	Sand (1–0.5)	Sand (0.5–0.25)	Sand (0.25–0.1)	Sand (0.1–0.05)	Silt (0.05–0.02)	Silt (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)			Coarse fragments ≥ 2 Pct.	Coarse fragments 2–19 Pct. of < 76mm	Coarse fragments 19–76 Pct. of < 76mm
		1B1b Pct. of < 2 mm																
0-3/4	A11	55.7	30.9	13.4	2.8	12.4	16.6	16.9	7.0	13.0	17.9		48.7					
3/4-4-1/4	A12	59.1	27.6	13.3	2.0	12.4	18.5	18.9	7.3	11.8	15.8		51.8					
4-1/4-7½	A13	56.4	25.8	17.8	1.9	11.0	17.7	18.5	7.3	10.5	15.3		49.1					
7½-8-3/4	B1t	54.5	24.2	21.3	0.8	9.9	17.5	19.2	7.1	9.9	14.3		47.4					
8-3/4-13-3/4	B21t	47.5	19.3	33.2	0.7	9.2	15.9	16.1	5.6	6.3	13.0		41.9					
13-3/4-18-3/4	B22t	33.5	15.7	50.8	1.2	7.2	10.5	10.4	4.2	4.7	11.0		29.3					
18-3/4-21	B23t	30.7	14.4	54.9	1.6	6.6	10.3	8.5	3.7	3.6	10.8		27.0					
21-23-3/4	B24t	36.6	10.8	52.6	1.9	9.4	14.0	8.1	3.2	3.2	7.6		33.4					
23-3/4-30	Cm																	

Depth (In.)	6A2a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct.		Bulk density g/cc	Bulk density g/cc	Bulk density g/cc		Water content Pct.	Water content Pct.	Water content Pct.			pH 8C1a (1:1)
0-3/4	8.00	0.406														6.1
3/4-4-1/4	1.29	0.085														6.4
4-1/4-7½	0.66	0.055														6.4
7½-8-3/4	0.52	0.047														6.3
8-3/4-13-3/4	0.45	0.046														6.8
13-3/4-18-3/4	0.48	0.048														5.4
18-3/4-21	0.52	0.052														4.8
21-23-3/4	0.48	0.043														4.5
23-3/4-30	0.07	0.007														5.3

Depth (In.)	Extractable bases 5B1a Ca 6H2b	Mg 6G2b	Na 1/	K 2/	Sum of bases	6H2a Ext. Acidity	5A3a CEC Sum								Base saturation 5C3 Pct.	Pct.
	meq/100 g															
0-3/4	24.6	4.6	0.16	0.64	30.0	8.9	38.9								77	
3/4-4-1/4	7.4	2.3	0.05	0.38	10.1	2.7	12.8								79	
4-1/4-7½	5.1	2.7	0.07	0.41	8.3	2.8	11.1								75	
7½-8-3/4	4.3	3.1	0.07	0.32	7.8	2.9	10.7								73	
8-3/4-13-3/4	3.9	4.6	1.24	0.55	10.3	3.0	13.3								77	
13-3/4-18-3/4	4.1	6.7	0.74	0.20	11.7	5.8	17.5								67	
18-3/4-21	6.5	13.4	1.74	0.27	21.9	7.5	29.4								75	
21-23-3/4	7.0	14.6	2.03	0.30	23.9	7.5	31.4								76	
23-3/4-30	3.9	6.7	2.12	0.08	12.8	4.5	17.3								74	

Depth (In.)

1/ Gravimetrically as sodium uranyl magnesium acetate

2/ Precipitated as potassium sodium cobaltinitrite and titrated as potassium permanganate

TUSCAN GRAVELLY SANDY LOAM (taxadjunct) 1/
S4557-15

Location: San Diego County, California, 1/3 mile south and 1/10 mile west of bench mark 417 located about 2½ miles south of Camp Kearney. Date of Sampling: April 15, 1945.

Description by: R. C. Roberts and R. A. Gardner. Collectors: R. C. Roberts, F. O. Youngs, R. A. Gardner, L. T. Alexander, H. Jenny and R. E. Storie.

Classification: Typic Durixeralf, fine, montmorillonitic, thermic.

Vegetation: Chamise brush. Climate: Average annual precipitation is about 11 inches. Average annual temperature is about 62°F., January 54°F., July 70°F. Parent Material: Mixed older alluvium. Topography: Nearly level higher terraces. Elevation: 415 feet. Drainage: Well drained, very slow permeability, slow run-off. Soil Moisture: Dry.

Remarks: This soil profile is typical of a large area of soils in southern California. The color appears to be about as red as any sample collected for this study; the boundary between the surface and subsoil is as abrupt as in any other profile sampled; the claypan is just as compact; and the layer below the claypan is just as hard or harder than any of the other soils that have indurated layers. There does not appear to be so much manganese in this soil as in samples of the other soils, but the acidity is as strong or stronger, especially in the lower part of the profile. In some areas there is a thin but distinct gray layer immediately above the claypan.

HORIZON	DESCRIPTION
A11	0 to 0.75 inch, dark reddish brown (5YR 3/3) sandy loam containing considerable fine fragments of what appears to be burned organic matter that affects color of layer, dark reddish brown (5YR 2/2) moist; strong fine granular structure; soft, friable, slightly plastic; abundant roots and root remains; slightly acid (pH 6.1).
A12	0.75 to 4.25 inches, dark red (2.5YR 3/6) gravelly sandy loam, dark reddish brown (2.5YR 3/4) moist; very fine granular and fine blocky structure; slightly hard, friable, slightly plastic; slightly acid (pH 6.4).
A13	4.25 to 7.5 inches, dark red (2.5YR 3/6) gravelly heavy sandy loam, color dry and moist, structure and consistence similar to layer above; slightly acid (pH 6.4).
B1t	7.5 to 8.75 inches, dark red (2.5YR 3/6) gravelly light sandy clay loam, color dry and moist similar to layer above; granular structure; compact; hard, firm, plastic; slightly acid (pH 6.3).
B21t	8.75 to 13.75 inches, red (10R 4/6) gravelly sandy clay loam, dark red (10R 3/6) moist; blocky structure; compact; hard, firm, plastic; neutral (pH 6.8).
B22t	13.75 to 18.75 inches, red (10R 4/6) gravelly clay, color dry and moist and structure similar to layer above; very compact; very hard, very firm, very plastic; strongly acid (pH 5.4).
B23t	18.75 to 21 inches, yellowish red (5YR 4/6) gravelly clay, red (2.5YR 4/6) moist; coarse blocky to columnar structure; very compact; extremely hard, extremely firm, very plastic; very strongly acid (pH 4.8).
B24t	21 to 23.75 inches, yellowish red (5YR 4/6) gravelly clay, color dry and moist, structure and consistence similar to layer above; very strongly acid (pH 4.5).
Cm	23.75 to 30 inches, red (2.5YR 5/6) gravelly indurated hardpan, red (2.5YR 4/6) moist; extremely hard and cemented; strongly acid (pH 5.3).

1/ The Tuscan series is in a fine, montmorillonitic, thermic family of Typic Durixeralfs. This pedon has redder hues and lower pH than is typical of the Tuscan series.

CONSECUTIVE PEDON NUMBER C 69 17 CHARACTERIZATION DATA

SOIL SERIES FIDDYMENT TAXADJUNCT SOIL NO. S69 CALI. 31- 8 SAMPLE NO. 9 74-9 83 PLACER COUNTY AREA

SOIL FAMILY ABRUPTIC DURIXERALF FINE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL SAND 2-.05	FRACTION SILT .05-.002	CLAY LT .002	VCS 2-1	CS 1-.5	MS .5-.25	FS .25-.10	VFS .1-.05	CSI .05-.02	FSI .02-.002	CO. CLAY 2-.2U	FINE LT .2U	CARBONATE 3A1A	INT. II .2-.02	COARSE FRAGMENTS PCT. OF WHOLE SOIL	I 75-20 PCT.	II 20-5 OF 20	III 5-2 LT 75
			PERCENT OF LESS THAN 2MM																	
9 74	0- 23	AP	42.1	49.6	8.3	0.3	1.7	3.7	19.5	16.9	23.4	26.2				53.3	--A	--	--	--
9 75	23- 30	A3	37.3	51.5	11.2	0.2	1.8	3.4	17.1	14.8	21.4	30.1				47.3	--A	--	--	--
9 76	30- 48	B21T	31.5	41.9	26.6	0.2	1.5	2.8	14.8	12.2	17.2	24.7				39.5	--A	--	--	--
9 77	48- 63	B22T	26.5	40.0	33.5	0.1	0.9	2.1	11.5	11.9	13.3	26.7				33.0	--A	--	--	--
9 78	63- 71	B3	19.8	46.6	33.6	0.5	1.8	2.1	7.8	7.6	9.7	36.9				22.2	--A	--	--	--
9 79	71- 89	2C1 SM	46.8	39.2	14.0	6.9	14.2	8.0	12.2	5.5	6.0	33.2				18.0	--G	--	--	--
9 80	89-105	2C2 SM	35.0	51.8	13.2	0.8	7.6	7.5	11.6	7.5	10.6	41.2				24.6	--G	--	--	--
9 81	105-120	2C3 SI	41.8	49.2	9.0	0.9	6.1	7.0	12.1	15.7	20.5	28.7				43.5	--A	--	--	--
9 82	120-150	3C4	68.9	18.3	12.8	1.3	11.1	18.7	27.0	10.8	12.1	6.2				34.6	--A	--	--	--
9 83	0- 0	AP															--A	--	--	--

SAMPLE NO.	DEPTH CM.	ORG. CARBON 6A1A	MATTER NITROGEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B	19-2 6E1B	EXT. IRON FE 6C2B	ATTERBERG LIMIT LL 4F2	PL 4F1	BULK DENSITY EST 1/3 BAR 4A1F	1/3 BAR 4A1F	DRY 4AH	CM 3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2	EXTENSBLTY LEF 4D1	LE 4D1	PH H2O 1/1 8C1A	H2O 1/10 8C1A	CACL2 8C1E
		-PERCENT-		-PERCENT-		PCT.	PCT.	NO.40	GRAMS PER CC				-PERCENT-			-PERCENT-				
9 74	0- 23	0.50	0.042						1.62	1.65	1.00		16.2	4.1	0.6	0.6	5.4			4.6
9 75	23- 30	0.24	0.028						1.71	1.77	1.00		15.3	5.0	1.2	1.2	5.6			4.9
9 76	30- 48	0.24	0.034						1.62	1.88	1.00		20.4	11.4	5.1	5.1	6.0			5.3
9 77	48- 63	0.24	0.032						1.58	1.91	1.00		22.6	14.4	6.5	6.5	6.4			5.8
9 78	63- 71	0.25							1.33	1.66	1.00		32.9	18.0	7.7	7.7	6.9	7.9		6.3
9 79	71- 89								1.32	1.38	1.00		37.3	19.6	1.5	1.5	7.1	8.0		6.8
9 80	89-105								1.50	1.55	1.00		24.2	11.9	1.1	1.1	7.2	7.9		6.8
9 81	105-120								1.59	1.66	1.00		19.3	8.1	1.4	1.4	7.2	7.5		6.9
9 82	120-150								1.48	1.59	1.00		19.9	8.1	2.4	2.4	7.0	7.7		6.8
9 83	0- 0							1.48			1.00			4.3			5.5			4.8

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 602D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	BASE SAT. PCT.	C E C NA- OAC 5A2A	NH4- OAC 5A6A	EC 8A1A MMHO	WATER EXTRACT FROM SATURATED PASTE CA 6N1B	MG 6D1B	NA 6P1A	K 6Q1A	CO3 6I1A	HCO3 6J1A	CL 6K1A	SO4 6L1B	B 6T1A PPM	PH SAT. PASTE 8C1B
		MEQ/100G					PCT.	MEQ/100G		MMHO	MEQ/1000 ML									
9 74	0- 23	3.6	1.9	0.1	0.1	5.7	80		7.1											
9 75	23- 30	4.6	2.3	0.3	0.1	7.3	86		8.5											
9 76	30- 48	9.6	5.6	1.0	0.2	16.4	93		17.7											
9 77	48- 63	12.5	6.4	1.8	0.2	20.9	89		23.5	0.23										
9 78	63- 71	19.5	10.9	3.0	0.2	33.6	100+		32.3	0.90	1.1	0.9	6.7	0.1		4.3	1.5			6.4
9 79	71- 89	22.7	12.1	4.6	0.1	39.5	100+		36.1	1.50	2.3	1.9	12.3	TR		2.3	8.6			7.1
9 80	89-105	13.3	7.3	2.7	0.2	23.5	100+		22.1	2.36	5.7	4.8	16.8	0.1		2.3	18.1			7.2
9 81	105-120	9.8	5.9	2.0	0.2	17.9	100+		16.2	2.36	5.2	4.3	15.2	0.1		1.7	17.9			7.1
9 82	120-150	9.4	5.2	1.7	0.2	16.5	100+		14.6	2.26	5.7	4.5	15.0	0.1		2.4	17.1			7.0
9 83	0- 0																			

SAMPLE NO.	DEPTH CM.	WATER AT SAT. 8A PCT.	EXCHANGEABLE NA 5B4B MEQ.	NA 5D2 PCT.	SAR 5E	GYPSUM AMT. REQ. 6F1B PERCENT	6P3A	CLAY MINERALOGY <.002 MM LESS THAN 0.002 MM X RAY I 7A2E	X RAY II 7A2E	X RAY III 7A2E	DTA IV 7A2E	DTA PCT. 7A3	<.2U MM X RAY I 7A2E	X RAY II 7A2E	X RAY III 7A2E	MINERAL CODE	RELATIVE AMOUNT
9 74	0- 23		0.1	1				MI 4	KK 3							MI MICA	1 TRACE
9 75	23- 30		0.3	4												KK KAOLINIT	2 SMALL
9 76	30- 48		1.0	6				MI 4	KK 3	MT 1							3 MODERATE
9 77	48- 63		1.8	8												MT MONTMORT	4 ABUNDANT
9 78	63- 71	48.5	2.7	8	7												5 DOMINANT
9 79	71- 89	61.7	3.8	11	8												6 INDETER.
9 80	89-105	48.1	1.9	9	7												
9 81	105-120	42.3	1.4	8	7												
9 82	120-150	36.7	1.1	8	7			MT 3	MI 3	KK 3							
9 83	0- 0																

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
G=GROUND WHOLE. HORIZON INDURATED OR GRAVEL TOO SOFT TO BE SEPARATED. ALL DATA FOR WHOLE SOIL.

FIDDYMENT LOAM (TAXADJUNCT)* 1/
S69Calif-31-8

Location: Placer County, California. Approximately 3.7 miles northwest of Roseville, California. John Fiddyment ranch, 55 yards north and 185 yards east of southeast corner of sec. 30, T.10N., R.6E. Date of Sampling: October 12, 1970.
Description by: C. B. Goudey, T. M. Ryan, L. A. Brittan, G. M. Kennedy. Collectors: L. A. Brittan, C. B. Goudey, T. M. Ryan, G. M. Kennedy, W. D. Nettleton.
Classification: Abruptic Durixeralf, fine-loamy, mixed, thermic.
Vegetation: Tarweed, soft chess, wild oats, and other annual grasses (poor cover).
Climate: Average annual precipitation 17 to 22 inches. Mean annual air temperature 61°F. Parent Material: Surficial sediments deposited over Laguna Formation. Topography: Undulating terrace on a southeasterly slope of 5 percent. Elevation: 107 feet. Drainage: Moderately well drained, slow to medium runoff and very slow permeability. Soil Moisture: Dry to 12 inches, slightly moist below.
Remarks: Field has been cropped to annual grain. Poor cover of annuals. Fertility appears to be very low. Roots were dominantly matted on top of B21t horizon. Top of IIC1sim horizon has 1 mm thick discontinuous coating with matted roots above.
*The argillic horizon has slightly less clay than required of the series.

HORIZON	DESCRIPTION
	(0-23 cm.)
Ap RSL 6974	0 to 9 inches, light yellowish brown (10YR 6/4) loam, dark brown (7.5YR 4/4) moist; massive; hard, friable, slightly sticky, slightly plastic; many very fine and fine random roots; many very fine tubular and interstitial pores; strongly acid (pH 5.5); clear wavy boundary.
	(23-30 cm.)
A3 RSL 6975	9 to 12 inches, light yellowish brown (10YR 6/4) loam, dark brown (7.5YR 4/4) moist; common fine distinct yellowish brown (10YR 5/6) mottles; massive; hard, friable, sticky, slightly plastic; common very fine random roots; common very fine tubular and interstitial pores; medium acid (pH 5.6); abrupt smooth boundary.
	(30-48 cm.)
B21t RSL 6976	12 to 19 inches, brown (10YR 5/3) clay loam, dark brown (7.5YR 4/4) moist; moderate medium and coarse prismatic structure; very hard, firm, sticky, plastic; few very fine random roots; many very fine tubular pores; few thin clay films line pores and bridge mineral grains; slightly acid (pH 6.3); gradual smooth boundary.
	(48-63 cm.)
B22t RSL 6977	19 to 25 inches, yellowish brown (10YR 5/4) clay, dark brown (7.5YR 4/4) moist; moderate medium and coarse prismatic structure; very hard, firm, sticky, plastic; very few very fine random roots; common very fine tubular pores; common thin clay films line pores and bridge mineral grains and many moderately thick clay films on faces of peds; slightly acid (pH 6.5); abrupt wavy boundary.
	(63-71 cm.)
B3 RSL 6978	25 to 28 inches, yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 3/4) moist; moderate coarse prismatic structure; very hard, firm, sticky, plastic; very few very fine random roots; few very fine tubular pores; many moderately thick clay films line pores, bridge mineral grains and on faces of peds; neutral (pH 6.8); abrupt wavy boundary.
	(71-89 cm.)
IIC1sim RSL 6979	28 to 35 inches, light yellowish brown (10YR 6/4) and very pale brown (10YR 7/3) with brown (10YR 5/3) coatings on horizontal fracture plates of silty material, dark yellowish brown (10YR 3/4) and yellowish brown (10YR 5/4) moist; massive; extremely hard, extremely firm, brittle, slightly sticky, nonplastic; very few very fine tubular pores; few moderately thick clay films bridge mineral grains and on horizontal fracture planes; neutral (pH 7.0); abrupt smooth boundary.
	(89-105 cm.)
IIC2sim RSL 6980	35 to 41 inches, siltstone; massive; very hard, extremely firm, nonsticky, nonplastic; mildly alkaline (pH 7.5); clear smooth boundary.
	(105-120 cm.)
IIC3si RSL 6981	41 to 47 inches, same as IIC2sim except less firm.
	(120-150 cm.)
IIIC4 RSL 6982	47-59 inches, yellowish brown (10YR 5/4) sandy loam with a few thin (1 cm. thick) strata of pale brown (10YR 6/3) silt loam, strong brown (7.5YR 5/6) and yellowish brown (10YR 5/4) moist; hard, friable, slightly sticky, slightly plastic; some clay bridges in the sandy loam strata, a few clay skins in the silt loam strata.

1/ The Fiddyment series is in a fine, montmorillonitic, thermic family of Abruptic Durixeralfs. This pedon is in the same subgroup but has less than 35 percent clay in its control section.

CONSECUTIVE PEDON NUMBER C 69 26 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES SAN JOAQUIN TAXADJUNCT SOIL NO. S69 CALI. 31-21 SAMPLE NO. 9 123-9 130 PLACER COUNTY AREA

SOIL FAMILY ABRUPTIC DURIXERALF FINE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SAMPLE NO.	DEPTH CM.	HORZ.	SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2-.05	SILT .05-.002	CLAY LT .002	SANDS VCS 2-1	CS 1-.5	MS .5-.25	FS .25-.10	VFS .1-.05	SILTS CSI .05-.02	FSI .02-.002	CLAYS CO. 2-.2U	FINE LT .2U	CARBD NATE 3A1A	1A2A INT. 11 .2-.02	COARSE FRAGMENTS PCT. OF WHOLE SOIL	I 75-20 PCT. OF	II 20-5 LT 75	III 5-2
			PERCENT OF LESS THAN 2MM																	
9 123	0- 23	AP	49.5	39.0	11.5	1.2	5.9	11.2	21.2	10.0	19.9	19.1	6.6	4.9		40.0	--A	--	--	--
9 124	23- 33	A3	48.8	38.2	13.0	1.7	6.0	11.5	19.8	9.8	20.3	17.9				39.8	--A	--	--	--
9 125	33- 46	B21T	43.3	20.4	36.3	0.4	5.6	16.5	16.9	3.9	8.4	12.0	11.9	24.4		18.4	--A	--	--	--
9 126	46- 61	B22T	50.8	20.7	28.5	0.3	5.4	20.8	22.0	2.3	8.0	12.7				17.3	--A	--	--	--
9 127	61- 79	B31SM	62.5	21.6	15.9	0.3	7.3	29.3	21.8	3.8	7.4	14.2				17.6	--G	--	--	--
9 128	79-100	B32SM	71.7	19.4	8.9	1.6	15.4	31.5	17.6	5.6	8.2	11.2				20.1	--G	--	--	--
9 129	100-120	C 1SM	74.6	16.4	9.0	17.1	32.7	11.6	8.7	4.5	7.5	8.9				16.3	--G	--	--	--
9 130	120-170	C 2SM	44.4	48.7	6.9	6.5	9.1	3.7	9.4	15.7	24.4	24.3				46.2	--G	--	--	--

SAMPLE NO.	DEPTH CM.	ORG.MATTER CARBON 6A1A -PERCENT-	NITROGEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	2-19 6E1B	EXT. IRON FE 6C2B PCT.	ATTERBERG L L 4F2 PCT.	P L 4F1 NO.40	I M 4A1F	T 4A1F	BULK DENSITY EST 1/3 BAR 4A4H	DRY 3B2 GRAMS PER CC	CM	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2 -PERCENT-	EXTENSBLTY LEF 4D1	LE 4D1 -PERCENT-	PH H2O 1/1 8C1A	H2O 1/10 8C1A	CACL2 8C1E
9 123	0- 23	0.45	0.040			1.4					1.52	1.56	1.00		15.2	5.3	0.9	0.9	5.5		4.9
9 124	23- 33	0.30	0.033			1.5					1.62	1.69	1.00		15.5	6.3	1.4	1.4	5.6		4.9
9 125	33- 46	0.23				2.3					1.44	1.87	1.00		26.6	18.1	9.1	9.1	6.0		5.5
9 126	46- 61	0.10				2.0					1.49	1.76	1.00		24.7	15.2	5.7	5.7	6.3		5.8
9 127	61- 79					1.7					1.64	1.70	1.00		17.2	13.3	1.2	1.2	6.9		6.4
9 128	79-100					1.6					1.67	1.70	1.00		16.9	12.7	0.6	0.6	7.5		7.0
9 129	100-120					1.1					1.62	1.64	1.00		16.7	12.7	0.4	0.4	7.6		6.6
9 130	120-170					1.5					1.37	1.43	1.00		28.4	12.5	1.4	1.4	6.9		6.3

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6Q2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	BASE SAT. PCT.	C E C NA- OAC 5A2A	NH4- OAC 5A6A -MEQ/100G	EC 8A1A MMHO	WATER EXTRACT FROM SATURATED PASTE 8A1 CA	MG	NA	K	CO3	HCO3	CL	SO4	B PPM	PH SAT. PASTE 8C1B
		MEQ/100G									MEQ/1000 ML									
9 123	0- 23	4.4	2.7	0.1	0.2	7.4	80		9.2											
9 124	23- 33	4.9	3.3	0.1	0.1	8.4	79		10.7											
9 125	33- 46	15.5	13.7	0.5	0.4	30.1	100+		29.8											
9 126	46- 61	15.0	11.8	0.5	0.3	27.6	98		28.2											
9 127	61- 79	15.0	11.8	0.6	0.2	27.6	100+		27.2											
9 128	79-100	16.7	12.2	0.6	0.2	29.7	100+		26.7											
9 129	100-120	16.5	11.3	0.8	0.1	28.7	100+		26.6											
9 130	120-170	16.6	11.0	0.7	0.2	28.5	100+		27.5											

SAMPLE NO.	DEPTH CM.	WATER AT SAT. 8A PCT.	EXCHANGBLE NA 5B4B MEQ.	NA 5D2 PCT.	SAR 5E	GYPSUM AMT. 6F1B PCT.	REQ. 6P3A PCT.	CLAY MINERALOGY <.002 MM X RAY I 7A2E	X RAY II 7A2E	X RAY III 7A2E	DTA IV 7A2E	DTA PCT. 7A3	>.002 MM X RAY I 7A2E	X RAY II 7A2E	X RAY III 7A2E	MINERAL CODE	RELATIVE AMOUNT
9 123	0- 23		0.1	1													1 TRACE
9 124	23- 33		0.1	1				MI 3	KK 3							MI MICA	2 SMALL
9 125	33- 46		0.5	2				MI 3	KK 3	MT 1						KK KAOLINIT	3 MODERATE
9 126	46- 61		0.5	2												MT MONTMORT	4 ABUNDANT
9 127	61- 79		0.6	2													5 DOMINANT
9 128	79-100		0.6	2													6 INDETER.
9 129	100-120		0.8	3													
9 130	120-170		0.7	3													

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
G=GROUND WHOLE. HORIZON INDURATED OR GRAVEL TOO SOFT TO BE SEPARATED. ALL DATA FOR WHOLE SOIL.

SAN JOAQUIN LOAM (TAXADJUNCT)* 1/

S69Calif-31-21

Location: Placer County, California. West side of South Sutter Canal, Thorton ranch. 1,000 feet north of the center of sec. 23, T. 12 N., R. 5 E., 1 mile southwest of Sheridan.
Date of Sampling: May 9, 1969.
Description by: G. M. Kennedy, T. M. Ryan. Collectors: K. W. Flach, W. D. Nettleton, G. M. Kennedy, L. A. Brittan, T. M. Ryan.
Classification: Abruptic Durixeralf, fine-loamy, mixed, thermic.
Vegetation: Fallowed grain field. Climate: Average annual precipitation 25 inches. Mean annual air temperature 61°F. Parent Material: Mixed sediments over the Laguna Formation. Topography: Undulating terrace on a southwesterly slope of 3 percent. Elevation: 110 feet. Drainage: Well drained; slow runoff; very slow permeability. Soil Moisture: Profile moist below 9 inches.
Remarks: Ap and A3 horizons have about 5 percent quartzitic gravel. B32sim and C2sim horizons have thin continuous white silica sheets.
* Average clay content of the argillic horizon is somewhat lower than characteristic of series.

HORIZON	DESCRIPTION
	(0-23 cm.)
Ap	0 to 9 inches, reddish brown (5YR 4/4) loam, dark reddish brown (5YR 3/4) moist;
RSL	massive; hard, friable, slightly sticky, slightly plastic; many very fine roots;
69123	common very fine, few fine tubular pores; strongly acid (pH 5.3); abrupt smooth boundary.
	(23-33 cm.)
A3	9 to 13 inches, yellowish red (5YR 4/6) loam, dark reddish brown (5YR 3/4) moist;
RSL	moderate coarse angular blocky structure; hard, friable, sticky, plastic; common
69124	very fine roots; common very fine and fine tubular pores; few thin clay films line pores; strongly acid (pH 5.5); abrupt smooth boundary.
	(33-46 cm.)
B21t	13 to 18 inches, yellowish red (5YR 4/6) clay, reddish brown (5YR 4/4) moist; strong
RSL	medium and coarse prismatic structure; very hard, firm, sticky, very plastic; few
69125	very fine roots; common very fine tubular pores; continuous moderately thick clay films on faces of peds and lining pores; medium acid (pH 6.0); gradual smooth boundary.
	(46-61 cm.)
B22t	18 to 24 inches, variegated yellowish red (5YR 4/8) and dark reddish brown (2.5YR 3/4)
RSL	sandy clay loam, dark red (2.5YR 3/6) moist; moderate medium and coarse prismatic
69126	structure; very hard, firm, sticky, very plastic; very few very fine roots; few very fine tubular pores; many moderately thick clay films on faces of peds, lining pores, and bridging mineral grains; slightly acid (pH 6.5); abrupt wavy boundary.
	(61-79 cm.)
B31sim	24 to 31 inches, yellowish red (5YR 5/6) sandy loam, reddish brown (5YR 4/4) moist;
RSL	common distinct light brown and brown (7.5YR 6/4, 5/4) mottles; many medium distinct
69127	Mn stains; weak coarse prismatic structure; hard, firm, slightly sticky, slightly plastic; no roots; few very fine and fine interstitial pores; continuous thin clay films lining pores and bridging mineral grains, colloidal stains on mineral grains; neutral (pH 6.8); gradual wavy boundary.
	(79-100 cm.)
B32sim	31 to 40 inches, yellowish red (5YR 5/6) sandy loam, yellowish red (5YR 4/6) moist;
RSL	common medium distinct dark reddish brown (5YR 3/3, 3/2) Mn stains, many medium dis-
69128	tinct black Mn stains moist; massive; very hard, very firm, nonsticky, slightly plastic; no roots; few very fine interstitial pores; many thin clay films lining pores and bridging mineral grains; neutral (pH 7.0); abrupt wavy boundary.
	(100-120 cm.)
C1sim	40 to 48 inches, reddish yellow (7.5YR 6/6) sandy loam, yellowish red (5YR 4/6) moist;
RSL	many medium distinct dark reddish brown (5YR 3/3, 3/2) Mn stains, black moist;
69129	indurated; extremely firm, nonsticky, nonplastic; no roots; no pores; common moderately thick clay films bridging mineral grains; mildly alkaline (pH 7.5); abrupt wavy boundary.
	(120-170 cm.)
C2sim	48 to 67 inches, variegated light gray (2.5Y 7/2) and pale brown (10YR 6/3) sandy loam,
RSL	variegated yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/4) moist;
69130	indurated; extremely hard, extremely firm, nonsticky, nonplastic; no roots; no pores; few thin clay films bridging mineral grains; mildly alkaline (pH 7.6).

1/ The San Joaquin series is in a fine, kaolinitic family of Abruptic Durixeralfs. This pedon has less than 35 percent clay in its control section.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Abruptic Durixeralf, fine, illitic, thermic
SOIL Gloria loam SOIL Nos. S65Calif-27-16 LOCATION Monterey County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65456 - 65467

Depth (in.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	* Coarse fragments 1A2a >2	2 – 19	19 – 76	
		Pct. of < 2 mm														Pct.	Pct. of < 76 mm		
0-8	Ap1	54.4	31.6	14.0	7.8	14.6	8.9	14.4	8.7	17.6	14.0	33.6	45.7	0	14	10	10	0	**
8-15	A12	52.9	29.4	17.7	8.1	14.6	8.3	13.1	8.8	15.3	14.1	31.0	44.1	0	18	12	12	0	**
15-16	A2	52.9	31.8	15.3	10.3	13.8	7.6	12.5	8.7	16.9	14.9	32.2	44.2	0	15	12	12	0	**
16-23	B2t	34.6	18.5	46.9	7.6	9.4	5.2	7.6	4.8	9.9	8.6	18.8	29.8	0	47	15	15	0	**
23-32	B31sim-1 1/	78.1	15.6	6.3	15.1	24.7	13.1	16.7	8.5	8.7	6.9	25.8	69.6	0	6				***
32-41	B31sim-2 1/	72.4	20.0	7.6	21.9	20.1	9.6	13.5	7.3	10.0	10.0	24.4	65.1	0	8				***
41-57	B32sim-1 1/	68.6	21.5	9.9	17.9	19.5	8.5	14.6	8.1	9.7	11.8	25.8	60.5	0	10				***
57-68	B32sim-2 1/	65.9	21.3	12.8	16.7	18.7	9.1	13.7	7.7	11.4	9.9	26.5	58.2	0	13				***
68-69+	B32sim-3 1/																		***
0-14	B31sim 1/																		***
14-27	B32sim 1/																		***
27-80	C1 2/	72.1	13.4	14.5	19.7	15.3	9.8	19.2	8.1	6.4	7.0	24.8	64.0	0	15	33	33	0	**

Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$		Bulk density: 4A1f 1/3 bar	4A1h Oven dry		3B2 Cm	Water content:	4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH: 8C1b Saturated Paste	8C1a H_2O 1:1	8C1a H_2O 1:10
	Pct.	Pct.		Pct.	Pct.		g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.	in./in.			
0-8	0.62	0.062	10	0.8	-		1.69	1.71		0.93		10.6	4.9	0.004	0.004		5.9	
8-15	0.29	0.044	7	0.9	-		1.59	1.62		0.92		11.6	5.6	0.008	0.007		7.0	
15-16	0.16			0.9	-		1.78	1.82		0.92		11.1	4.7	0.007	0.007		7.1	
16-23	0.36			1.5	-		1.55	1.86		0.90		23.7	16.2	0.064	0.057		7.7	
23-32	0.04			1.0	tr.		1.81	1.82		0.75		11.4	7.3	0.002	0.001		9.0	
32-41	0.08			0.5	tr.		1.86	1.88		0.74		11.2	5.7	0.004	0.003		9.0	
41-57	0.12			0.4	-								5.5				8.6	
57-68	0.13			0.4	-								5.0				8.4	
68-69+					-								5.5					
0-14					-													
14-27					-													
27-80				0.4	-												4.1	

Depth (in.)	Extractable bases: 6N2a Ca	6O2a Mg	6P2a Na	5B1a 6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 8A1: 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K		6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0-8	3.1	1.7	0.3	0.5	5.6			7.0										
8-15	4.0	2.4	0.5	0.2	7.1	3.5		9.0										
15-16	3.4	2.7	0.9	0.1	7.1		10.6	7.8										
16-23	9.3	9.7	2.7	0.4	22.1		25.8	23.4										
23-32	7.5	6.5	2.2	0.3	16.5		17.6	15.4	0.5	0.5	7.6	tr.		-	3.6	2.7		0.9
32-41	6.5	6.3	2.4	0.3	15.5		16.2	14.2										
41-57	4.5	4.4	1.8	0.3	11.0		13.2	10.1										
57-68	3.3	2.8	1.3	0.2	7.6			7.4										
68-69+																		
0-14																		
14-27																		
27-80	12.0	11.4	3.8	1.2	28.4			11.4	242.0	231.7	99.0	11.0		-	0.7	66.0		44.6

Depth (in.)	8A Water at Saturation	5D2 Exchangeable Na	5B1b Exch. Na meq./100g.	Gypsum	5C1 Base Sat. NH_4OAc	Clay mineralogy (<0.002 mm.) 7A: Mont.	Verm.	Mica	Kaolin.	
	Pct.	Pct.		Pct.	Pct.	X-ray				
0-8					80					
8-15		6			79			xxx	xx	
15-16		8			91	t		xxxx	xx	
16-23		10			94	x		xxx	xx	
23-32	29.7	11	1.9		100+					
32-41		15			100+					
41-57		14			100+	xxx		xx	xx	
57-68		18			100+					
68-69+										
0-14										
14-27										
27-80	30.3	7	0.8		100+	xx		xxx	xx	

* From characterization sample (5Kg)(except as noted); use 65467 as estimate of >2 mm. material in pan horizons.

** 2-19 mm. from characterization sample, 19-76 mm. from field volume estimate.

*** >2 mm. not determined. Characterization sample ground whole.

1/ The B31sim and B32sim horizons were sub-sampled.

2/ The lower part of the profile was described and sampled in a road cut 30 yards east of the pit.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

GLORIA SANDY LOAM

S65Calif-27-16

Location: Monterey County, California, near center SE¼ NW¼ SE¼ Sec. 25, T16S, R5E, about 4 miles east of Gonzales on Gloria Road. Date of Sampling: May 22, 1965.
Described by: Lewis C. Leifer. Collectors: W. D. Nettleton, B. R. Brasher, C.J.Weisel, R. D. Waggoner, F. J. Pecarich; site selection by T. D. Cook.
Classification: Abruptic Durixeralf, fine, illitic, thermic. Noncalcic Brown (maximal).
Vegetation: Grain land with volunteer ripgut brome and barley, pastured. Climate: Precipitation is 12 inches; mean annual temperature 58°F., mean January 50°F., and mean July 65°F. Parent Material: Granitic alluvium. Topography: Smooth, slightly concave, gently sloping south slope of 5 percent. Elevation: 550 feet. Drainage: Well drained, very slowly permeable, medium runoff. Soil Moisture: Dry, wilting point or below.
Remarks: No paired profile secured. Soil units mapped as loam, but contain areas of sandy loam with varying amounts of very fine gravel.

HORIZON	DESCRIPTION
Ap RSL 65456	0 to 8 inches, brown (10YR 5/3) sandy loam, dark yellowish brown (10YR 3/4) moist; weak medium subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; plentiful very fine roots; many very fine interstitial pores; medium acid (pH 5.8); 15 percent of horizon consists of gopher holes filled with strong granular structure; gradual smooth boundary.
A1 RSL 65457	8 to 15 inches, brown (7.5YR 5/4) sandy loam, reddish brown (5YR 4/4) moist; massive; hard, very friable, sticky and plastic; plentiful very fine roots; many very fine interstitial and common very fine and fine tubular pores; slightly acid (pH 6.5); small thin blotches of A2 occur in lower part; clear smooth boundary.
A2 RSL 65458	15 to 16 inches, very pale brown (10YR 7/3) sandy loam, brown (7.5YR 5/4) moist; weak medium platy structure; hard, very friable, sticky and plastic; plentiful very fine roots; few very fine interstitial, common very fine and fine tubular pores; neutral (pH 7.0); very abrupt smooth boundary.
B2t RSL 65459	16 to 23 inches, reddish brown (5YR 4/4) moist and dry, light clay, with dark brown (7.5YR 3/2) moist and dry coatings on top and upper sides of peds, some veins and blotches of olive hues (2.5Y) in middle and lower part plus various shades of brown to reddish brown; strong coarse prismatic structure; extremely hard, very firm, very sticky and plastic; plentiful very fine roots on ped exteriors; common very fine tubular pores; continuous thin clay films and few moderately thick films on ped faces; mildly alkaline (pH 7.7); abrupt smooth boundary.
C1sim RSL 65460	23 to 32 inches, reddish brown (5YR 5/4) coarse sandy loam crushed; reddish brown (2.5YR 4/4) moist; massive; indurated, does not soften or slake upon wetting and can be chipped with hand tools with extreme difficulty; no roots; common very fine tubular pores; few moderately thick clay films in pores and continuous thin films as bridges; moderately alkaline (pH 7.9); matrix noncalcareous, very slightly calcareous with lime as filaments in some veins, in parts of the pit 1/8" lime seams occur on top of indurated pan but not in area sampled; horizon has light yellowish brown (2.5Y 6/2d, 4/2m) usually vertical veins, 1/4 to 3/4 inch thick, makes up about 5 to 10 percent of the soil mass, and appears to be silica and clay; this horizon becomes more yellow with depth; boundary indeterminate.
C2sim RSL - 65461	32 to 41 inches, same as the C1sim horizon.
C3sim RSL - 65462	41 to 57 inches, strong brown (7.5YR 5/6) coarse sandy loam crushed, crushed colors are light yellowish brown (10YR 6/4d); massive; strongly cemented, does not slake or soften upon wetting; common very fine tubular pores; this horizon examined by auger with great difficulty, contains few black Mn specks 1 to 2 mm; boundary indeterminate.
C4sim RSL - 65463	57 to 68 inches, same as the C3sim horizon.
C5sim RSL - 65464	68 to 69 inches, same as the C3sim horizon.
- RSL 65465	0 to 14 inches*, yellowish red (5YR 5/8) sandy clay loam; massive; indurated, does not soften or slake upon wetting and can be chipped with hand tools with extreme difficulty; no roots; many very fine and fine and common medium tubular pores; common moderately thick clay skins in tubular pores; gradual boundary.
- RSL 65466	14 to 27 inches, yellowish red (5YR 5/8) fine gravelly sandy loam with few fine distinct red (2.5YR 4/6) streaks; massive; indurated; no roots; common very fine tubular pores; few thin to common thick clay skins in pores; common thick, mostly horizontal seams of silica; gradual boundary.
- RSL 65467	27 to 80 inches, light yellowish brown (10YR 6/4) light gravelly sandy loam; massive; friable; few micro and few fine interstitial pores; few thin clay skins in pores and as bridges between sand grains; few horizontal and vertical seams of silica.

*The description and sampling of Gloria was continued in and below the duripan in a road cut 30 yards east of the profile pit where the lower part of the profile could be observed. Depths are measured from the top of the duripan at the road cut.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Abruptic Durixeralf, fine, mixed, thermic

SOIL Redding gravelly loam (taxadjunct) SOIL Nos. S4557-5 LOCATION Tehama County, California

SOIL SURVEY LABORATORY _____ LAB. Nos. _____

Depth (In.)	Horizon	Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05)	Total: Silt (0.05–0.002)	Total: Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	Coarse fragments: > 2 Pct	Coarse fragments: 2 – 19 Pct. of < 76mm	Coarse fragments: 19 – 76 Pct. of < 76mm
		1B1b — Pct. of < 2 mm														
0-8	A11	50.2	40.2	9.6	9.1	8.6	4.3	10.0	18.2	20.4	19.8		32.0			
8-14½	A12	50.0	39.1	10.9	8.2	7.9	4.5	10.3	19.1	19.2	19.9		30.9			
14½-19½	A13	49.1	38.7	12.2	10.1	7.5	4.3	9.7	17.5	19.2	19.5		31.6			
19½-22	B2t	25.0	19.5	55.5	6.1	4.9	2.2	4.4	7.4	8.4	11.1		17.6			
22-24½	IIC1m	60.1	13.9	26.0	28.5	15.5	4.6	6.5	5.0	3.9	10.0		60.1			
24½-35	IIC2m	54.4	19.6	26.0	25.1	13.9	4.4	5.3	5.7	4.7	14.9		48.7			

Depth (In.)	6A2a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct.		Bulk density g/cc	g/cc	g/cc		Water content Pct.	Pct.	Pct.		pH	8C1a (1:1)
0-8	0.36	0.040														5.7
8-14½	0.18	0.029														5.6
14½-19½	0.14	0.026														5.5
19½-22	0.35	0.057														5.3
22-24½	0.18	0.044														5.5
24½-35	0.05	0.021														6.8

Depth (In.)	Extractable bases: Ca 6N2b	Mg 6O2b	Na 2/	K 1/	5B1a Sum of bases	6H2a Ext. Acidity	5A3a CEC Sum								Base saturation: 5C3 Sum Pct.	Pct.
	meq/100 g															
0-8	3.2	1.3	tr	0.38	4.9	2.6	7.5								65	
8-14½	3.2	1.9	<0.01	0.25	5.3	2.6	8.0								67	
14½-19½	3.2	2.6	0.03	0.17	6.0	2.6	8.6								70	
19½-22	12.6	13.4	0.29	0.29	26.6	6.2	32.8								81	
22-24½	13.5	13.5	0.37	0.28	27.6	5.4	33.0								84	
24½-35	12.6	12.2	0.20	0.21	25.2	2.9	28.1								90	

Depth (In.)					

1/ Precipitated as potassium sodium cobaltinitrite and titrated as potassium permanganate

2/ Gravimetrically as sodium uranyl magnesium acetate

REDDING GRAVELLY LOAM (taxadjunct) 1/
84557-5

Location: Tehama County, California, 0.42 mile north of bench mark 311 located about 5 miles south of Red Bluff. Date of Sampling: April 2, 1945.
Described by: R. C. Roberts and R. A. Gardner. Collectors: R. C. Roberts, F. O. Youngs, R. A. Gardner, L. T. Alexander, H. Jenny and R. E. Storie.
Classification: Abruptic Durixeralf, fine, mixed, thermic.
Vegetation: Sparse vegetation consists of short annual grasses and associated herbaceous plants dominated by alfilaria. Climate: Average annual precipitation is 19 inches, average annual temperature is 62°F., January 45°F., and July 82°F. Parent Material: Mixed materials. Topography: Nearly level to undulating old terraces of mixed valley-fill materials on a general slope of about 1 percent. Many of the fields have numerous mounds or "hog-wallow" microrelief. Pit was dug about halfway between mound and intermound areas. Elevation: 315 feet. Drainage: Well drained, very slow permeability, slow runoff. Soil Moisture: Moist to 24 inches, dry below.
Remarks: The soil at this site is representative of many of the soils of California that occupy very old terraces with deeply entrenched drainageways. The principal characteristics of these soils are (1) Weakly developed surface-soil structure and very low organic matter content; (2) a yellowish red or reddish brown surface soil that rests abruptly on (3) a distinct claypan, which is generally redder than the layers above or below; (4) an indurated layer below the claypan; and (5) in general a decrease in acidity with depth. This profile appears to represent an advanced stage of soil development, but it appears to be normal for its relief, effective soil climate, vegetation, parent material, and age or length of time without overflow or significant increment of material.

The pit where the samples were collected, like many of the other pits examined in this study, exposed an unconformity, possibly an old rodent burrow in one corner. At the time the samples were collected, the soil material of this unconformity was saturated, whereas the adjacent soil was nearly dry or only slightly moist. The rodent burrow or unconformity was very irregular and appeared as small pits in the hardpan. Some penetrated deeper than others, and one penetrated the hardpan into the gravelly layer below.

HORIZON	DESCRIPTION
A11	0 to 8 inches, yellowish red (5YR 5/6) gravelly light loam, dark reddish brown (2.5YR 3/4) moist; weak granular structure; slightly hard, very friable, slightly plastic; plentiful fine roots; medium acid (pH 5.7); gradual boundary.
A12	8 to 14.5 inches, yellowish red (5YR 5/6) gravelly light loam, red (2.5YR 4/6) moist; weak blocky structure; slightly hard, friable, slightly plastic; plentiful fine roots but somewhat fewer than in layer above; medium acid (pH 5.6); gradual boundary.
A13	14.5 to 19.5 inches, yellowish red (5YR 5/6) gravelly light loam, color dry and moist, structure and consistence similar to layer above; plentiful fine roots; strongly acid (pH 5.5); abrupt wavy boundary.
B2t	19.5 to 22 inches, yellowish red (5YR 4/6) clay containing a slight amount of gravel, glazed surface of moist soil dark red (2.5YR 3/6), red (2.5YR 4/6) moist; strong blocky to prismatic structure; very compact; extremely hard, extremely firm, very plastic; coatings of manganese oxide present; very few roots; strongly acid (pH 5.3); abrupt wavy boundary.
IIC1m	22 to 24.5 inches, yellowish red (5YR 4/6) very gravelly indurated hardpan; color dry and moist similar to layer above; color of glazed surface, dark red (2.5YR 3/6); massive; coatings of manganese oxide present; no roots; strongly acid (pH 5.5); gradual boundary.
IIC2m	24.5 to 35 inches, yellowish red (5YR 5/6) very gravelly strongly cemented hardpan; color moist similar to layer above; massive; coatings of manganese oxide present and in general layer is harder where manganese oxide occurs; no roots; pH as determined in the field ranges from 6 where manganese oxide is present to 7 where manganese oxide is absent; pH of prepared sample is 6.8.

1/ The Redding series is in a fine, kaolinitic, thermic family of Abruptic Durixeralfs. This pedon is in the same subgroup but has mixed mineralogy.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Abruptic Durixeralf, fine, mixed, thermic
SOIL Redding loam (taxadjunct) **SOIL Nos.** S66Calif-37-2 **LOCATION** San Diego, California

SOIL SURVEY LABORATORY Riverside, California **LAB. Nos.** 66236 - 66242*

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)			1/ Coarse fragments 1A2a: > 2 Pct.	2 - 19 Pct. of < 2mm	19 - 76 Pct. of < 76mm	
		Pct. of < 2 mm																	
0- 4	A1	55.3	33.5	11.2	2.9	15.7	18.0	13.7	5.0	14.7	18.8	25.3	50.3	0	11	22	8	14	2/
4-15	A2	52.8	35.9	11.3	3.1	12.9	17.1	13.8	5.9	15.2	20.7	27.0	46.9	0	11	14	9	5	2/
15-18	B1	55.3	27.3	37.4	1.6	8.3	11.2	10.0	4.2	11.1	16.2	19.4	31.1	0	37	8	7	1	2/
18-30	B2t	24.2	15.6	60.2	1.0	6.0	7.6	6.7	2.9	6.9	8.7	12.6	21.3	0	60	6	1	2	3/
30-36	B31sim	65.3	7.1	27.6	17.4	21.8	11.9	10.9	3.3	3.8	3.3	11.7	62.0	0	28	14	3	4	3/
36-45+	B32sim	85.1	6.0	8.9	20.8	28.3	16.5	15.1	4.4	3.6	2.4	14.7	80.7	0	9	20	2	5	3/
27-41	Bm32sim	87.1	7.1	5.8	22.1	28.6	16.1	15.0	5.3	4.5	2.6	16.6	81.8	0	6	19	4	3	3/

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. Iron as Fe Pct.	6E1b Carbonate as $CaCO_3$ Pct.	Bulk density: 4A1f 1/3 bar g/cc	Bulk density: 4A1h Oven dry g/cc		3B2 Cm Pct.	Water content: 4B1c 1/3 bar Pct.	Water content: 4B2 15 bar Pct.	4D1 Extensibility COLEF in./in.	4D1 Extensibility COLE in./in.	pH: 8C1a H_2O 1:1		
0- 4	2.51					1.27	1.30		0.88	9.6	5.5	0.009	0.008	5.6		
4-15	0.63					1.65	1.68		0.91	9.8	3.7	0.006	0.006	5.5		
15-18	0.41					1.59	1.78		0.95	20.3	12.1	0.039	0.037	4.6		
18-30	0.38					1.47	1.78		0.96	26.8	20.6	0.067	0.065	4.3		
30-36	0.35					1.69	1.77		0.91	17.0	15.8	0.015	0.013	4.3		
36-45+	0.17					1.79	1.81		0.86	14.1	11.2	0.005	0.004	4.4		
27-41						1.92	1.94		0.85	11.2	8.0	0.004	0.003	4.4		

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	5A3a Sum	6G1d KCl Ext. Al^{+++}	Water extract from saturated paste 8A1: 6N1b Ca	6O1b Mg	6P1a Na	6Q1a K	6I1a CO_3	6J1a HCO_3	6K1a Cl	6L1b SO_4	8A1a Electrical conductivity
	meq/100 g									meq/liter								mmho/cm
0- 4	5.2	2.1	0.4	0.6	8.3	5.9	11.1	14.2	0.2	2.5	2.1	1.9	1.0	-	2.8	2.4		0.70
4-15	4.3	2.4	0.4	0.3	7.4	3.5	6.8	10.9	0.3	0.5	0.5	4.2	tr.	-	1.0	0.6		0.25
15-18	3.3	5.5	1.8	0.2	10.8	9.8	16.6	20.6	2.9	0.2	0.3	3.4	tr.	-	0.3	1.5		0.41
18-30	5.5	10.4	4.1	0.2	20.2	15.6	28.6	35.8	5.1	0.4	0.3	7.2	tr.	-	0.2	4.5		0.85
30-36	5.1	9.5	4.9	0.2	19.7	14.3	29.4	34.0	5.2	0.6	0.8	13.8	tr.	-	0.3	9.7		2.12
36-45+	4.7	8.3	4.9	0.2	18.1	11.7	26.6	29.8	4.3	0.6	0.9	15.9	tr.	-	0.2	12.6		1.92
27-41	3.2	5.1	4.2	0.2	12.7	9.8	19.8	22.5	3.7	1.4	2.2	25.5	tr.	-	0.1	17.8	9.5	3.00

Depth (In.)	8A Water at Saturation Pct.	5D2 Exchangeable Na Pct	Clay mineralogy (<0.002 mm.) 7A: Mont.	Verm.	Mica	Kaolin. (X-ray)	Base saturation: 5C3 Sum Pct	5C1 NH_4OAc Pct.
0- 4	31.9	0.3					58	75
4-15	16.5	0.3	t	-	xx	x	68	100+
15-18	37.3	1.6					52	65
18-30	65.2	3.7	xx	-	-	xxx	56	71
30-36	44.5	4.3	xx	-	-	xxx	58	67
36-45+	44.4	4.2					61	68
27-41	39.7	3.2	xx	-	-	x	56	64

* RSL 66242 was collected at station 39.8, or 6.8 feet from S66Calif-37-2.

1/ From characterization sample (5 kg)(except as noted).
2/ 2-19 mm. from characterization sample, 19-76 mm. from field weight (>50 kg).
3/ 2-19 mm. from characterization sample, 19-76 mm. from field weight; >2 mm. includes volume estimate of >76 mm. fraction.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

REDDING LOAM (taxadjunct) 1/
S66Calif-37-2

Location: San Diego County, California; Miramar Transect No. 1, station 33+0; 950 feet west and 750 feet north of the southeast corner of section 24, T. 15 S., R. 3 W. Date of sampling: June 10, 1966. Description by: George Borst, David Estrada, Gerald Kester, Reuben Nelson, and Dennis Nettleton. Samples collected by: Klaus Flach, Benny Brasher, and Dennis Nettleton. Classification: Abruptic Durixeralf, fine, mixed, thermic family. Vegetation: Sparse chamise and flattop buckwheat. Climate: Weather record for San Diego, near the sampling site, is mean winter air temperature 55° F., mean summer air temperature 68° F., mean annual precipitation 10 inches. Parent Material: Stream deposit over Pleistocene marine terrace. Topography: Flat marine terrace of less than 1 percent slope. Elevation: About 425 to 450 feet. Drainage: Moderately well drained; runoff is medium; permeability is very slow. Soil Moisture: Dry. Remarks: Less than 15 percent rounded gravel throughout.

HORIZON	DESCRIPTION
A1 RSL No. 66236	0 to 4 inches, yellowish brown (10YR 5/6) loam, dark yellowish brown (10YR 4/6) when moist; weak fine granular structure; slightly hard, very friable, nonsticky, nonplastic; abundant very fine roots; many very fine tubular pores; medium acid (pH 5.8); clear smooth boundary.
A2 RSL No. 66237	4 to 15 inches, light brown (7.5YR 6/4) loam, brown (7.5YR 5/4) when moist; massive; hard, friable, slightly sticky, nonplastic; plentiful very fine to medium roots; many very fine tubular pores; strongly acid (pH 5.5); clear smooth boundary.
B1 RSL No. 66238	15 to 18 inches, yellowish red (5YR 5/6) clay, yellowish red (5YR 4/6) when moist; moderate medium angular blocky structure; very hard, firm, sticky, plastic; plentiful very fine to fine roots; common very fine tubular pores; common moderately thick clay skins * on ped faces; very strongly acid (pH 4.5); very abrupt smooth boundary.
B2t RSL No. 66239	18 to 30 inches, red (2.5YR 4/6) clay, dark red (2.5YR 3/6) when moist; strong medium angular blocky structure; very hard, firm, sticky, plastic; plentiful very fine to fine roots; common very fine tubular pores; many thick clay skins * on ped faces; very strongly acid (pH 4.5); abrupt smooth boundary.
B31sim RSL No. 66240	30 to 36 inches, yellowish red (5YR 5/6) duripan, yellowish red (5YR 4/6) when moist; strong fine angular blocky structure; indurated; few fine roots on ped exteriors; few fine tubular pores; many moderately thick clay skins on ped faces; extremely acid (pH 4.2); abrupt smooth boundary.
B32sim RSL No. 66241	36 to 45 inches +, light brownish gray (2.5Y 6/2) duripan, grayish brown (2.5Y 5/2) when moist; massive; indurated; extremely acid (pH 4.0).

* Probably mostly pressure faces --- some are slickensides.

1/ The Redding series is in a fine, kaolinitic, thermic family of Abruptic Durixeralfs. This pedon is in the same subgroup, but has about equal amounts of montmorillonite and kaolinite.

CONSECUTIVE PEDON NUMBER C 69 21 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES FIDDYMENT TAXADJUNCT SOIL NO. S69 CALI. 31-13 SAMPLE NO. 9 98-9 99 PLACER COUNTY AREA

SOIL FAMILY ABRUPTIC DURIXERALF FINE,MIXED,THERMIC,SHALLOW RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION 2- .05	SILT .05- .002	CLAY LT .002	SANDS VCS 2-1	CS 1- .5	MS .5- .25	FS .25- .10	VFS .1- .05	--SILTS-- CSI .05- .02	FSI .02- .002	----CLAYS---- CO. 2- .2U	FINE LT .2U	CARBO NATE 3A1A	INT. -COARSE FRAGMENTS- II .2- .02	PCT. OF WHOLE SOIL	I 75- 20 PCT.	II 20-5 OF LT 75	III 5-2
			PERCENT OF LESS THAN 2MM																	
9 98	8- 25	A3	48.2	39.4	12.4	2.2	5.2	8.6	19.4	12.8	18.3	21.1				42.3	--A	--	--	--
9 99	26- 43	B2 T	32.3	28.6	39.1	0.9	3.7	7.1	12.3	8.3	9.0	19.6				24.2	--A	--	--	--

SAMPLE NO.	DEPTH CM.	ORG.MATTER CAR- BON 6A1A -PERCENT--	NITRO GEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B	19-2 6E1B	EXT. IRON FE 6C2B -PERCENT-	ATTERBERG LL 4F2 PCT.	PL 4F1 PCT.	BULK DENSITY EST 1/3 BAR 4A1F NO.40	1/3 BAR 4A1F GRAMS	DRY 4AH PER CC	CM 3B2	WATER CONTENT 1/10 BAR 4B1C -PERCENT---	1/3 BAR 4B1C	15 BAR 4B2	EXTENSBLTY LEF 4D1 -PERCENT-	LE 4D1	-----PH------ H2O 1/1 8C1A	H2O 1/10 8C1A	CACL2 8C1E
9 98	8- 25	0.27	0.032						1.68			1.00			5.1			5.6		4.9
9 99	26- 43	0.25							1.66			1.00			17.4			6.2		5.8

SAMPLE NO.	DEPTH CM.	----EXTRACTABLE BASES--- CA 5B4A 6N2E	MG 5B4A 6Q2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	BASE SAT. PCT.	—C E C— NA- OAC 5A2A -MEQ/100G	NH4- OAC 5A6A	EC 8A1A MMHO	-------WATER EXTRACT FROM SATURATED PASTE 8A1 ----- CA 6N1B	MG 6Q1B	NA 6P1A	K 6Q1A	CO3 6I1A -MEQ/1000 ML	HCO3 6J1A	CL 6K1A	SO4 6L1B	B 6T1A PPM	PH SAT. PASTE 8C1B
		MEQ/100G																		
9 98	8- 25	5.2	2.7	0.2	0.1	8.2	81		10.1											
9 99	26- 43	18.2	9.6	1.0	0.3	29.1	96		30.3											

SAMPLE NO.	DEPTH CM.	WATER AT SAT. 8A PCT.	EXCHANGBLE NA 5B4B MEQ.	NA 5D2 PCT.	SAR 5E	-GYPSUM- AMT. 6F1B PERCENT	REQ. 6P3A	---------- C L A Y LESS THAN 0.002 MM--- I 7A2E	II 7A2E	III 7A2E	IV 7A2E	DTA 7A3 PCT.	M I N E R A L O G Y -L.T. .0002 MM- I 7A2E	II 7A2E	III 7A2E	MINERAL CODE
								X RAY					X RAY			
9 98	8- 25		0.2	2				MI 4	KK 3	MT 1						MI MICA
9 99	26- 43		1.0	3				MI 4	MT 3	KK 3						KK KAOLINIT
																MT MONTMORT

RELATIVE AMOUNT
1 TRACE
2 SMALL
3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

FIDDYMENT LOAM (taxadjunct) 1/
S69Calif-31-13

Location: Placer County, California. Approximately 4.7 miles south of Lincoln on Highway 65 along embankment of PG&E substation; 15 feet west from Trigo pedon (S69Calif-31-11); 750 feet west and 500 feet south of NE corner of sec. 9, T. 11 N., R. 6 E. Date of Sampling: May 7, 1970.

Description by: L. A. Brittan, T. M. Ryan. Collectors: K. W. Flach, W. D. Nettleton, G. M. Kennedy, L. A. Brittan, T. M. Ryan.

Classification: Abruptic Durixeralf, fine, mixed, thermic, shallow.

Vegetation: Filaree, rose clover, soft chess, lupine, and purple vetch. Climate: Average annual rainfall 17 to 32 inches. Mean annual air temperature 61°F. Parent Material: Surficial sediments deposited over Laguna Formation. Topography: Undulating terrace slope of 2 to 9 percent on a south aspect. Elevation: 125 feet. Drainage: Moderately well drained, slow to medium runoff and very slow permeability. Soil Moisture: Slightly moist.

Remarks: Roots in B2t horizon essentially follow vertical cracks between peds. Tubular pores in IIC1sim horizon appear to be root channels. Top of IIC1sim has thin (2mm) coating of clay; also has clay bedding in planes of siltstone. Below siltstone has stratified layers of sand.

HORIZON	DESCRIPTION
Ap	(0-8 cm.) 0 to 3 inches, brown (7.5YR 5/4) loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; common very fine vertical roots; many very fine tubular and interstitial pores; medium acid (pH 6.0); clear smooth boundary.
A3 RSL 6998	(8-25 cm.) 3 to 10 inches, brown (7.5YR 5/4) loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; few very fine vertical roots; many very fine tubular and interstitial pores; medium acid (pH 5.8); abrupt wavy boundary.
B2t RSL 6999	(25-43 cm.) 10 to 17 inches, brown (10YR 5/3) clay, dark reddish brown (5YR 3/4) moist; weak medium and coarse prismatic structure; very hard, very firm, very sticky, very plastic; few very fine vertical roots; common very fine tubular pores; many moderately thick clay films line pores; neutral (pH 7.0); abrupt wavy boundary.
IIC1sim	(43-66 cm.) 17 to 26 inches, light gray (2.5Y 7/2) silty clay loam matrix with strong brown (7.5YR 5/6) stains, light olive brown (2.5Y 5/4) moist; massive; extremely hard, extremely firm, brittle, sticky, plastic; common very fine tubular pores; many moderately thick clay films in bedding planes; mildly alkaline (pH 7.8).

1/ **The Fiddyment series is in a fine, montmorillonitic, thermic family of Abruptic Durixeralfs. This pedon is in a mixed family of the same subgroup.**

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Abruptic Durixeralf, fine, montmorillonitic, thermic

SOIL Monserate sandy loam (taxadjunct) SOIL Nos. S57Calif-33-12 LOCATION Riverside County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 57534 - 57541

Depth (In)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non carbonate clay	1/ Coarse fragments 1A2a: > 2 Pct.	2 – 19 (Pct. of < 76 mm)	19 – 76 (Pct. of < 76 mm)
		Pct of < 2 mm																
0-6	Ap	51.8	39.0	9.2	8.8	11.0	6.3	12.3	13.4	25.7	13.3	46.7	38.4			18		
6-9	A1	52.5	37.3	10.2	10.7	12.2	5.9	11.6	12.1	24.2	13.1	43.3	40.4			19		
9-12	A3	49.9	31.4	18.7	11.9	11.5	5.8	10.8	9.9	18.6	12.8	35.1	40.0			28		
12-18	B21	37.0	24.1	38.9	10.6	9.1	4.0	6.8	6.5	14.1	10.0	24.6	30.5			20		
18-25	B22	36.1	25.5	38.4	9.3	8.8	4.0	7.0	7.0	14.5	11.0	25.6	29.1			17		
25-37	Cm1	62.9	30.6	6.5	11.9	18.0	8.6	13.7	10.7	17.0	13.6	35.7	52.2			19		
37-58	Cm2	56.1	32.8	11.1	15.3	13.4	5.6	11.4	10.4	17.6	15.2	35.4	45.7			21		
58-64+	Cm3	55.3	29.5	15.2	14.9	12.9	5.8	12.6	9.1	16.0	13.5	32.9	46.2			21		

Depth (In)	6A1a Organic carbon Pct	6B1a Nitrogen Pct	C/N	Ext. Iron as Fe Pct.	6B1b Carbonate as $CaCO_3$ Pct	Bulk density: 4A1f 1/3 bar g/cc	Bulk density: 4A1h Oven dry g/cc	4A3a Field moist g/cc	3B2 Cm	Water content: 4B1a 1/10 bar Pct.	Water content: 4B1a 1/3 bar Pct.	4B2 15 bar Pct	4D1 Extensibility LEf Pct	4D1 Extensibility LE Pct.	pH: 8C1b Saturated Paste	pH: 8C1a H_2O 1:1	pH: 8C1a H_2O 1:10
0-6	0.25	0.036	7		-					19.7	11.9	4.1			6.1	6.3	
6-9	0.23	0.033			-			1.54		19.1	11.8	4.1			6.1	6.2	
9-12	0.15	0.025			-							6.1			6.8	6.7	
12-18	0.27	0.037	7		-			1.85				12.1			7.1	6.7	
18-25	0.24				-							12.7			7.1	7.0	
25-37	0.01				-							7.6			7.7	7.8	
37-58	0.02				tr.							7.4			7.7	7.5	
58-64+	0.02				-							7.7			7.4	7.1	

Depth (In)	Extractable bases: 6N2b Ca 5B1a meq/100 g	Extractable bases: 6O2c Mg 5B1a meq/100 g	Extractable bases: Na meq/100 g	Extractable bases: K meq/100 g	Sum of bases meq/100 g	6H2a Ext. Acidity meq/100 g	Cation Exch Capacity: 5A2a NaOAc meq/100 g	Cation Exch Capacity: 5A6a NH_4OAc meq/100 g	Water extract from saturated paste 8A1: 6N1a Ca meq/liter	6O1a Mg meq/liter	6P1a Na meq/liter	6Q1a K meq/liter	6I1a CO_3 meq/liter	6J1a HCO_3 meq/liter	6K1a Cl meq/liter	6L1b SO_4 meq/liter	8A1a Electrical conductivity mmho/cm
0-6	3.4	2.3				2.8	7.9		3.2	1.5	1.1	0.7	-	0.9	0.6		0.7
6-9	3.7	2.2				2.2	7.9		2.2	1.4	1.3	0.3	-	0.6	1.0		0.6
9-12	5.1	3.2				2.4	10.8		3.5	2.8	3.3	0.2	-	1.3	2.7		1.1
12-18	10.3	8.7				3.4	21.9		4.5	4.1	5.9	0.1	-	1.0	7.4		1.6
18-25	12.2	10.4				2.6	24.5		3.3	2.9	5.7	0.1	-	0.9	8.9		1.4
25-37	9.9	7.9				0.6	19.7		3.6	3.1	9.3	0.1	-	2.3	10.5		1.8
37-58	8.8	7.8				0.7	16.9		5.5	5.1	13.3	0.1	-	1.6	18.5		2.3
58-64+	8.9	10.5				1.4	18.0		6.5	6.0	15.2	0.1	-	1.1	22.3		3.0

Depth (In)	8A Water at Saturation Pct	Exch. bases: 5B3b Ca meq./100 g.	Exch. bases: 5B1b 6Q2a K meq./100 g.	Exch. bases: 5B1b 6P2a Na meq./100 g.	5D2 Exchangeable Na Pct.	5C3 Base Sat. Pct.	Gypsum Pct.	Clay mineralogy (<0.002 mm) 3A1: Mont.	Verm.	Mica 7A2 X-ray	Kaolin.
0-6	20.6		0.5	0.6		71		tr.		xxx	x
6-9	22.5		0.5	0.3		75					
9-12	22.6		0.3	0.3		79					
12-18	42.8		0.3	1.5		86		xxx		tr.	xx
18-25	48.5		0.4	1.2		90					
25-37	30.5		0.2	1.5		97					
37-58	28.7		0.2	2.0		96					
58-64+	31.1		0.3	1.9		94					

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

MONSERATE SANDY LOAM (taxadjunct) 1/
S57Calif-33-12

Location: 1400 feet east and 400 feet north of the southwest corner of Sec. 36, T. 2 S., R. 4 W. On the Langdon Maxwell Ranch, about 1 mile north of Sunnymead, Riverside County, California. Date of Sampling: June 6, 1957.
Described by: Fred Eggers. Collectors: George Borst, R. E. Nelson, Cliff Henry, Arnold Knecht, and Fred Eggers.
Classification: Abruptic Durixeralf, fine, montmorillonitic, thermic.
Vegetation: Fallow. In dry farmed grain fallow rotation. Precipitation: 12 inches. Parent Material: Granitic alluvium. Physiography: Old terrace, thoroughly dissected. The site is near the top of a terrace remnant that has the appearance of a low rounded hill. Elevation: 1690 feet. Drainage: External drainge is rapid; internal drainage is very slow.
Remarks: Coarse quartz fragments throughout profile, especially prominent in A3 horizon.

HORIZON		DESCRIPTION
S57Calif-33-12-1 Ap	0-6"	Brown (7.5 YR 5/4 dry; dark brown 4/4 moist) sandy loam; weakly defined subangular blocky breaking to weakly defined fine granular; slightly hard when dry, friable when moist; nonsticky and slightly plastic when wet; moderately rapid permeability; many plant roots; many fine pores; pH 6.0; noncalcareous; clear smooth lower boundary.
S57Calif-33-12-2 A1	6-9"	Brown (7.5YR 5/4 dry, dark brown 4/4 moist) sandy loam; moderately defined medium subangular blocky breaking to weakly defined fine granular; slightly hard when dry, friable when moist; nonsticky and slightly plastic when wet; moderately rapid permeability; many plant roots; many fine pores; pH 6.2; a definite cultivation pan; gradual wavy lower boundary.
S57Calif-33-12-3 A3	9-12"	Light brown (7.5YR 6/4 dry, reddish brown 5YR 4/4 moist) sandy clay loam; moderately defined fine granular; hard when dry, firm when moist; sticky and plastic when wet; moderately slow permeability; occasional roots; many fine pores; pH 6.5; very weak discontinuous clay skins; abrupt smooth lower boundary.
S57Calif-33-12-4 B21	12-18"	Reddish brown (2.5YR 4/4 dry, dark red 3/6 moist) sandy clay; strongly defined medium prismatic; very hard when dry, very firm when moist; sticky and very plastic when wet; very slowly permeable; occasional roots; many pores; prominent clay skins; pH 7.0; gradual smooth lower boundary.
S57Calif-33-12-5 B22	18-25"	Reddish brown (2.5YR 4/4 dry, dark red 3/6 moist) sandy clay; strongly defined medium prismatic; very hard when dry, very firm when moist; sticky and very plastic when wet; occasional roots; many pores; prominent clay skins; pH 7.8; yellowish mottling just above contact too thin to sample; abrupt smooth lower boundary.
S57Calif-33-12-6 Cm1	25-37"	Reddish brown (5YR 4/4 dry; dark reddish brown 3/4 moist) loamy coarse sand; massive; indurated; extremely hard when dry, after crushing very friable when moist; nonsticky and nonplastic when wet; no roots; fragmentary clay skins; pH 8.0; slight effervescence; gradual wavy lower boundary.
S57Calif-33-12-7 Cm2	37-58"	Brown (7.5YR 5/4 dry, dark brown 4/4 moist) coarse sandy loam; massive; strongly cemented; extremely hard when dry, after crushing very friable when moist; slightly sticky and slightly plastic when wet; no roots; fragmentary clay skins; pH 8.0; noncalcareous; gradual wavy lower boundary.
S57Calif-33-12-8 Cm3	58-64"+	Brown (7.5YR 5/4 dry, dark reddish brown 5YR 3/4 moist) coarse sandy loam; massive; weakly cemented; very hard when dry, after crushing very friable when moist; slightly sticky and slightly plastic when wet; no roots; fragmentary clay skins; prominent dark stains in pores and seams; pH 8.0; noncalcareous.

1/ The Monserate series is in a fine, montmorillonitic, thermic family of Typic Durixeralfs (see pedon S57Calif-33-13). This pedon has an argillic horizon with more than 35 percent clay throughout and has an abrupt upper boundary with clay increase of more than 15 percent.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Huichica loam (taxadjunct) **LOCATION** Sonoma County, California

SOIL FAMILY: Abruptic Haplic Durixeralf, fine-loamy, mixed, thermic.

SOIL NOS. S61Calif-49-7 **LAB. NOS.** 61431 - 61437

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0- 7	A11	1.8	5.7	6.1	20.7	14.7	41.7	9.3	48.4	21.2	8	1
7-14	A12	1.6	5.5	5.9	19.3	14.6	42.3	10.8	47.7	21.8	5	1
14-23	A21	2.4	5.3	6.1	18.9	15.8	40.1	11.4	46.8	21.4	6	1
23-30	B2t	6.5	8.0	7.0	15.5	7.7	26.1	29.2	26.8	15.7	31	cl-scl
30-36	C1m	2.1	15.0	12.3	20.7	5.2	15.0	29.7	22.0	8.4	11	scl
36-47	IIC2m	7.6	24.6	18.4	17.9	5.4	13.5	12.6	18.8	8.1	3	cosl
47-57+	IIIC3m	3.7	15.9	11.9	20.9	10.6	24.4	12.6	32.9	14.1	0	sl

pH 8C1a H_2O 1:1	pH 8C1c KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	Bulk Density 4A3a g/cc	Ext. Iron % Fe 6C1b	4B2 S il water 15 atmos. Pct.
5.4	4.2	1.10	0.096	11	1.53	0.4	5.0
5.5	4.0	0.26	0.047		1.50	0.4	5.1
6.1	4.3	0.17	0.040			0.4	5.7
6.7	5.0	0.14				0.4	13.6
7.7	5.9	0.04				0.3	17.5
7.6	5.8	0.02				0.3	15.3
7.3	5.6	0.01				0.4	21.4

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B1a 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K	BASE SAT. % 5C3	Sum of Cations 5A3a meq/100g.	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →							
10.0	2.5	0.8	5.7	0.1	0.3	39	9.4	
8.8	2.4	1.5	4.4	0.2	0.3	50	8.8	
9.1	2.6	2.3	3.2	0.3	0.2	63	8.6	
22.1	7.6	9.8	3.2	1.2	0.2	85	22.0	
34.4	12.3	16.4	1.8	2.1	0.2	95	32.8	
32.6	12.0	15.2	2.0	2.1	0.2	94	31.5	
42.6	16.2	20.3	3.0	2.7	0.2	93	42.4	

HUICHICA LOAM(taxadjunct) 1/
S61Calif-49-7

Location: Sonoma County, California. Loamite Company. SE1/4, SW1/4, section 19, T. 8 N., R. 8 W. 480 feet east and 220 feet north of the southwest corner of section 19. In field 930 feet southwest of railroad track, site spotted on photo No. CSH-2BB-183.
Date of Sampling: June 23, 1961.
Collectors: Reuben Nelson, Leo C. Klameth, V. C. Miller, G. Lambert, J. H. Kashiwagi, F. Graham.
Classification: **Abruptic Haplic Durixeralf, fine-loamy, mixed, thermic.**

Vegetation: Annual grasses, a few perennial grasses, and a few scattered oaks. Use: Dryland pasture. Climate: Average rainfall 29.4 inches, average temperature 57.6° F., average January temperature 46.5° F., average July temperature 66.7° F. Parent Material: Mixed valley alluvium. Elevation: About 112 feet. Relief: Hummocky on 1 percent slope. Drainage: Imperfectly drained, slow runoff, moderately slow to very slow permeability. Biological Activity: Worm casts to 23 inches.

HORIZON	DESCRIPTION
A11 RSL No. 61431	0 to 7 inches, light brownish gray (10YR 6/2) loam with common medium distinct mottles of yellowish brown (10YR 5/4) when dry, dark brown (10YR 4/3) when moist; massive; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; abundant very fine and fine roots; many very fine and fine tubular pores; strongly acid, pH 5.5; gradual, wavy boundary.
A12 RSL No. 61432	7 to 14 inches, pale brown and brown (10YR 6/3 and 10YR 5/3) loam, dark brown (10YR 4/3) when moist; massive; hard when dry, friable when moist, slightly sticky and slightly plastic when wet; abundant very fine and fine roots; many very fine and fine interstitial and tubular pores; strongly acid, pH 5.5; light gray stains on sand grains; clear, wavy boundary.
A21 RSL No. 61433	14 to 23 inches, light gray (10YR 7/2) sandy clay loam with many fine faint mottles of brown (10YR 5/3) when dry, brown (10YR 5/3) when moist; massive; hard when dry, friable when moist, slightly sticky and slightly plastic when wet; plentiful very fine and fine roots; many very fine and fine tubular and interstitial pores; strongly acid, pH 5.3; abrupt, wavy boundary.
A22 Not sampled	Ashy cap, light gray (10YR 7/1) when dry, grayish brown (10YR 5/2) when moist; 2-3 mm. thick; abrupt, wavy boundary.
B2t RSL No. 61434	23 to 30 inches, light brownish gray (10YR 6/2) clay, very dark grayish brown (10YR 3/2) when moist; strong coarse columnar structure; top and sides of columns coated with ashy gray film; extremely hard when dry, very firm when moist, very sticky and very plastic when wet; abundant very fine roots along ped faces; many very fine and fine tubular and interstitial pores; continuous thick clay films on ped faces, in bridges, and in pores; medium acid, pH 6.0; abrupt, irregular boundary.
C1m RSL No. 61435	30 to 36 inches, white (2.5Y 8/2) sandy loam, dark brown (10YR 4/3) with variegated mottles of light olive brown (2.5Y 5/4) when moist; massive; very hard when dry; firm when moist; slightly sticky and nonplastic when wet; few fine roots; common very fine interstitial and fine tubular pores; continuous, moderately thick to thick clay films in pores and on bridges; moderately alkaline, pH 8.0; firm to weakly cemented; gradual, irregular boundary.
IIC2m RSL No. 61436	36 to 47 inches, white (2.5Y 8/2) loamy sand with common fine distinct mottles of strong brown (7.5YR 5/6) when dry, dark brown (10YR 4/3) when moist; massive breaking to moderate subangular blocks; very hard when dry, firm to extremely firm when moist; nonsticky and nonplastic when wet; common fine and very fine interstitial pores; continuous, thick clay films on fracture planes; moderately alkaline, pH 8.0; varied weak to strong indurations of soil material; (manganese) stains concentrated in fissures; clear, wavy boundary.
IIIC3m RSL No. 61437	47 to 57 inches +, white (10YR 8/2) sandy clay loam with common fine distinct mottles of strong brown (7.5YR 5/6) when dry; grayish brown (10YR 5/2) with common fine faint mottles of yellowish brown (10YR 5/4) when moist; clay films are strong brown when moist; massive breaking to weak subangular blocky structure; very hard when dry, firm when moist, slightly sticky and slightly plastic when wet; continuous, thick clay films on fracture planes; mildly alkaline, pH 7.5.

1/ **The Huichica series is in a fine, montmorillonitic, thermic family of Abruptic Haplic Durixeralfs. This pedon has less than 35 percent clay in the argillic horizon.**

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Arlington sandy loam **LOCATION** Riverside County, California

SOIL FAMILY: Haplic Durixeralf, coarse-loamy, mixed, thermic.

SOIL NOS. S57Calif-33-10 **LAB. NOS.** 57520 - 57526

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0-6	Ap	5.9	17.0	12.6	23.0	12.4	20.8	8.3	37.4	9.1	3	sl
6-12	A1	6.1	14.2	12.3	24.5	13.8	22.0	7.1	40.5	9.7	2	sl
12-24	A3	3.7	12.2	11.9	26.7	15.5	22.0	8.0	45.5	8.3	2	fsl
24-35	B21	7.6	14.5	8.7	16.4	11.3	27.5	14.0	36.8	11.6	4	sl
35-38	B22	7.8	13.6	8.8	16.3	11.6	26.4	15.5	36.4	11.1	3	sl
38-55	Cm1	8.3	12.6	7.6	15.0	11.3	26.0	19.2	37.7	8.6	4	fsl
55-60+	Cm2	7.8	12.8	8.3	18.6	10.8	22.8	18.9	34.7	10.0	8	fsl

8C1b SATURATED PASTE 1:1	pH 8C1a 1:10	4A3a Bulk Density g/cc	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	CO_3 6I1a Meq/l	8A1a Elec. Conduc. EC x 10^3 MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	HCO_3 6J1a Meq/l	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
6.2	6.7	-	0.46	0.055	8.4	0.0	0.9	0	5.1	16.9	10.4	3.6
5.9	6.6	1.50	0.37	0.046	8.0	0.0	0.8	0	4.9	16.7	10.8	3.5
6.9	7.1	1.77	0.22	0.021		0.0	1.6	0	2.4	16.4	8.2	3.6
7.0	7.4	1.73	0.27	0.016	16.9	0.0	1.6	0	2.4			5.8
7.0	7.4	1.80	0.24			0.0	1.0	0	1.9			5.9
7.3	7.4	1.76	0.24			0.0	1.2	Tr	1.8			7.6
7.5	8.4		0.01			0.0	1.5	<1	2.8			7.4

5A2a CATION EXCHANGE CAPACITY (← Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
7.3	4.4	1.4	1.4	0.5	0.3	83	3.4	0.2	4.1	1.8	2.1	23.5
7.3	4.2	1.4	1.5	0.7	0.2	81	3.4	0.1	3.2	1.7	2.4	22.4
7.3	4.0	1.4	0.8	0.4	0.2	88	5.7	0.1	7.7	3.3	6.2	20.3
11.8	7.8	2.6	1.0	0.7	0.2	94	6.8	0.1	7.6	3.2	6.7	23.4
11.7	8.3	2.9	1.3	0.8	0.2	90	5.3	0.1	3.0	1.3	1.6	22.5
15.4	9.8	3.6	0.9	0.9	0.3	94	5.6	0.1	4.2	2.2	2.8	28.5
13.8	15.0	4.0		0.8	0.3		5.4	0.1	6.0	3.0	3.4	28.0

1/ Percent of whole soil

ARLINGTON SANDY LOAM
S57Calif-33-10

Location: 1200 feet east and 100 feet north of the south 1/4 corner of Sec. 21, T. 4 S., R. 3 W. On the Roy Smith Ranch, about 2 miles northeast of Perris, Riverside County, California. Date of Sampling: June 5, 1957.
Description by: Fred Eggers. Collectors: George Borst, R. E. Nelson, Cliff Henry, and Arnold Knecht.
Vegetation: Fallow land. Precipitation: 12 inches. Parent Material: Granitic alluvium. Physiography: Alluvial fan. Elevation: 1425 feet. Drainage: Well drained.
Classification: Haplic Durixeralf, coarse-loamy, mixed, thermic.

HORIZON	DESCRIPTION
S57Calif-33-10-1 Ap 0-6"	Brown (10YR 5/3 dry, dark yellowish brown 3/4 moist) sandy loam; moderately defined medium subangular blocky breaking to weakly defined fine granular; hard when dry, friable when moist; nonsticky and slightly plastic when wet; moderately rapid permeability; many roots; many fine pores; pH 6.0; noncalcareous; clear smooth lower boundary.
S57Calif-33-10-2 A1 6-12"	Brown (10YR 5/3 dry, dark yellowish brown 3/4 moist) sandy loam; moderately defined medium subangular blocky breaking to weakly defined fine granular; hard when dry, firm when moist; nonsticky and slightly plastic when wet; moderately rapid permeability; many roots; many fine pores; pH 6.2; noncalcareous; clear smooth lower boundary.
S57Calif-33-10-3 A3 12-24"	Grayish brown to brown (10YR 5/2-5/3 dry, dark brown 7.5YR 3/4 moist) sandy loam; moderately defined medium subangular blocky breaking to weakly defined fine granular; hard when dry, firm when moist; nonsticky and slightly plastic when wet; moderately rapid permeability; many roots; many fine pores; pH 6.5; noncalcareous; clear smooth lower boundary.
S57Calif-33-10-4 B21 24-35"	Grayish brown to brown (10YR 5/2-5/3 dry, dark brown 7.5 YR 3/4 moist) sandy clay loam; strong ly defined medium angular blocky; very hard when dry, firm when moist; slightly sticky and plastic when wet; occasional roots; many fine pores; moderately slow permeability; pH 6.8; noncalcareous; weak discontinuous clay skins; gradual smooth lower boundary.
S57Calif-33-10-5 B22 35-38"	Yellowish brown (10YR 5/4 dry, dark brown 7.5YR 3/4 moist) sandy clay loam; strongly defined medium angular blocky; very hard when dry, firm when moist; slightly sticky and plastic when wet; occasional plant roots; moderately slow permeability; pH 7.8; noncalcareous; weak discontinuous clay skins; abrupt smooth lower boundary.
S57Calif-33-10-6 Cm1 38-55"	Brown (10YR 5/3 dry, dark brown to dark yellowish brown 3/3-3/4 moist) fine sandy clay loam; massive; weakly cemented; very hard when dry, firm when moist; slightly sticky and plastic when wet; slow permeability; few roots; pH 7.8; slight effervescence; moderately prominent clay skins; gradual wavy lower boundary.
S57Calif-33-10-7 Cm2 55-60"+	Brown (10YR 5/3 dry, dark brown 4/3-3/3 moist) loam; massive, strongly cemented; extremely hard when dry, firm when moist; slightly sticky and slightly plastic when wet; very slowly permeable; no roots; pH 8.2 slight effervescence; prominent clay skins (might be mineral precipitation).

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Fresno loam (taxadjunct) **LOCATION** Fresno County, California

SOIL FAMILY: Natric Durixeralf, coarse-loamy, mixed, thermic.

SOIL NOS. S58Calif-10-1 **LAB. NOS.** 58245 - 58250

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0-6	A1	0.3	2.9	3.7	13.2	17.4	53.4	9.1	57.5	22.5	0	sil
6-12	B2	0.2	2.0	2.4	9.5	12.2	48.3	25.4	41.2	26.3	0	l
12-21	B3t	7.6	23.5	3.2	6.9	2.3	45.1	11.4	27.8	24.5	0	l
21-28	C1sicam	9.7	13.6	6.3	12.1	14.8	37.3	6.2	41.6	18.1	4	2/
28-39	C2sica	8.2	10.8	5.7	15.2	15.2	39.0	5.9	46.6	17.3	1	2/
39-63	C3sica	2.1	3.0	2.3	9.9	18.1	60.4	4.2	55.9	30.1	1	2/
63+	C4	Not sampled										

8C1b SATURATED PASTE 1:1	pH 8C1a 1:5	8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	CO_3** 8A1 6I1a	8A1a Elec. Conduc. EC×10³ MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	HCO_3* 8A1 6J1a	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
8.1		8.9	0.45	0.048	9.4	2.8	1.14	3	7.5	25.0	16.6	4.2
8.9		9.8	0.21	0.031		5.2	2.23	5	8.3			9.4
9.3		10.0	0.13	0.018		5.2	2.22	8	9.1			7.4
9.1		9.8	0.09			5.2	1.69	15	5.0			9.5
9.3		9.7	0.56			2.4	0.91	14	4.4			6.9
8.9		9.5	0.02			0.0	0.69	7	9.3			4.2

5A2a CATION EXCHANGE CAPACITY (-(Na)	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a N	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	milliequivalents per 100g. soil →	5D1 EXCH. Na %	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a	6O1a	6K1a	milliequivalents per liter →	8A MOISTURE AT SATURATION %
11.7	16.9	1.8	-	3.7	1.3		32	6.4	1.0	4.0	1.3	2.7		24.4
22.1	15.9	1.6	-	14.8	1.4		67	21.8	0.3	0.7	0.1	6.9		27.4
17.5	17.1	1.5	-	11.3	1.0		65	22.6	0.2	0.5	0.3	7.2		31.0
17.3	17.1	1.0	-	9.6	0.3		56	16.3	<0.1	0.4	1.0	6.7		34.5
12.4	15.5	0.9	-	6.4	0.1		52	9.0	<0.1	0.3	0.3	2.5		36.8
10.1	17.3	0.8	-	2.8	0.1		28	6.2	<0.1	0.4	0.4	2.5		36.9

1/ Percent of whole soil

2/ Incomplete dispersion, PSD not valid as texture standard.

FRESNO LOAM (taxadjunct) 1/
S58Calif-10-1

Location: Fresno County, California. 2,390 feet west and 1,640 feet south of northeast corner, NW1/4 Sec. 18, T. 15 S., R. 18 E. Date of Sampling: October 31, 1958.
Description by: R. Ulrich. Collectors: R. E. Nelson, Jess Glouser, Gene Novak, and R. Ulrich.
Classification: Natric Durixeralf, coarse-loamy, mixed, thermic.
Vegetation: Saltgrass, spikeweed, pickleweed, soft chess, jackass clover. Range pasture land use. Climate: About 9 inches rainfall. Mean annual temperature about 63° F. Parent Material: Largely water transported, sorted, and deposited sediments from granitic sources in Sierra Nevada to eastward. The position is basin or basin rim by University of California physiographic terminology. Slope: Essentially level plain, less than 1 percent slope, with minor microrelief including some low mounds. Elevation: 220 feet as shown in Kearney Park USGS Topographic Quadrangle. Drainage: Imperfect natural drainage, very slow internal drainage due to hardpan, very slow runoff.

DESCRIPTION

A1
RSL No. 58245
0-6 inches, light gray (2.5Y 7/2) light loam (this texture is questionable; it is being mapped fine sandy loam), grayish brown (2.5Y 5/2) moist, very weak very fine granular moist drying essentially massive with some coarse prismatic cracks appearing late in the dry season; hard, friable, very slightly plastic, nonsticky; few fine roots in soil mass but numerous and concentrated along the prismatic cracks, with mat-like root concentrations occuring in places; many very fine interstitial pores, common extremely fine and very fine tubular pores; slightly calcareous; reaction not determined in field, see laboratory data; abrupt, slightly wavy lower boundary.

B2t
RSL No. 58246
6-12 inches, grayish brown (2.5Y 5/2) light clay loam, very dark grayish brown (2.5Y 4/2) with darker (2.5Y 3/2 and 3/1) organic films on many ped faces, moist; weak coarse prismatic and moderate medium angular blocky; very hard, very firm, plastic, slightly sticky; few fine roots in soil mass, roots more numerous and somewhat flattened along structure planes; common extremely fine and very fine tubular pores; slightly calcareous, the lime disseminated; thin to moderately thick patchy clay films; clear slightly wavy lower boundary.

B3t
RSL No. 58247
12-21 inches, light brownish gray (2.5Y 6/2) loam, grayish brown (2.5Y 5/2) with darker (2.5Y 4/2 and 3/2) organic films on some ped faces, moist; weak medium subangular blocky; very hard, very firm, very slightly plastic, nonsticky; few fine roots in soil mass; common extremely fine and very fine tubular pores; slightly calcareous, the lime disseminated; thin patchy clay films; abrupt, slightly wavy boundary.

C1sicam
RSL No. 58248
21-28 inches, variable light brownish gray and light gray (2.5Y 6/2 and 7/2) indurated lime-silica hardpan, grayish brown (2.5Y 5/3) moist, with a very thin, very dense, dark grayish brown (2.5Y 4/2) upper crust; this extremely cemented crusty cementing material appears elsewhere in the hardpan but it is thinner, more lenselike and less continuous than on the upper surface of the hardpan; very thin light colored lime segregations and crusts may also appear on the surface of the hardpan and at various places within the hardpan horizon; the lower portion of the hardpan becomes more platy, lenselike, and fragmental and softer materials are also present; roots are very few, fine and in places flattened and matted - they appear to follow cracks and joint planes and plates in the hardpan; calcareous (amount uncertain) with little if any softening upon treatment with dilute acid; abrupt slight wavy lower boundary.

C2sica
RSL No. 58249
28-39 inches, light gray (2.5Y 7/2) stratified fine sandy loam and loam, light brownish gray (2.5Y 6/2) moist, with some thin silt lenses; few faint fine yellowish brown (10YR 5/6 and 5/8) moist mottles; massive; hard, firm to friable, very slightly to nonplastic, nonsticky; no roots; common extremely fine and very fine interstitial pores and few extremely fine and very fine tubular pores; moderately calcareous, most of the lime being softly segregated in a reticulate pattern or in very thin slightly hardened masses and lenses; clear smooth lower boundary.

C3sica
RSL No. 58250
39-63 inches, light gray (2.5Y 7/1) micaceous, stratified, finely to coarsely laminated fine sands and silts, light brownish gray (2.5Y 6/2) moist, variable few to numerous fine faint to distinct mottles of 10YR 5/6 and 5/8 and 7.5YR 5/6 and 5/8; variable consistency but mostly hard, firm to friable, very slightly plastic to nonplastic, and nonsticky; no roots; common extremely fine and few very fine interstitial pores; variable slightly to strongly calcareous in very thin lenses and seams of softly to somewhat hardened lime segregations, probably will average moderately calcareous; clear smooth lower boundary.

C4
RSL No. 58251
63 inches +, similar to material above but very slightly calcareous to noncalcareous in most of mass.

1/ The Fresno series is in a fine-loamy, mixed, thermic family of Natric Durixeralfs. This pedon has an argillic horizon with less than 18 percent clay.

CONSECUTIVE PEDON NUMBER C 69 59 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES BONTA DEEP VARIANT SOIL NO. S69 CALI. 33- 1 SAMPLE NO. 9 309-9 315 SAN BERNARDINO AREA

SOIL FAMILY TYPIC HAPLOXERALF COARSE-LOAMY,MIXED,MESIC RIVERSIDE SOIL SURVEY LABORATORY

SAMPLE NO.	DEPTH CM.	HORZ.	SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2- .05	SILT .05- .002	CLAY LT .002	SANDS VCS 2-1	CS 1- .05	MS .5- .25	FS .25- .10	VFS .1- .05	SILTS CSI .05- .02	FSI .02- .002	CLAYS CO. 2- .2U	FINE LT .2U	CARBONATE 3A1A.02	1A2A INT. II PCT. OF WHOLE SOIL	COARSE FRAGMENTS I 75- 20 PCT.	II 20-5 OF 20	III 5-2 LT 75
			PERCENT OF LESS THAN 2MM																
9 309	0- 5	AP1	82.1	11.7	6.2	13.4	22.0	14.3	22.7	9.7	5.7	6.0	0.2	6.0	27.1	--	--	--	--
9 310	5- 20	AP2	81.0	12.9	6.1	12.9	21.1	13.9	23.3	9.8	6.7	6.2	TR	6.0	28.9	--	--	--	--
9 311	20- 30	AP3	78.2	15.2	6.6	12.2	19.6	12.6	23.3	10.5	7.6	7.6		7.0	30.8	--	--	--	--
9 312	30- 58	A14	75.0	15.4	9.6	11.4	19.7	11.6	22.4	9.9	6.4	9.0		10.0	28.3	--	--	--	--
9 313	58- 79	A15	75.6	16.5	7.9	9.3	18.9	12.5	24.7	10.2	4.7	11.8		8.0	28.1	--	--	--	--
9 314	79-135	B21T	74.9	15.5	9.6	7.8	15.7	12.3	27.1	12.0	6.7	8.8		10.0	33.6	--	--	--	--
9 315	135-165	B22T	78.7	13.6	7.7	10.5	21.4	12.9	24.0	9.9	5.4	8.2		8.0	27.8	--	--	--	--

SAMPLE NO.	DEPTH CM.	ORG.MATTER CARBON 6A1A -PERCENT--	NITROGEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	19-2 6E1B	EXT. IRON FE 6C2B PCT.	ATTERBERG LIMIT LL 4F2 PCT.	PL 4F1	BULK DENSITY EST 1/3 BAR 4A1F NO.40	DRY 4A1F	CM 4AH	3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2 -PERCENT---	EXTENSBLTY LEF 4D1 -PERCENT--	LE 4D1	PH H2O 1/1 8C1A	H2O 1/10 8C1A	CACL2 8C1E
9 309	0- 5	2.11							GRAMS PER CC						4.6			6.1		5.7
9 310	5- 20	1.11	0.064												3.8			7.0		6.5
9 311	20- 30	0.50	0.035												3.7			6.8		6.1
9 312	30- 58	0.13													4.7			6.2		5.6
9 313	58- 79	0.20													4.1			6.3		6.1
9 314	79-135	0.13													4.8			5.8		5.3
9 315	135-165	0.13													4.1			6.0		5.5

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6Q2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	BASE SAT. PCT.	C E C NA- OAC 5A2A -MEQ/100G	NH4- OAC 5A6A	EC 8A1A MMHO	WATER EXTRACT FROM SATURATED PASTE CA 6N1B	MG 6O1B	NA 6P1A	K 6Q1A	CO3 6I1A -MEQ/1000 ML	HCO3 6J1A	CL 6K1A	SO4 6L1B	8A1 B 6T1A PPM	PH SAT. PASTE 8C1B
		MEQ/100G					PCT.													
9 309	0- 5																			
9 310	5- 20																			
9 311	20- 30																			
9 312	30- 58																			
9 313	58- 79																			
9 314	79-135																			
9 315	135-165																			

SAMPLE NO.	DEPTH CM.	WATER AT SAT. 8A PCT.	EXCHANGBLE NA 5B4B MEQ.	NA 5D2 PCT.	SAR 5E	GYPSUM AMT. 6F1B	REQ. 6P3A PERCENT	CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I	7A2E II	7A2E III	DTA 7A2E IV	7A3 PCT.	LT. .0002 MM X RAY 7A2E I	7A2E II	7A2E III	MINERAL CODE	RELATIVE AMOUNT
9 309	0- 5																1 TRACE
9 310	5- 20																2 SMALL
9 311	20- 30																3 MODERATE
9 312	30- 58																4 ABUNDANT
9 313	58- 79																5 DOMINANT
9 314	79-135																6 INDETER.
9 315	135-165																

SAMPLE PREPARATION CODES

BONTA SANDY LOAM, DEEP VARIANT 1/
S69Calif-33-1

Location: Riverside County, California; the U. S. Forest Service Nixon Plots nursery area, on North Mountain, on the northwest flanks of the San Jacinto Mountain mass, south of Beaumont, California, SE¼ SE¼ sec. 8, T.4S., R1E.,SBBM. Date of Sampling: 12/2/66**

Description by: F. F. Peterson and C. S. Holzhey. Collectors: F. F. Peterson and C. S. Holzhey.**Resampled 6/27/69 by E. C. Nord.

Classification: Typic Haploxeralf, coarse-loamy, mixed, mesic.

Vegetation: Recently cleared from tall, hard chaparral. Most abundant plants include manzanita, birchleaf mountain mahogany, ceanothus, chamise, and mostly annual grasses and forbs. Climate: Mediterranean. Estimated total annual precipitation 23 inches, but varies from 13 to 43 inches that comes mostly between October and April. Elevation: 3,600 feet. Drainage: Well drained, moderate permeability. Soil Moisture: Moist throughout.

Remarks: This soil has formed in moderately coarse textured alluvium from quartz diorite grus. The body of alluvium in which the soil has formed is located on a moderately broad, gently sloping mountain ridgeline saddle. The soil and underlying alluvium are presently being dissected by encroaching gully headwalls from either side of the east-west trending saddle.

HORIZON	DESCRIPTION
	(0-5 cm.)
Ap1 RSL 69309	0 to 2 inches, dark grayish brown (10YR 4/2) sandy loam, very dark brown (10YR 2/2) moist; massive; friable to slightly firm, nonsticky, nonplastic; slightly acid (pH 6.5); horizon subdivided for laboratory study.
	(5-20 cm.)
Ap2 RSL 69310	2 to 8 inches, same as Ap1.
	(20-30 cm.)
Ap3 RSL 69311	8 to 12 inches, same as Ap1.
	(30-58 cm.)
A14 RSL 69312	12 to 23 inches, pale brown (10YR 6/3) sandy loam, dark yellowish brown and brown (10YR 4/3) moist (10YR 4/4, moist, uncrushed);massive; friable,nonsticky,nonplastic; contains 20 percent of 2-inch diameter krotovinas; slightly acid (pH 6.5); gradual smooth boundary.
	(58-79 cm.)
A15 RSL 69313	23 to 31 inches, pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; massive; friable, nonsticky, nonplastic; a few krotovinas; few brown 1-3 mm linear clay flows, a few slightly clay impregnated bands (10YR 4/3.4) moist, uncrushed, in the 10YR 4/3 moist matrix); slightly acid (pH 6.5); clear smooth boundary.
	(79-135 cm.)
B21t RSL 69314	31 to 53 inches, brown (10YR 5/3) sandy loam, brown (10YR 4/3.4)moist; massive; firm, nonsticky, nonplastic; with 1/4 to 1/2 inch wide horizontal slightly clay impregnated bands at 3 to 5 inch intervals (bands: dark yellowish brown 10YR 4/4, moist; matrix: brown 10YR 4/3, moist); slightly acid (pH 6.5); clear smooth boundary.
	(135-165 cm.)
IIB22t RSL 69315	53 to 64 inches, brown (10YR 5/3.4)sandy loam, dark brown (10YR 4/3.4)moist; massive; firm, nonsticky, nonplastic; with clear 1/2 to 3/4 inch wide, wavy horizontal somewhat clay impregnated bands at 3 to 4 inch intervals in the upper 8 inches of the horizon, with 3/8 to 1 inch wide bands at 2 inch intervals in the lower parts of the horizon, with a few vertical clay bands (bands: 10YR 3/4, moist; matrix: 10YR 4/3, moist; clayey bands in this and above horizon are slightly sticky; a few roots; slightly acid (pH 6.5); increased amounts of medium and coarse sand-sized mica in this sedimentary layer; a few 2 inch diameter krotovinas present.

1/ **The Bonta series is in a coarse-loamy, mixed, mesic family of Typic Haploxeralfs. This pedon is in the same family and subgroup but lacks a paralithic contact within 1 meter.**

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Greenfield sandy loam **LOCATION** Riverside County, California

SOIL FAMILY: Typic Haploxeralf, coarse-loamy, mixed, thermic

SOIL NOS. S57Calif-33-9 **LAB. NOS.** 57513 - 57519

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0-5	A1	8.9	15.3	9.8	18.9	10.8	25.6	10.7	36.2	11.2	6	sl
5-12	B1	6.0	14.4	9.4	18.1	11.3	25.8	15.0	36.0	11.9	6	fsl
12-24	B21	9.7	16.7	8.5	15.0	8.1	22.2	19.8	28.8	9.9	6	cosl
24-32	B22	10.6	19.7	11.3	17.2	8.2	19.4	13.6	29.8	7.2	3	cosl
32-44	C1	6.2	14.5	9.3	18.4	11.4	26.9	13.3	38.1	10.8	3	sl
44-52	C2	8.8	16.4	10.2	17.3	10.0	23.8	13.5	33.7	9.9	6	cosl
52-60+	B2b	7.3	12.0	7.3	13.3	7.3	16.9	35.9	25.6	6.1	4	sc

pH 8C1b Saturated Paste 1:1	pH 8C1a 1:10	4A3a Bulk Density g/cc	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6I1a CO_3 meq/l	8A1a Elec. Conduc. mmhos/cm. at 25° C.	6E1b $CaCO_3$ equivalent %	6J1a HCO_3 meq/l	MOISTURE TENSIONS 4B1a 1/10 ATMOS. %	4B1a 1/3 ATMOS. %	4B2 15 ATMOS. %
5.9	7.6		0.48	0.075	6.4	0.0	14.0	0	2.8	19.4	13.4	4.1
6.8	7.0	1.90	0.28	0.044	6.4	0.6	2.8	0	5.5			5.4
6.8	7.0	1.84	0.10	0.027		0.0	2.3	0	4.3			6.5
7.2	7.5	1.82	0.25	0.014		0.0	2.9	0	4.7			5.0
7.4	8.1	1.83	0.24	0.011		0.6	4.0	Tr	4.3			5.2
7.4	8.3	1.74	0.03			0.0	4.4	Tr	3.6			5.1
7.1	7.5	1.77	0.01			0.0	4.8	Tr	3.0			11.3

5A2a CATION EXCHANGE CAPACITY (- Na)	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch 5B1b K 6Q2a	5D1 Exch. Na %	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
7.5	7.6	2.7	1.4	0.5	0.5	7	34.0	3.6	77.1	28.7	31.4	25.9
9.3	6.8	1.9	1.2	1.1	0.3	12	11.0	0.3	11.9	3.3	15.3	25.3
12.6	8.7	2.7	1.2	1.5	0.2	12	11.1	0.2	6.0	3.5	13.2	28.2
13.0	8.7	2.5	0.8	1.4	0.2	11	14.3	0.1	9.5	3.8	17.8	25.4
11.4	10.8	2.6	0.4	0.8	0.2	7	17.0	0.2	15.1	6.1	27.8	26.3
11.8	12.9	2.8	1.0	2.1	0.1	18	16.4	0.2	18.0	7.4	34.6	23.6
24.5	17.3	6.7	1.4	0.6	0.3	2	17.2	0.2	20.7	7.8	39.4	49.5

1/ Percent of the whole soil

GREENFIELD SANDY LOAM
S57Calif-33-9

Location: Riverside County, California. 150 feet north and 150 feet east of the south 1/4 corner of Sec. 3, T. 5 S., R. 3 W. On the Clyde Smith Ranch, about 2 miles southeast of Perris. Date of Sampling: June 5, 1957.
Description by: Fred Eggers. Collectors: George Borst, R. E. Nelson, Cliff Henry, and Arnold Knecht.
Classification: Typic Haploxeralf, coarse-loamy, mixed, thermic.
Vegetation: Fallow land. It was in irrigated alfalfa many years, potatoes two years, and is now being leveled. Precipitation: 12 inches. Parent Material: Granitic alluvium. Physiography: Alluvial fan. Elevation: 1426 feet.
Drainage: Well drained.

HORIZON		DESCRIPTION
S57Calif-33-9-1 A1	0-5"	Grayish brown to brown (10YR 5/2-5/3 dry, 3/3 moist) sandy loam; moderately defined fine granular; slightly hard when dry, friable when moist; nonsticky and slightly plastic when wet; moderately rapid permeability; occasional plant roots; many fine pores; pH 6.0; noncalcareous; clear smooth lower boundary.
S57Calif-33-9-2 B1	5-12"	Brown to yellowish brown (10YR 5/3-5/4 dry, dark yellowish brown 3/4 moist) loam; strongly defined medium granular; hard when dry, firm when moist; slightly sticky and plastic when wet; moderately slow permeability; few roots; many fine pores; pH 6.7; gradual smooth lower boundary.
S57Calif-33-9-3 B21	12-24"	Brown (7.5YR 5/4 dry, dark brown 3/4 moist) sandy clay loam; massive to strongly defined medium angular blocky; very hard when dry; firm when moist; sticky and plastic when wet; few roots; many fine pores; pH 7.7; noncalcareous; weak discontinuous clay skins; gradual smooth lower boundary.
S57Calif-33-9-4 B22	24-32"	Brown (7.5YR 5/4 dry, dark brown 3/4 moist) gritty sandy clay loam; massive to strongly defined medium angular blocky; very hard when dry, firm when moist; sticky and plastic when wet; moderately slow permeability; no plant roots; many fine pores; pH 8.0; noncalcareous; moderately strong clay skins. Clear smooth lower boundary.
S57Calif-33-9-5 C1	32-44"	Brown (7.5YR 5/4 dry, dark brown 3/4 moist) sandy clay loam; massive; breaking to moderately defined medium granular; slightly hard when dry, friable when moist; slightly sticky and slightly plastic when wet; moderate permeability; no plant roots; occasional fine pores; pH 8.0; slight effervescence; fragmentary clay skins; gradual smooth lower boundary.
S57Calif-33-9-6 C2	44-52"	Brown (10YR 5/3 dry, dark brown 3/4 moist) gritty sandy clay loam; massive; breaking to strongly defined medium angular blocky; very hard when dry, firm when moist; sticky and plastic when wet; moderate permeability; no plant roots; occasional fine pores; pH 8.0; slight effervescence; fragmentary clay skins; abrupt smooth lower boundary.
S57Calif-33-9-7 B2b	52-60"+	Brown (7.5YR 5/4 dry, dark brown 4/4 moist) sandy clay; massive; extremely hard when dry, very firm when moist; sticky and very plastic when wet; very slow permeability; no roots; occasional fine pores; pH 8.0; slight effervescence with soft lime segregated in seams; heavy clay skins on all peds.

Remarks: Fertilizers used on potatoes in 1955 totaled approximately 200 pounds of P per acre. Slight mottling observed in B1 horizon.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Greenfield coarse sandy loam **LOCATION** Riverside County, California

SOIL FAMILY: Typic Haploxeralf, coarse-loamy, mixed, thermic

SOIL NOS. S57Calif-33-16 **LAB. NOS.** 57564 - 57570

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 ≥2 1/	TEXTURAL CLASS
0-1	Ap1	21.1	22.8	12.2	16.7	6.3	11.6	9.3	21.6	4.7	12	cosl
1-8	Ap2	18.8	24.9	12.7	17.1	6.3	14.4	5.8	22.1	7.4	2	lcos
8-18	A11	23.3	23.0	11.8	15.9	5.9	14.3	5.8	20.3	8.0	11	lcos
18-32	A12	15.0	23.3	12.9	19.4	7.3	16.0	6.1	25.1	8.4	14	lcos
32-41	B21m	18.7	21.0	11.4	15.4	5.8	13.8	13.9	19.6	8.0	16	cosl
41-47	B22m	19.0	26.3	12.3	14.1	4.4	10.5	13.4	14.8	7.0	15	cosl
47-64	C	16.9	30.0	13.5	15.3	4.6	7.7	12.0	15.2	4.4	17	cosl

pH 8C1b SATURATED PASTE 1:1	pH 1:5	pH 8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	ORGANIC MATTER 6B1a NITROGEN %	C/N	6I1a CO_3 meq/l	8A1a Elec. Conduc. mmhos/cm. at 25°C.	6E1b $CaCO_3$ equivalent %	6J1a HCO_3 meq/l	MOISTURE TENSIONS 4B1a 1/10 ATMOS. %	MOISTURE TENSIONS 4B1a 1/3 ATMOS. %	MOISTURE TENSIONS 4B2 15 ATMOS. %
6.5		7.2	1.95	0.154	12.7	n.d.	2.3	0	n.d.	15.6	10.3	4.8
6.4		6.8	0.55	0.044	12.5	0.0	0.4	0	1.5	12.3	8.3	2.5
5.8		6.4	0.29	0.027	10.7	0.0	0.2	0	0.7	10.3	7.2	2.6
6.1		6.6	0.16	0.033		0.0	0.1	0	0.7	10.3	7.5	2.6
6.2		6.6	0.08			0.0	0.3	0	1.0			5.4
6.3		6.3	0.09			0.0	0.3	0	1.1			5.6
6.4		6.5	0.05			0.0	0.2	0	0.9			4.8

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
9.7	7.6	1.8	2.4	0.3	0.6	81	2.6	12.4	7.0	3.4	3.0	36.1
5.2	3.1	1.0	2.0	0.2	0.4	70	0.8	0.8	1.4	1.1	1.8	21.9
5.4	2.5	0.7	2.0	0.5	0.3	67	0.8	0.1	0.8	0.7	0.7	19.3
4.6	2.6	1.0	1.4	0.4	0.2	75	0.7	0.1	0.6	0.4	0.7	18.3
7.5	4.8	2.1	1.8	0.4	0.2	81	1.4	0.1	0.9	0.9	1.0	21.1
7.9	5.0	3.0	1.6	0.4	0.2	84	1.5	0.1	1.0	0.6	0.7	22.7
7.1	4.3	2.7	0.7	0.6	0.1	92	1.1	0.1	0.7	0.4	1.0	24.7

1/ Percent of the whole soil

GREENFIELD COARSE SANDY LOAM
S57Calif-33-16

Location: Riverside County, California. 1500 feet south and 1100 feet west of the intersection of San Diego aqueduct and Long Valley road, 1/2 mile north and 1¼ miles east of Temecula School, Temecula. Date of Sampling: June 10, 1957.
Description by: Fred Eggers. Collectors: George Borst, R. E. Nelson, Cliff Henry, Arnold Knecht, and Fred Eggers.
Classification: Typic Haploxeralf, coarse-loamy, mixed, thermic.
Vegetation: Wild oats, bur clover, dove weed, lupine, soft chess, Turkey mullein and alfileree. Precipitation: 14 inches. Parent Material: Granitic material.
Physiography: A very old non-marine terrace thoroughly dissected.
Elevation: 1260 feet. Drainage: Well drained.
Remarks: All horizons very gritty and micaceous. Evidence of much animal activity in A11 horizon. Comparable soil profiles are found only on ridges and other tops of terrace remnants. Prominent discontinuous clay skins in B horizons.

HORIZON		DESCRIPTION
S57Calif-33-16-1 A_{p1}	0- 1"	Grayish brown (10YR 5/2 dry, dark brown 3/3 moist) coarse sandy loam; weakly defined fine granular; soft when dry, very friable w hen moist; nonsticky and nonplastic when wet; moderately rapid permeability; many roots; many pores; pH 6.5; noncalcareous; clear smooth lower boundary.
S57Calif-33-16-2 A_{p2}	1- 8"	Grayish brown (10YR 5/2 dry, dark brown 3/3 moist) coarse sandy loam; moderately defined medium subangular blocky breaking to weakly defined fine granular; slightly hard when dry, very friable when moist; nonsticky and nonplastic when wet; moderately rapid permeability; many roots; many pores; pH 6.0; gradual wavy lower boundary.
S57Calif-33-16-3 A_{11}	8-18"	Grayish brown (10YR 5/2 dry, dark brown 3/3 moist) coarse sandy loam; moderately defined medium subangular blocky breaking to weakly defined fine granular; hard when dry, very friable when moist; nonsticky and nonplastic when wet; moderately rapid permeability; many roots; many pores; pH 5.5; noncalcareous; gradual wavy lower boundary.
S57Calif-33-16-4 A_{12}	18-32"	Grayish brown (10YR 5/2-6/2 dry, dark brown 3/3 moist) sandy loam; moderately defined medium subangular blocky breaking to weakly defined fine granular; slightly hard when dry, very friable when moist; nonsticky and nonplastic when wet; moderately rapid permeability; many roots; many pores; pH 6.0; noncalcareous; abrupt wavy lower boundary.
S57Calif-33-16-5 B_{21m}	32-41"	Light brownish gray (10YR 6/2 dry, dark brown 4/3 moist) sandy clay loam; massive; extremely hard when dry, firm when moist; slightly sticky and slightly plastic when wet; moderately slow permeability; few roots; many pores; pH 6.0; noncalcareous; gradual wavy lower boundary.
S57Calif-33-16-6 B_{22m}	41-47"	Light reddish brown (5YR 6/3 dry, reddish brown 4/3 moist) sandy clay loam; massive; very hard when dry, firm when moist; slightly sticky and slightly plastic when wet; moderately slow permeability; no roots; occasional pores; pH 5.5; noncalcareous; clear wavy lower boundary.
S57Calif-33-16-7 C	47-64"+	Light reddish brown (5YR 6/3 dry, reddish brown 4/3 moist) loamy coarse sand containing lenses and layers of cla y material; single grain; very hard when dry, very friable when moist; nonsticky and nonplastic when wet; no roots; occasional pores; pH 6.0.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Greenfield coarse sandy loam **LOCATION** Riverside County, California

SOIL FAMILY: Typic Haploxeralf, coarse-loamy, mixed, thermic.

SOIL NOS. S57Calif-33-17 **LAB. NOS.** 57571 - 57577

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0-10	Ap	12.5	17.5	10.0	18.6	9.4	22.2	9.8	31.0	11.1	10	cosl
10-18	A11	11.4	17.0	10.4	20.0	10.9	22.9	7.4	31.4	13.8	10	cosl
18-25	A12	10.0	20.2	10.8	17.6	9.2	21.2	11.0	28.5	11.6	11	cosl
25-32	B21	9.0	17.1	10.4	19.2	9.8	22.6	11.9	32.1	11.4	14	cosl
32-43	B22	13.9	19.6	9.8	17.0	8.3	18.2	13.2	26.2	9.9	10	cosl
43-55	B3	14.1	23.0	11.6	17.4	7.2	16.2	10.5	23.8	9.2	10	cosl
55-72	C	18.7	31.3	12.4	14.3	4.7	9.8	8.8	15.8	6.1	20	lcos

pH 8C1b SATURATED PASTE 1:1	pH 1:5	pH 8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	ORGANIC MATTER 6B1a NITROGEN %	C/N	6I1a CO_3 meq/l	8A1a Elec. Conduc. mmhos/cm. at 25° C	6E1b $CaCO_3$ equivalent %	6J1a HCO_3 meq/l	MOISTURE TENSIONS 4B1a 1/10 ATMOS. %	MOISTURE TENSIONS 4B1a 1/3 ATMOS. %	MOISTURE TENSIONS 4B2 15 ATMOS. %
6.6		6.8	0.23	0.028		0.0	0.3	0	1.2	12.3	10.0	4.0
6.0		6.5	0.23	0.029		0.0	0.4	0	1.0	13.3	9.7	3.0
7.0		6.9	0.09	0.021		0.0	0.2	0	1.5	14.9	10.4	4.3
7.0		6.8	0.08			0.0	0.3	0	0.7	15.2	10.5	4.6
7.0		7.1	0.06			0.0	0.3	0	1.5	15.0	10.5	5.0
7.3		7.3	--			0.0	0.3	0	1.5	15.4	10.0	4.4
7.3		7.4	0.02			0.0	0.2	0	1.3	13.4	9.0	4.2

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	5B Exch. 5B1b Na 6P2a	5B Exch. 5B1b K 6Q2a	milliequivalents per 100g. soil →	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	milliequivalents per liter →	8A MOISTURE AT SATURATION %
7.4	4.0	1.8	1.9	0.6	0.3		78	1.0	0.2	1.4	0.5	0.5		18.0
5.4	3.0	1.5	2.3	0.4	0.5		70	1.1	0.6	0.7	0.3	1.4		18.6
6.9	4.3	1.8	1.9	0.5	0.3		78	1.2	0.1	0.6	0.4	0.7		19.2
6.5	4.6	1.9	1.8	0.3	0.2		80	0.6	0.0	1.3	0.6	0.5		20.0
7.5	6.0	2.5	1.8	0.6	0.2		84	1.1	0.0	1.3	0.7	0.7		21.6
7.9	6.5	2.4	1.4	0.7	0.1		87	1.5	0.0	1.1	0.7	0.8		21.6
8.5	5.4	2.0	1.1	0.6	0.2		88	1.6	0.0	0.6	0.6	1.2		22.1

1/ Percent of the whole soil

GREENFIELD COARSE SANDY LOAM
S57Calif-33-17

Location: Riverside County, California. North of Long Valley Road, 500 feet southwest of Buck Messa benchmark. On the Vail Company Ranch, Pauba Grant, 2½ miles north and 6½ miles east of Temecula School, Temecula. Date of Sampling: June 10, 1957.
Description by: Fred Eggers. Collectors: George Borst, R. E. Nelson, Cliff Henry, Arnold Knecht, and Fred Eggers.
Classification: Typic Haploxeralf, coarse-loamy, mixed, thermic.
Vegetation: Barley. Climate: 14 inches rainfall. Parent Material: Granitic alluvium; ancient nonmarine terrace.
Elevation: 1,448 feet. Drainage: Well drained.
Remarks: All horizons very gritty and micaceous.

HORIZON	DESCRIPTION
S57Calif-33-17-1 A_p 0-10"	Grayish brown (10YR 5/2 dry, dark brown 3/3 moist) coarse sandy loam; weakly defined fine granular; slightly hard when dry, friable when moist; non-sticky and nonplastic when wet; moderately rapid permeability; many roots; many pores; pH 6.0; non-calcareous; clear smooth lower boundary.
S57Calif-33-17-2 A_{11} 10-18"	Grayish brown (10YR 5/2 dry, dark brown 3/3 moist) coarse sandy loam; moderately defined medium angular blocky breaking to weakly defined fine granular; hard when dry, friable when moist; nonsticky and nonplastic when wet; moderately rapid permeability; many roots; many pores; pH 6.0; a definite cultivation pan; gradual wavy lower boundary.
S57Calif-33-17-3 A_{12} 18-25"	Grayish brown (10YR 5/2 dry, dark brown 3/3 moist) coarse sandy loam; moderately defined medium subangular blocky breaking to weakly defined fine granular; slightly hard when dry, friable when moist; nonsticky and non-plastic when wet; moderately rapid permeability; many roots; many pores; pH 6.3; abrupt wavy lower boundary.
S57Calif33-17-4 B21 25-32"	Light brownish gray to grayish brown (10YR 6/2-5/2 dry, dark brown 7.5YR 4/3 moist) sandy clay loam; massive; prominent discontinuous clay skins; extremely hard when dry, firm when moist; slightly sticky and slightly plastic when wet; moderately slow permeability; many roots; many pores; pH 6.0; noncalcareous; gradual wavy lower boundary.
S57Calif-33-17-5 B_{22} 32-43"	Light brown (7.5YR 6/2 dry, dark brown 4/2 moist) sandy clay loam; massive; prominent clay skins, not continuous; extremely hard when dry, firm when moist; slightly sticky and slightly plastic when wet; moderately slow permeability; occasional roots; many pores; pH 6.2; gradual wavy lower boundary.
S57Calif-33-17-6 B3 43-55"	Light brown (7.5YR 6/2 dry, dark brown 4/3 moist) sandy clay loam; massive; prominent clay skins in seams and on contacts; very hard when dry, firm when moist; slightly sticky and slightly plastic when wet; moderately slow permeability; occasional roots; many pores; pH 6.0; noncalcareous; gradual wavy lower boundary.
S57Calif-33-17-7 C 55-72"+	Light brown (7.5YR 6/4 dry, dark brown 4/4 moist) loamy very coarse sand; single grain; soft when dry, friable when moist; nonsticky and nonplastic when wet; rapid permeability; few roots; pH 5.8.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Ramona fine sandy loam (taxadjunct) **LOCATION** Riverside County, California

SOIL FAMILY: Typic Haploxeralf, coarse-loamy, mixed, thermic

SOIL NOS. S59Calif-33-2 **LAB. NOS.** 59556 - 59566

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)								3A1	2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0-9	Ap	9.2	17.1	11.9	20.9	12.2	24.4	4.3	40.8	7.8	13	cosl
9-13	A12	7.8	16.8	11.4	20.1	11.9	25.2	6.8	40.0	8.9	15	sl
13-17	A13	11.7	18.3	10.8	17.5	10.3	22.4	9.0	34.4	8.2	20	cosl
17-24	B1t	11.2	17.3	9.9	16.4	9.8	21.4	14.0	32.5	7.9	24	cosl
24-31	B21t	10.1	18.1	8.2	14.7	8.5	19.0	15.4	28.3	7.5	15	cosl
31-45	B22t	11.3	14.5	8.6	17.9	9.6	19.2	18.9	30.9	8.4	13	cosl
45-51	B31t	11.2	16.5	10.6	19.8	9.8	17.0	15.1	29.8	8.3	15	cosl
51-58	B32t	12.2	17.4	11.5	23.3	9.7	14.6	11.3	30.6	6.7	20	cosl
58-67	C1	23.4	24.5	10.9	17.9	5.6	11.6	6.1	20.7	5.5	24	lcos
67-87	C2	17.7	22.7	13.2	20.3	7.3	12.8	6.0	25.3	5.5	29	lcos
87-96+	C3	12.3	19.8	11.8	24.7	10.6	13.8	7.0	33.0	5.5	23	lcos

	pH		ORGANIC MATTER				8A1a		6C1b	6I1a	6J1a	4B2
8C1b SATURATED PASTE 1:1	1:5	8C1a 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	Elec. Conduc. mmhos/cm. at 25°C.	$CaCO_3$ equivalent %	Ext. Iron % Fe	CO_3 meq/l	HCO_3 meq/l	Soil water 15 atmos. Pct.
5.7		6.3	0.29	0.033	8.8		0.8		0.5	-	1.7	2.7
6.3		6.7	0.24	0.025			0.3		0.6	-	1.5	3.6
7.0		7.1	0.21	0.026			0.2		0.7	-	1.1	4.3
7.2		7.7	0.17	0.024			0.3		0.8	-	1.7	5.8
7.4		7.6	0.15	0.023			0.3		0.8	-	1.7	5.7
7.4		7.9	0.12	-			0.4		0.8	-	0.9	7.7
7.5		7.8	0.08				0.3		0.7	-	0.9	6.7
7.6		7.5	0.06				0.3		0.5	-	1.4	5.2
7.7		7.5	0.05				0.3		0.4	-	1.6	3.5
7.9		7.5	0.04				0.4		0.4	-	2.5	3.7
8.0		8.7	0.01				0.5		0.5	-	3.0	4.8

5A2a	EXTRACTABLE CATIONS			5B		BASE SAT. %	SATURATION EXTRACT SOLUBLE				8A1	8A
CATION EXCHANGE CAPACITY (+ Na)	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch 5B1b K 6Q2a	5C3	6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	MOISTURE AT SATURATION
	milliequivalents per 100g. soil →						← milliequivalents per liter →					%
5.7	2.5	0.8	1.7	<0.1	0.4	69	1.0	1.3	4.0	1.5	2.4	29.7
6.7	3.5	0.9	1.2	0.1	0.3	80	0.7	0.3	1.1	0.3	0.6	18.1
7.8	4.7	1.1	1.1	0.1	0.3	85	0.7	0.2	1.2	0.3	0.4	18.3
10.2	6.1	1.9	1.2	0.1	0.2	87	0.7	0.1	1.5	0.5	0.3	19.7
11.8	6.7	2.5	1.4	0.1	0.2	87	0.8	0.1	1.6	0.4	0.3	22.3
13.3	7.6	2.9	1.3	0.2	0.1	89	1.0	<0.1	2.0	0.9	0.5	29.0
11.4	6.6	2.6	2.2	0.2	0.1	89	1.2	<0.1	1.3	0.8	0.4	26.2
9.0	5.4	2.2	0.5	0.2	0.1	94	1.1	<0.1	1.6	0.2	0.4	25.0
6.4	4.3	1.6	0.5	0.1	0.1	92	1.3	<0.1	1.6	0.1	0.5	22.6
7.7	5.0	1.6	0.9	0.2	<0.1	88	1.5	<0.1	2.4	0.2	0.6	22.3
10.9	7.6	2.5	1.8	0.2	0.1	85	1.9	<0.1	2.7	0.4	0.4	28.6

1/ Percent of the whole soil

RAMONA FINE SANDY LOAM (taxadjunct) 1/
S59Calif-33-2

Location: Riverside County, California. About 3 miles northeast of the town of Sunnymead, approximately 1370 feet north, 1220 feet west of southeast corner of Sec. 34, T. 2 S., R. 3 W. Date of Sampling: September 11, 1959. Description by: Arnold Knecht and George Borst. Collectors: Arnold Knecht, Cliff Henry, Reuben Nelson and Lothair Grant.

Classification: Typic Haploxeralf, coarse-loamy, mixed, thermic.

Vegetation: Grain stubble. Climate: Average annual precipitation about 11 inches; average January temperature about 50° F., average July temperature about 70° F., and average annual temperature about 62° F. Parent Material: Moderately coarse textured alluvium, predominantly from granitic sources. Topography: Gently sloping alluvial terrace, with about 3 percent southeasterly slope. Elevation: 1,880 feet. Drainage: Well drained. Soil Moisture: None.

Remarks: This profile is characterized by an ochric epipedon and an argillic horizon, according to the revised system of soil classification (7th Approximation). A weak duripan, with coarse polygonal structure, was observed in the road cut about 100 feet west of sampling site.

HORIZON	DESCRIPTION
Ap RSL No. 59556	0-9 inches (0-23 cm.), brown (10YR 5/3) coarse sandy loam, dark yellowish brown (10YR 3/4) when moist; massive; hard, very friable, nonsticky and nonplastic, few fine roots; common very fine tubular pores; slightly acid (pH 6.2); abrupt, smooth boundary.
A12 RSL No. 59557	9-13 inches (23-33 cm.), brown (10YR 5/3) coarse sandy loam, dark yellowish brown (10YR 3/4) when moist; massive; very hard, very friable; nonsticky and nonplastic; plentiful fine roots; common very fine tubular pores; slightly acid (pH 6.2); abrupt, smooth boundary. This horizon may be a tillage pan.
A13 RSL No. 59558	13-17 inches (33-43 cm.), brown (10YR 5/3) coarse sandy loam, dark yellowish brown (10YR 3/4) when moist; massive; hard, very friable, nonsticky and nonplastic; plentiful fine roots; many fine and very fine tubular pores; slightly acid (pH 6.5); clear, smooth boundary.
B1t RSL No. 59559	17-24 inches (43-61 cm.), brown (10YR 5/3) coarse sandy loam, dark yellowish brown (10YR 3/4) when moist; weak coarse prismatic structure; very hard, friable, slightly sticky and slightly plastic; few fine roots; many fine to very fine tubular pores; few very thin discontinuous clay films on ped faces; neutral (pH 6.8); clear, smooth boundary.
B21t RSL No. 59560	24-31 inches (61-79 cm.), reddish brown (5YR 4/3) coarse sandy loam near sandy clay loam; dark reddish brown (5YR 3/3) when moist; moderate coarse prismatic structure; very hard, firm, sticky and plastic; few fine roots; many fine to very fine tubular pores; few moderately thick clay films on ped faces; neutral (pH 7.2); gradual smooth boundary.
B22t RSL No. 59561	31-45 inches (79-115 cm.), reddish brown (5YR 4/3) coarse sandy loam near sandy clay loam, dark reddish brown (5YR 3/3) when moist; moderate coarse prismatic structure; very hard, firm, sticky and plastic; common fine to very fine tubular pores; few moderately thick clay films on ped faces; neutral (pH 7.2); gradual, smooth boundary.
B31t RSL No. 59562	45-51 inches (115-130 cm.), brown to dark brown (7.5YR 4/4) coarse sandy loam, dark brown (7.5YR 3/4) when moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common fine and very fine tubular pores; few moderately thick clay films on ped faces; neutral (pH 7.2); gradual, smooth boundary.
B32t RSL No. 59563	51-58 inches (130-145 cm.), brown (10YR 5/3) coarse sandy loam, dark yellowish brown (10YR 4/4) when moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine and very fine tubular pores; mildly alkaline (pH 7.5); clear wavy boundary.
C1 RSL No. 59564	58-67 inches (145-170 cm.), brown (10YR 5/3) gravelly loamy coarse sand, dark yellowish brown (10YR 4/3) when moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine tubular pores; mildly alkaline (pH 7.5); clear wavy boundary.
C2 RSL No. 59565	67-87 inches (170-220 cm.), light brownish gray (10YR 6/2) gravelly loamy coarse sand, brown (10YR 5/3) when moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine tubular pores; mildly alkaline (pH 7.5); clear, wavy boundary.
C3 RSL No. 59566	87-96 inches + (220-245 cm.), pale brown (10YR 6/3) gravelly loamy coarse sand, brown (10YR 5/3) when moist; massive; slightly hard, very friable, nonsticky and nonplastic; mildly alkaline (pH 7.5); slightly effervescent.

1/ The Ramona series is in a fine-loamy, mixed, thermic family of Typic Haploxeralfs. This pedon is in a coarse-loamy family of the same subgroup.

SCS-420
10-64

U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Haploxeralf, fine-loamy, mixed, thermic

SOIL Fallbrook sandy loam SOIL Nos. S64Calif-37-2 LOCATION San Diego County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 6414 - 6422

Depth (In.)	Horizon	1B1b Total Sand (2-0.05)	Total Silt (0.05-0.002)	Total Clay (<0.002)	Sand: Very coarse (2-1)	Sand: Coarse (1-0.5)	Sand: Medium (0.5-0.25)	Sand: Fine (0.25-0.1)	Sand: Very fine (0.1-0.05)	Silt: 0.05-0.02	Silt: Int. III (0.02-0.002)	Int. II (0.2-0.02)	(2-0.1)	* Clay <.002	** Clay <.002	Coarse fragments 1A2a: >2	2-19	19-76
		Pct. of <2 mm														Pct.	Pct. of <76 mm	
0- 2	A11	72.9	19.5	7.6	13.3	19.2	10.2	19.5	10.7	10.1	9.4	31.3	62.2	7.8	7.2	8	8	0
2- 6	A12	72.4	19.4	8.2	13.1	18.2	10.1	19.7	11.3	9.6	9.8	31.5	61.1	8.6	7.8	9	9	0
6-12	A3	66.4	21.0	12.6	11.8	16.4	9.4	18.3	10.5	9.4	11.6	29.3	55.9	12.5	11.6	3	3	0
12-20	B21t	54.4	19.5	26.1	11.6	12.1	7.6	14.1	9.0	8.4	11.1	25.1	45.4	28.0	27.0	4	4	0
20-28	B22t	51.8	17.0	31.2	12.1	11.6	7.4	13.4	7.3	7.0	10.0	21.3	44.5	31.4	30.4	3	3	0
28-47	B3	72.4	12.8	14.8	17.0	21.6	10.5	16.7	6.6	5.1	7.7	19.7	65.8	13.6	12.1	11	11	0
47-68	C1	79.6	11.2	9.2	23.8	25.8	9.6	14.9	5.5	4.1	7.1	16.3	74.1	8.3	6.7	19	19	0
68-85	C2	80.7	13.9	5.4	21.7	25.0	10.4	16.9	6.7	6.7	7.2	21.8	74.0	4.5	3.6	21	21	0
85-90+	C3	80.2	14.7	5.1	27.1	23.4	9.1	14.8	5.8	7.6	7.1	20.3	74.4	8.1	5.2	36	36	0

Depth (In.)	6A1a * Organic carbon	6B1a* Nitrogen	C/N	*6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven dry	Bulk density: g/cc	3B2 C'	Water content: 4B1c 1/3 bar	Water content: 4B2* 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH: 8C1b Saturated Paste	pH: 8C1a H_2O 1:1	pH: 8C1a H_2O 1:10
	Pct.	Pct.		Pct.	Pct.	g/cc	g/cc			Pct.	Pct.	in./in.	in./in.			
0- 2	0.73	0.070	10	0.8		1.42	1.44		0.96	10.2	2.9	0.005	0.004	6.4	6.6	
2- 6	0.50	0.047	10	0.7		1.60	1.62		0.94	10.5	3.6	0.003	0.003	6.3	6.5	
6-12	0.30			0.7		1.78	1.85		0.98	11.0	5.0	0.013	0.013	6.5	6.8	
12-20	0.27			1.4		1.78	1.92		0.97	15.0	10.1	0.026	0.025	6.6	6.8	
20-28	0.24			1.4		1.73	1.89		0.98	16.5	11.3	0.029	0.029	6.7	7.0	
28-47	0.07			0.9		1.80	1.89		0.92	13.7	7.8	0.016	0.015	7.0	7.4	
47-68	0.02			0.7		1.81	1.90		0.86	10.9	5.9	0.016	0.014	7.4	7.6	
68-85	0.01			0.6							3.7			7.9	8.2	
85-90+	0.02			0.8							4.2			7.9	8.1	

Depth (In.)	Extractable bases 6N2a * Ca	6O2a* Mg	6P2a* Na	5B1a 6Q2a* K	Sum of bases	6H2a Ext.* Acidity	Cation Exch. Capacity 5A2a* NaOAc	5A3a * Sum	Clay mineralogy (<0.0002 mm) 7A2e Verm.	Illite	Kaol.	Water extract from saturated paste** 8A1 6P1a Na	6Q1a K	6L1b SO_4	8A1a Electrical conductivity
	meq/100 g								X-ray			meq/liter			mmho/cm
0- 2	4.6	1.3	0.3	0.4		1.5	9.6	8.1							
2- 6	5.2	1.3	0.3	0.1		1.6	9.2	8.5	tr.		xx				
6-12	6.5	2.0	0.4	0.1		1.9	10.8	10.9	x		xx				
12-20	10.0	4.7	0.4	0.1		2.9	18.3	18.1	x		xxx				
20-28	10.0	5.0	0.5	0.1		2.9	19.7	18.5	tr.		xxx				
28-47	11.3	5.0	0.9	0.1		1.7	19.3	19.0	tr.	tr.	xx				
47-68	10.3	4.3	0.9	0.1		1.2	16.7	16.8				1.1	tr.		0.18
68-85	8.5	3.9	0.8	tr.		0.8	13.7	14.0							
85-90+	9.4	3.7	0.9	0.2		0.8	15.1	15.0				0.8	tr.		0.07

Depth (In.)	8A Water at Saturation Pct.	5D2 Exchangeable Na Pct.	5B1b Exch. Na meq / 100g	Base Sat. Cations Pct.	Base Sat. NaOAc CEC Pct.	Clay mineralogy (<0.002 mm) 7A: Relative abundance based on height of diagnostic X-ray peak (7A2): Mont.	Verm.	Hydrobiotite	Illite	Kaol.	% Kaol. (DTA) 7A3	% Kaol. in ground whole soil (DTA)
						X-ray						
0- 2		3		81	69	-	-	t	xxxx	xx	20	tr.
2- 6		4		82	75	-	-	-	xxxx	xx		
6-12		4		82	81	-	-	xxxx	x	xx		
12-20		2		84	83	-	x	xxx	x	xxx		
20-28		3		84	80	-	t	t	xx	xxxx	33	17
28-47		5		91	90	-	t	t	xx	xxxx	29	12
47-68	38.2	5		93	93	-	x	t	xx	xxx	12	tr.
68-85		6		94	96							
85-90+	44.1	6		95	94	x	xx	t	xx	xx	0	1

1/ From characterization sample; determined by shaking overnight in a sodium hexametaphosphate solution.

* Analysis of ground whole soil; results expressed on <2-mm basis.

** Analysis of ground whole soil; results expressed on whole-soil basis.

\- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

FALLBROOK SANDY LOAM
S64Calif-37-2

Location: San Diego County, California. A soil profile pit located about 2-1/4 miles south and 3/4 mile east of Fallbrook in the NE1/4 of the SW1/4 of section 31, T. 9 S., R. 3 W. Date of Sampling: February 17, 1964.
Description By: Roy H. Bowman and Gerald Kester. Collectors: Klaus Flach, Gerald Kester, George Borst, Benny Brasher and R. E. Nelson.
Classification: Typic Haploxeralf, fine-loamy, mixed, thermic.
Vegetation: Wild oats, annual weeds and grasses. Climate: Annual precipitation is 15 inches and mean annual temperature is 60° F. Parent Material: Tonalite grus. Topography: Southwest-facing, smooth 12 percent slopes in middle backslope position on rolling upland. Elevation: 555 feet. Drainage: Well drained; medium runoff; moderately slow permeability. Soil Moisture: Dry when sampled.
Remarks: The B3 horizon appears to be the most dense of the profile, and the B3 horizon the lowest in permeability. This soil occurs on a slope 320 feet SE of the Vista site S64Calif-37-1.

HORIZON	DESCRIPTION
A11 RSL No. 6414	0 to 2 inches, brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; weak fine crumb structure; slightly hard, very friable, nonsticky and nonplastic; abundant very fine to medium roots; many very fine and fine interstitial pores; slightly acid (pH 6.4); clear smooth boundary.
A12 RSL No. 6415	2 to 6 inches, brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; massive; hard, friable, nonsticky and nonplastic; plentiful very fine to medium roots; common very fine to fine tubular pores; slightly acid (pH 6.4); abrupt smooth boundary.
A3 RSL No. 6416	6 to 12 inches, reddish brown (5YR 5/3) loam, dark reddish brown (5YR 3/3) moist; weak coarse subangular blocky structure; hard, friable, slightly sticky and nonplastic; plentiful very fine and fine roots; common very fine and fine tubular pores; few thin clay films in pores, few bridges; slightly acid (pH 6.3); clear smooth boundary.
B21t * RSL No. 6417	12 to 20 inches, reddish brown (5YR 5/4) sandy clay loam, dark reddish brown (5YR 3/4) moist; moderate medium prismatic structure; very hard, firm, slightly sticky and slightly plastic; plentiful very fine and fine roots; common very fine and fine tubular pores; continuous thick clay skins on ped faces; slightly acid (pH 6.4); gradual smooth boundary.
B22t RSL No. 6418	20 to 28 inches, color, texture, structure, consistence, clay skins and reaction are the same as the B21t horizon; plentiful very fine roots; few very fine tubular pores; clear wavy boundary.
B3 RSL No. 6419	28 to 47 inches, light reddish brown (5YR 6/4) loam, reddish brown (5YR 4/4) moist; weak coarse subangular blocky structure; hard, friable, slightly sticky and nonplastic; few very fine roots; few very fine tubular pores; common moderately thick clay skins on ped faces; neutral (pH 6.6); gradual smooth boundary.
C1 * RSL No. 6420	47 to 68 inches, dark reddish brown (2.5YR 4/4), light red (2.5YR 6/6), and pale red (2.5YR 6/2) tonalite grus of loamy coarse sand texture; massive; hard, loose, nonsticky and nonplastic; very few very fine roots; slightly acid (pH 6.5); gradual smooth boundary.
C2 RSL No. 6421	68 to 85 inches, reddish brown (5YR 5/4), pink (5YR 7/3), and black (5YR 2/1) tonalite grus of fine gravelly sand texture; medium acid (pH 6.0); gradual smooth boundary.
C3 RSL No. 6422	85 to 90 inches +, white (10YR 8/1), light brownish gray (10YR 6/2), and black (10YR 2/1) tonalite grus of fine gravelly sand texture; medium acid (pH 6.0).

*Soil horizons sampled for BPR

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Haploxeralf, fine-loamy, mixed, thermic
SOIL Greenfield gravelly loam (taxadjunct) SOIL Nos. S4557-4 LOCATION Tehama County, California

SOIL SURVEY LABORATORY _____ LAB. Nos. _____

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Size class and particle diameter (mm) Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt (0.05–0.02)	Silt: Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)	Coarse fragments ≥ 2 Pct.	Coarse fragments 2–19 Pct. of < 76mm	Coarse fragments 19–76 Pct. of < 76mm
		Pct. of < 2 mm														
0-9	Ap	39.1	49.9	11.0	6.6	6.9	3.9	7.5	14.2	22.5	27.4		24.9			
9-21	A1	39.7	45.5	14.8	6.2	7.1	4.4	7.6	14.4	20.8	24.7		25.3			
21-31	B21t	41.9	41.2	16.9	7.5	7.9	4.9	8.5	13.1	18.4	22.8		28.8			
31-43	B22t	46.0	33.7	20.3	9.7	9.1	6.0	10.4	10.8	13.0	20.7		35.2			
43-51	B3t	54.3	27.1	18.6	11.6	11.3	7.2	13.6	10.6	9.7	17.4		43.7			
57-65	C?	65.0	19.4	15.6	15.9	17.4	10.5	13.7	7.5	6.1	13.3		57.5			
84-107	C?	77.6	12.0	10.4	29.9	26.0	9.9	8.0	3.8	3.8	8.2		73.8			

Depth (In.)	6A2a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	Carbonate as $CaCO_3$ Pct.	Bulk density g/cc	Bulk density g/cc	Bulk density g/cc	Water content Pct.	Water content Pct.	Water content Pct.	pH 8C1a (1:1) H_2O
0-9	0.69	0.081									5.5
9-21	0.30	0.051									5.9
21-31	0.14	0.037									6.4
31-43	0.12	0.038									6.6
43-51	0.10	0.034									6.7
57-65	0.08	0.028									6.9
84-107	0.08	0.021									6.8

Depth (In.)	Extractable bases 5B1a Ca 6N2b	Mg 6O2b	Na 2/	K 1/	Sum of bases	6H2a Ext. Acidity	5A3a CEC Sum	Base saturation 5C3 Sum Pct.	Pct.
	meq/100 g								
0-9	3.4	0.8	<0.01	0.53	4.7	4.4	9.1	52	
9-21	5.0	1.3	tr.	0.25	6.5	2.6	9.2	71	
21-31	5.8	3.8	0.02	0.13	9.8	2.7	12.4	79	
31-43	5.9	5.7	tr.	0.16	11.8	3.2	15.0	78	
43-51	5.3	6.4	0.00	0.14	11.8	1.8	13.6	87	
57-65	5.4	6.5	0.00	0.12	12.0	2.1	14.1	85	
84-107	3.7	5.8	tr.	0.08	9.6	1.5	11.1	86	

Depth (In.)

1/ Precipitated as potassium sodium cobaltinitrite and titrated as potassium permanganate

2/ Gravimetrically as sodium uranyl magnesium acetate

GREENFIELD GRAVELLY LOAM (taxadjunct) 1/
S4557-4

Location: Tehama County, California. From pit located 55 yards southwest of northeast corner Sec. 6, R24N, R3W, MDB&M. Date of Sampling: April 2, 1945.
Description by: R. C. Roberts and R. A. Gardner. Collectors: R. C. Roberts, F. O. Youngs, R. A. Gardner, L. T. Alexander, H. Jenny and R. E. Storie.
Classification: Typic Haploxeralf, fine-loamy, mixed, thermic.
Vegetation: Used for sheep pasture - formerly cultivated. Cover consists of a fairly dense stand of short annual grasses and associated herbaceous plants. Climate: Average annual precipitation is about 19 inches. Mean annual temperature is 62°F., January temperature is 45°F., and July 82°F. Parent Material: Alluvium from sedimentary rocks. Topography: Nearly level fans adjacent to stream channels. Elevation: 320 feet. Drainage: Well drained, moderate permeability, slow runoff. Soil Moisture: Moist.
Remarks: This soil has a distinct texture and color profile that does not appear to be due to stratification. The structural units of the subsoil are slightly coated with reddish-colored colloidal material.

HORIZON	DESCRIPTION
Ap	0 to 9 inches, yellowish brown (10YR 5/4) gravelly loam (very near gravelly silt loam), brown (10YR 4/3) moist; weak coarse granular structure; slightly hard, very friable or nearly loose, slightly plastic; abundant small roots present; strongly acid (pH 5.5); abrupt smooth boundary.
A1	9 to 21 inches, yellowish brown gravelly loam; weak granular structure; color dry and moist and consistence similar to layer above; abundant small roots; medium acid (pH 5.9); clear wavy boundary.
B21t	21 to 31 inches, strong brown (7.5YR 5/5) gravelly loam, brown (7.5YR 4/4) moist; weak granular structure; slightly compact; slightly hard, friable, slightly plastic; abundant small roots; slightly acid (pH 6.4); gradual boundary.
B22t	31 to 43 inches, strong brown gravelly heavy loam (7.5YR 5/5), brown (7.5YR 4/4) moist; blocky structure; compact; hard, firm, plastic; plentiful small roots; neutral (pH 6.6); gradual boundary.
B3t	43 to 51 inches, strong brown gravelly heavy sandy loam, color dry and moist similar to layer above but very slightly less reddish; blocky structure; slightly compact; hard, friable, slightly to moderately plastic; few roots; neutral (pH 6.7); clear wavy boundary.
C?	57 to 65 inches, light yellowish brown (10YR 6/4) very gravelly coarse sandy loam, color moist similar to layer above; massive; slightly hard, loose, nonplastic; very few roots; neutral (pH 6.9).
C ?	84 to 107 inches, light yellowish brown (10YR 6/4) very gravelly coarse sandy loam (near gravelly loamy coarse sand), yellowish brown (10YR 5/5) moist; structure and consistence similar to layer above; very few roots present; neutral (pH 6.8).

1/ The Greenfield series is in a coarse-loamy, mixed, thermic family of Typic Haploxeralfs. This pedon is in a fine-loamy family of the same subgroup.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Huichica loam variant **LOCATION** Sonoma County, California

SOIL FAMILY: Typic Haploxeralf, fine-loamy, mixed, thermic.

SOIL NOS. S61Calif-49-8 **LAB. NOS.** 61438 - 61445

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0- 8	Ap	1.7	2.9	5.6	19.4	13.7	45.4	11.3	47.0	24.4	5	1
8-19	A12	1.7	3.0	5.3	19.1	12.8	46.3	11.8	46.3	25.0	5	1
19-24	A2	1.2	3.0	5.3	19.1	13.3	46.5	11.6	47.1	25.2	5	1
24-31	B2t	0.9	3.0	5.1	17.6	11.8	38.2	23.4	44.0	17.5	4	1
31-42	B3tg	2.2	5.2	5.8	20.0	11.5	30.7	24.6	37.5	17.5	12	1
42-48	C1mg	9.2	17.6	13.7	18.6	6.7	14.4	19.8	24.3	7.1	21	cosl - scl
48-54	IIC2mg	18.3	23.1	9.4	17.5	8.9	15.5	7.3	26.9	7.2	0	cosl-lcos
54-66	IIC3	4.3	6.9	7.0	22.1	13.6	32.1	14.0	44.3	15.4	12	fsl

pH 8C1a H_2O 1:1	pH 8C1c KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	Ext. Iron 6C1b % Fe	4B2 Soil water 15 atmos. Pct.
5.7	4.4	0.82	0.079	10	0.4	5.2
5.6	4.2	0.29	0.045		0.4	5.3
5.9	4.3	0.18	0.035		0.3	5.2
5.8	4.0	0.15			0.4	11.6
5.4	4.0	0.08			0.3	12.1
5.4	3.8	0.03			0.6	10.7
5.5	3.9	0.02			0.5	14.7
6.1	4.3	0.01			0.6	14.1

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 6N2b Ca	6G2c Mg	6H2a H	6P2a Na	6Q2a K	BASE SAT. % 5C3	Sum of Cations 5A3a meq/100g.	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →							
11.5	4.2	1.7	4.9	0.1	0.2	56	11.1	
10.4	3.6	1.9	4.2	0.2	0.2	58	10.1	
9.8	3.0	2.7	3.5	0.2	0.2	64	9.6	
18.5	5.2	7.6	4.0	0.7	0.2	77	17.7	
19.7	5.5	8.5	3.7	1.0	0.2	80	18.9	
19.7	5.4	8.1	3.5	1.2	0.1	81	18.3	
35.4	10.7	15.7	5.5	2.8	0.1	84	34.8	
30.7	10.1	14.7	4.6	2.1	0.2	85	31.7	

HUICHICA LOAM variant 1/
S61 Calif-49-8

Location: Sonoma County, California. Northwest corner of SE1/4, SE1/4, section 5, T. 7 N., R. 8 W. (Matteri Ranch). 165 feet west of fence corner. Date of Sampling: June 26, 1961. Collectors: Reuben Nelson, Leo C. Klameth, V. C. Miller, G. Lambert, J. H. Kashiwagi, F. Graham. Classification: **Typic Haploxeralf, fine-loamy, mixed, thermic.**

Vegetation: Annual grasses, a few perennial grasses and a few scattered oaks. Climate: Annual precipitation 29.4 inches, average temperature 57.6° F., average January temperature 46.5° F., average July temperature 66.7° F. Parent Material: Mixed valley alluvium. Elevation: About 135 feet. Relief: Hummocky on 1 - 2 percent slope. Drainage: Imperfect drainage, slow runoff, moderately slow to very slow permeability. Biological Activity: Abundant worm casts in zone 8-19 inches from surface. Use: Oat hay.

HORIZON	DESCRIPTION
Ap RSL No. 61438	0 to 8 inches, light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) when moist; massive; slightly hard when dry, very friable when moist, slightly sticky and plastic when wet; abundant very fine and fine roots; many very fine and fine tubular and interstitial pores; strongly acid, pH 5.3; clear, wavy boundary.
A12 RSL No. 61439	8 to 19 inches, light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) when moist; massive; slightly hard when dry, very friable when moist, sticky and plastic when wet; abundant very fine and fine roots; many fine interstitial and tubular pores; strongly acid, pH 5.3; occasional shot size (iron manganese) concretion; clear, wavy boundary.
A2 RSL No. 61440	19 to 24 inches, light brownish gray (10YR 6/2) silty clay loam, dark grayish brown (10YR 4/2) when moist; massive; very friable when moist, sticky and plastic when wet; plentiful fine and very fine roots, many fine interstitial and tubular pores; medium acid pH 5.7; scattered shot size (manganese and iron) concretions; a thin white layer concentrated at bottom of this horizon is only a few millimeters thick, too thin to sample; abrupt, wavy boundary.
B2t RSL No. 61441	24 to 31 inches, light brownish gray (10YR 6/2) sandy clay loam with common fine distinct mottles of yellowish brown (10YR 5/4), brown (10YR 5/3) when moist; weak coarse prismatic with a suggestion of columnar structure, breaking to weak angular blocks; very hard when dry, very firm when moist, sticky and plastic when wet; plentiful very fine and fine roots; common very fine and fine tubular pores; continuous, thick clay films in pores and on ped faces; medium acid, pH 5.7; scattered shot size (manganese) concretions; diffuse, irregular boundary.
B3tg RSL No. 61442	31 to 42 inches, light brownish gray (10YR 6/2) and light gray (10YR 7/2) gravelly clay loam with common fine distinct mottles of light yellowish brown (10YR 6/4) when dry, grayish brown (2.5Y 5/2) with dusky red (10R 3/3) (manganese) stains when moist; massive breaking to weak coarse prismatic structure; firm when moist, slightly sticky and slightly plastic when wet; abundant dead roots in fracture planes; common very fine and fine tubular and interstitial pores; continuous, thick clay films on fracture planes and in pores; clear, wavy boundary. Small lenses and knots of weakly cemented material in this horizon.
C1mg RSL No. 61443	42 to 48 inches, grayish brown (2.5Y 5/2) gravelly loam with common fine distinct mottles of light olive brown (2.5Y 5/4) when dry, light olive brown (2.5Y 5/4) with dusky red (10R 3/3) (manganese) staining when moist; massive; nonsticky and nonplastic when wet; dead roots in fracture planes; common very fine and fine tubular and interstitial pores; continuous, thick clay films on fracture planes; continuous, moderately thick clay films in pores and on bridges; medium acid, pH 5.7; spotty weak cementation and thin cemented layer at top of horizon; abrupt, wavy boundary.
IIC2mg RSL No. 61444	48 to 54 inches, light brownish gray (2.5Y 6/2) with common fine faint grayish brown (2.5Y 5/2) mottles when dry, dark grayish brown (10YR 4/2) with dusky red (10R 3/2) (manganese) stains when moist; this is a strongly cemented layer so texture is not recorded; massive with a few fine vertical cracks; nonsticky and nonplastic (when pulverized); fine and very fine dead roots in vertical cracks, common very fine and fine tubular and interstitial pores; continuous thick clay films in the vertical cracks; medium acid, pH 6.0; clear, irregular boundary.
IIC3 RSL No. 61445	54 to 66 inches +, light brownish gray (2.5Y 6/2) gravelly clay loam with common fine faint mottles of olive brown (2.5Y 4/4) when dry, olive brown (2.5Y 4/4) with dark brown (10YR 3/3) (manganese) stains when moist; massive; slightly sticky and slightly plastic when wet; dead roots on fracture planes; common very fine and fine tubular pores; continuous, thick clay films in pores; slightly acid, pH 6.5; scattered (manganese) stains; iron concretions in spots; weak spotty cementation.

1/ The Huichica series is in a fine, montmorillonitic, thermic family of Abruptic Haplic Durixeralfs. This pedon has less than a 15 percent clay increase from the A to the B horizon, does not have a duripan within 1 meter depth and has an argillic horizon with less than 35 percent clay.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Haploxeralf, fine-loamy, mixed, thermic
SOIL Montpellier gravelly loam SOIL Nos. S4557-11 LOCATION Tehama County, California

SOIL SURVEY LABORATORY _____ LAB. Nos. _____

Depth (In.)	Horizon	Size class and particle diameter (mm)													Coarse fragments		
		Total			Sand					Silt		Int. II (0.2–0.02)	(2–0.1)				
		Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	0.05–0.02	Int. III (0.02–0.002)				> 2	2 – 19	19 – 76
		Pct. of < 2 mm													Pct.	Pct. of < 76mm	
0-7	A11	44.3	44.9	10.8	10.8	9.0	4.8	8.1	11.6	21.4	23.5		32.7				
7-13½	A12	44.9	43.3	11.8	12.3	8.7	4.7	8.0	11.2	20.2	23.1		33.7				
13½-20	B21t	37.4	32.5	30.1	10.8	7.2	3.9	6.4	9.1	14.4	18.1		28.3				
20-26	B22t	36.6	33.0	30.4	9.2	7.0	4.1	7.2	9.1	14.9	18.1		27.5				
26-32	B23t	37.5	32.4	30.1	9.3	7.4	4.4	7.3	9.1	13.7	18.7		28.4				
32-41	B24t	43.5	22.2	34.3	12.5	10.6	6.0	7.9	6.5	7.7	14.5		37.0				
41-50	C	50.0	16.6	33.4	7.9	15.3	12.9	8.9	5.0	5.1	11.5		45.0				

Depth (In.)	6A2a Organic carbon	6B1a Nitrogen	C/N		Carbonate as $CaCO_3$		Bulk density				Water content					pH
																8C1a
	Pct	Pct.			Pct.		g/cc	g/cc	g/cc		Pct.	Pct.	Pct			(1:1)
0-7	0.39	0.046														5.5
7-13½	0.21	0.034														5.9
13½-20	0.29	0.051														6.6
20-26	0.17	0.030														7.5
26-32	0.10	0.025														7.5
32-41	0.06	0.022														7.5
41-50	0.05	0.020														7.3

Depth (In.)	Extractable bases 5B1a				Sum of bases	6H2a Ext. Acidity	5A3a CEC Sum	Base saturation 5C3 Sum
	Ca 6N2b	Mg 6O2b	Na 1/	K 2/				
	meq/100 g							Pct.
0-7	3.1	4.0	0.05	0.13	7.3	3.2	10.5	69
7-13½	5.3	3.3	0.26	0.08	8.9	2.8	11.7	76
13½-20	5.3	13.3	1.10	0.12	19.8	3.0	22.8	87
20-26	4.8	15.2	1.49	0.10	21.6	2.1	23.7	91
26-32	4.8	15.8	1.91	0.11	22.6	1.6	24.2	93
32-41	6.9	16.5	2.16	0.18	25.7	1.9	27.6	93
41-50	6.8	12.7	1.83	0.13	21.6	1.6	23.1	93

Depth (In.)

1/ Gravimetrically as sodium uranyl magnesium acetate

2/ Precipitated as potassium sodium cobaltinitrite and titrated as potassium permanganate

MONTPELLIER GRAVELLY LOAM
S4557-11

Location: Tehama County, California. Pit located 3/4 mile N. of the County road bend 6 miles west and 1 mile north of Corning. Date of Sampling: April 4, 1945.

Description by: R. C. Roberts and R. A. Gardner. Collectors: R. C. Roberts, F. O. Youngs, R. A. Gardner, L. T. Alexander, H. Jenny and R. E. Storie.

Classification: Typic Haploxeralf, fine-loamy, mixed, thermic.

Vegetation: Used for grazing. Vegetation is short annual grasses and associated herbaceous plants. Climate: Mean annual precipitation is about 19 inches; average annual temperature is about 62°F., January 45°F., July 82°F. Parent Material: Gravelly terrace alluvium. Topography: Gently undulating older terraces. On a slope of about 2 percent. Site has a distinct "hogwallow" microrelief. Elevation: 350 feet. Drainage: Well drained, very slow permeability, slow runoff. Soil Moisture: Moist.

Remarks:

This soil has some of the characteristics of the Redding soils, as indicated by some cementation below layer 3. Deep road cuts near the pit show that the material immediately below the claypan is in various stages of cementation, and within a distance of a few feet will range from indurated to no cementation. The material at lower depths is loose and gravelly.

HORIZON	DESCRIPTION
A11	0 to 7 inches, yellowish red (5YR 5/6) gravelly loam, red (2.5YR 4/6) moist; weak granular structure; hard, friable, slightly plastic; abundant small roots; strongly acid (pH 5.5); clear smooth boundary.
A12	7 to 13.5 inches, yellowish red (5YR 5/5) dry and moist, gravelly loam; weak granular structure; hard, friable, slightly plastic; few small roots; medium acid (pH 5.9); abrupt wavy boundary.
B21t	13.5 to 20 inches, yellowish red (5YR 5/5) gravelly clay loam, yellowish red (5YR 5/5) moist; weak blocky structure; compact; very hard, firm, plastic; very few roots; neutral (pH 6.6); clear boundary.
B22t	20 to 26 inches, yellowish red gravelly clay loam containing a slight amount of gravel; color dry and moist similar to layer above; coarse blocky structure; compact, weakly cemented; very hard, firm, plastic; very few roots; mildly alkaline (pH 7.5); gradual boundary.
B23t	26 to 32 inches, red (2.5YR 4/6) gravelly clay loam, red (10R 4/6) moist; strong coarse blocky structure; compact, weakly cemented; very hard, firm, plastic; very few roots; mildly alkaline (pH 7.5); wavy gradual boundary.
B24t	32 to 41 inches, yellowish red (5YR 4/6) gravelly clay loam (near gravelly sandy clay), red (2.5YR 4/6) moist; reticulate mottling; massive; very compact; extremely hard, very firm, plastic; very few roots; mildly alkaline (pH 7.5); clear boundary.
C	41 to 50 inches, yellowish red, sandy clay loam (near sandy clay) containing a slight amount of gravel. Color dry and moist, consistence, and structure similar to layer above but slightly less compact. Reticulate mottling more pronounced than above; weathered gravel also cause yellowish streaking; very few roots; neutral (pH 7.3).

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Montpellier fine sandy loam **LOCATION** Riverside County, California

SOIL FAMILY: Typic Haploxeralf, fine-loamy, mixed, thermic

SOIL NOS. S55Calif-33-14 **LAB. NOS.** 55593-597

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 >2 1/	TEXTURAL CLASS
0-10	A1	4.1	8.4	6.7	17.3	20.7	34.2	8.6	53.8	12.5	5	sl
10-24	B2	2.4	4.7	4.3	12.4	14.7	30.2	31.3	40.4	12.8	0	cl
24-38	B2ca	2.0	4.4	4.4	15.3	19.1	31.7	23.1	48.0	13.4	1	l
38-60	Cca	5.4	9.4	7.4	17.8	18.4	27.7	13.9	47.3	10.4	1	sl
60+	C	28.0	22.6	8.3	10.8	6.7	14.0	9.6	18.8	7.8	67	cos1

	pH		ORGANIC MATTER				8Ala Elec. Conduc.	6E1b	6F1a	MOISTURE TENSIONS		
8C1b SATURATED PASTE 1:1	8C1a 1:5	8C1a 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	EC x10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	4B1a 1/10 ATMOS. %	4B1a 1/3 ATMOS. %	4B2 15 ATMOS. %
5.4		6.2	0.40	0.041	9.8		0.9			21.9	11.8	3.7
7.0		8.1	0.24	0.032			1.0					12.0
7.6		8.7	0.07				3.6	tr.				9.7
7.3		7.9	0.02				6.5	tr.				7.1
6.6		7.2	0.01				7.2					4.7

5A2a	EXTRACTABLE CATIONS 5B					BASE SAT. %	SATURATION EXTRACT SOLUBLE 8A				8A
CATION EXCHANGE CAPACITY ←(Na)	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	5C3	6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg	6K1a	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →				
7.9	3.3	1.4	2.4	0.2	0.5	69	3.3	0.6	4.3		22.0
22.8	10.4	8.1	1.7	1.5	0.3	92	6.1	Tr.	2.1		43.8
19.4	11.4	7.6	-	1.7	0.3	100+	21.5	0.2	11.1		41.4
14.5	10.9	5.4	-	1.5	0.2	100+	36.0	0.2	25.6		30.6
10.1	5.0	3.6	0.9	0.9	0.1	91	35.0	0.4	30.7		20.9

1/ Percent of the whole soil

MONTPELLIER FINE SANDY LOAM
S55Calif-33-14

Collectors: Fred Eggers, Arnold Knecht, Floyd G. Stephens, W. G. Harper, Reuben E. Nelson and F. F. Harradine
Date of Sampling: December 8, 1955.
Description by: W. G. Harper.

Location: On Vail Co. Ranch - 1000' E of N 1/4 corner, Sec. 23, T7S, R2W, about 7 miles NE of Temecula, Riverside County, California.

Elevation: About 1,425 feet.

Precipitation: About 12 inches

Classification: Typic Haploxeralf, fine-loamy, mixed, thermic.

California Group: IV

Vegetation: Fallow, following dry-farmed small grain, probably barley.

Parent Material: Old alluvium; Pleistocene non-marine deposits; chiefly derived from granitic materials.

Physiography: Terrace, nearly level top but severely dissected.

Drainage: Surface drainage is good. Internal drainage is very slow.

HORIZON		DESCRIPTION
A1	0-10"	Brown (10YR 5/3 dry, dark brown 4/3 moist) fine sandy loam; moderately defined medium granular; non-sticky when wet, very friable, slightly hard; moderately permeable; many plant roots; pH on dilution 6.0.
B2	10-24"	Reddish-brown (2.5YR 4/4 dry, dark reddish-brown 3/4 moist) fine sandy clay; strongly defined medium prismatic; sticky and plastic, very firm, extremely hard; very slowly permeable; fair amount of plant roots; thin grayish vesicular layer on tops of prisms; pH on dilution 6.5.
B_{2ca}	24-38"	Brown (7.5YR 5/4 dry, dark brown 7.5YR 4/4 moist) fine sandy clay; strongly defined, medium prismatic; sticky and plastic, very firm, extremely hard; few roots; strongly calcareous; very slowly permeable; pH 8.0.
C_{ca}	38-60"	Pale-brown (10YR 6/3 dry, dark grayish-brown 4/2 moist) sandy loam; massive; slightly sticky, firm, hard; strongly calcareous; weakly cemented; pH 7.5; flakes of manganese present.
C	60"+	Brown (10YR 5/3 dry, dark brown 10YR 4/3 moist) gravelly sandy loam; massive; slightly sticky, firm, hard; pH 7.0.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Montpellier fine sandy loam (taxajunct) **LOCATION** Riverside County, California

SOIL FAMILY: Typic Haploxeralf, fine-loamy, mixed, thermic.

SOIL NOS. S55Calif-33-15 **LAB. NOS.** 55598-603

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)								3A1	2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	>2 1/	
0-8	A11	2.8	5.6	4.6	19.1	26.4	35.7	5.8	63.2	12.8	2	vfsl
8-13	A12	2.2	5.1	4.4	17.9	25.8	36.6	8.0	62.0	13.4	2	vfsl
13-18	A2	2.8	5.0	4.3	15.9	22.9	38.3	10.8	57.2	15.4	2	l
18-31	B2	1.3	3.7	3.1	12.0	16.7	30.3	32.9	43.3	12.5	3	cl
31-39	B2ca	2.2	3.4	2.5	11.9	19.7	30.7	29.6	46.7	12.7	2	cl
39-57	Cca	4.1	6.1	4.4	15.9	21.0	26.5	22.0	48.5	10.2	4	scl

	pH		ORGANIC MATTER				8A1a Elec. Conduc.	6E1b	6F1a	MOISTURE TENSIONS		
8C1b SATURATED PASTE 1:1	8C1a 1:5	8C1a 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	EC×10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	4B1a 1/10 ATMOS. %	4B1a 1/3 ATMOS. %	4B2 15 ATMOS. %
5.4		5.9	0.38	0.038	10.0		0.20			20.4	11.5	3.2
5.1		5.7	0.27	0.034	8.0		0.31			21.8	12.8	3.9
6.1		6.8	0.14				0.29			22.1	14.7	4.8
7.2		8.2	0.27				0.85					12.5
8.0		9.0	0.13				2.0	2				12.1
8.0		8.9	0.08				3.4	Tr.				9.9

5A2a	EXTRACTABLE CATIONS 5B					BASE SAT. %	SATURATION EXTRACT SOLUBLE 8A1				8A
CATION EXCHANGE CAPACITY ↔ Na	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	5C3	6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg		6K1a	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
7.0	2.3	0.9	2.7	0.2	0.2	57	1.0	0.1	0.6			23.2
7.9	3.0	3.9	3.0	0.2	0.2	71	1.3	0.1	1.0			23.3
9.9	4.6	2.3	2.3	0.6	0.1	77	2.0	Tr.	0.4			21.4
19.5	8.3	6.7	2.1	2.1	0.1	89	6.6	Tr.	0.8			39.9
18.3	14.5	6.3	-	2.8	0.1	100	16.0	0.1	2.1			45.4
13.9	5.6	4.7	-	2.6	0.1	100	26.3	0.1	3.2			38.4

1/ Percent of the whole soil

MONTPELLIER FINE SANDY LOAM (taxadjunct) 1/
S55Calif-33-15

Location: On right-of-way west side of U. S. Highway 395, 1000 north of junction with State Highway 71, near northwest corner, Sec. 13, T. 8 S., R. 3 W, about 2 miles north of Temecula, Riverside County, California.
Date of Sampling: December 9, 1955.
Description by: W. G. Harper. Collectors: Fred Eggers, Arnold Knecht, Floyd G. Stephens, W. G. Harper, and Reuben E. Nelson.
Classification: Typic Haploxeralf, fine-loamy, mixed, thermic.
Vegetation: Alfileria and annual grasses. This site was probably dry-farmed to grain prior to the construction of the new highway (about 1945). Precipitation: About 12 inches. Parent Material: Old alluvium. Pleistocene non-marine deposits; chiefly derived from granitic materials. Physiography: Terrace with nearly level top but severly dissected. Elevation: About 1100 feet. Drainage: Surface drainage is good. Internal drainage is very slow.

HORIZON		DESCRIPTION
A11	0- 8"	Brown (10YR 5/3 dry, dark-brown 4/3 moist) fine sandy loam; weakly defined medium granular; slightly sticky, very friable, loose; moderately permeable; many plant roots; pH 6.0; clear smooth boundary.
A12	8-13"	Brown (10YR 5/3 dry, dark-brown 4/3 moist) fine sandy loam; weakly defined medium subangular blocky; slightly sticky, friable, soft; moderately permeable; many plant roots; pH 6.0; clear smooth boundary.
A2	13-18"	Pale-brown (10YR 6/3 dry, dark-brown 4/3 moist) fine sandy loam; weakly defined medium subangular blocky; somewhat vesicular; slightly sticky, friable, soft; moderately permeable; many plant roots; pH 6.2; abrupt smooth boundary.
B2	18-31"	Dark-brown (7.5YR 4/4 dry, dark-brown 3/2 moist) clay; strongly defined coarse columnar with rounded caps on columns; plastic, extremely firm, extremely hard; very slowly permeable; few plant roots; pH 7.5; clear smooth boundary.
B-2$_{ca}$	31-39"	Brown (7.5YR 5/4 dry, dark-brown 3/2 moist) clay; strongly defined coarse columnar; plastic, extremely firm, extremely hard; very slowly permeable; very few plant roots; strongly calcareous with both disseminated and segregated lime; pH 8.0; clear smooth boundary.
Cca	39-57"	Brown (10YR 5/3 dry, dark reddish-brown 5YR 3/2 moist) sandy clay; massive; plastic, very firm, hard; very slowly permeable; strongly calcareous; pH 8.0.
D	57"+	A gravelly, cobbly layer of mixed rock material.

1/ The color of the argillic horizon is outside the limits recognized for the Montpellier series.

SOIL SURVEY LABORATORY ..... Riverside, California

SOIL TYPE Ramona loamy coarse sand **LOCATION** Riverside County, California

SOIL FAMILY: Typic Haploxeralf, fine-loamy, mixed, thermic

SOIL NOS. S57Calif-33-8 **LAB. NOS.** 57507 - 57512

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0- 9	Ap	13.4	23.6	14.0	22.0	10.0	12.1	4.9	30.4	3.7	5	lcos
9-20	A1	11.4	21.4	13.6	22.4	11.2	14.3	5.7	34.2	3.7	5	lcos
20-28	B1	5.9	18.2	14.5	22.5	11.7	19.0	8.2	36.7	6.3	3	sl
28-36	B21	6.4	11.8	7.5	12.3	9.9	29.4	22.7	32.7	13.7	2	1
36-48	B22	5.9	10.9	8.2	14.7	10.6	29.2	20.5	35.6	12.7	2	1
48-60+	C1	3.7	9.4	7.8	17.9	12.8	30.7	17.7	42.3	12.0	2	1

pH 8C1b Saturated Paste 1:1	pH 8C1a 1:10	4A3a Bulk Density g/cc	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6I1a CO_3 meq/l	8A1a Elec. Conduc. mmhos/cm. at 25° C.	6E1b $CaCO_3$ equivalent %	6J1a HCO_3 meq/l	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
6.2	7.6	1.71	0.15	0.019		0.0	1.3	0	1.5	12.8	5.9	1.9
6.1	6.9	1.79	0.11	0.016		0.0	1.7	0	1.4	14.2	7.0	2.2
6.1	6.8	1.81	0.08			0.0	2.2	0	1.1	15.5	8.6	2.7
6.5	7.0	1.82	0.09			0.0	1.1	0	1.7			7.8
6.7	7.0	1.92	0.08			0.0	0.9	0	2.0			7.7
7.6	8.2	1.84	0.01			0.0	1.0	Tr	3.2			6.4

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil						milliequivalents per liter					
4.0	2.0	0.8	1.6	0.4	0.4	69	2.5	2.1	5.4	2.4	2.4	19.2
4.2	2.2	1.2	1.7	0.4	0.3	71	3.8	1.5	8.0	0.6	2.2	18.6
5.6	3.1	1.0	2.8	0.4	0.3	63	2.8	0.7	13.4	4.5	4.3	18.4
14.6	7.8	3.0	2.3	0.4	0.4	83	1.8	0.2	5.4	2.6	2.4	29.1
14.6	8.8	3.7	0.6	0.4	0.2	96	1.9	0.0	3.7	2.4	1.8	31.9
12.4	13.8	3.4	0.2	0.5	0.2	99	2.4	0.1	4.2	2.7	2.2	29.8

1/ Percent of the total soil

RAMONA LOAMY COARSE SAND
S57Calif-33-8

Location: 500 feet south and 30 feet west of east 1/4 corner of Sec. 9, T. 4 S., R. 3 W. On Floyd Bonge Ranch, about 4 miles northeast of Perris, Riverside County, California. Date of Sampling: June 4, 1957.
Description by: Fred Eggers. Collectors: George Borst, R. E. Nelson, Cliff Henry, and Arnold Knecht.
Classification: Typic Haploxeralf, fine-loamy, mixed, thermic.
Vegetation: Irrigated potatoes. (Site in turn land near road). Precipitation: 12 inches. Parent Material: Granitic alluvium. Physiography: Alluvial fan. Elevation: 1,460 feet. Drainage: Well drained.
Remarks: Few roots in the Ap horizon and none below it. Occasional small pores throughout the profile. Weak discontinuous clay skins in the B1 horizon, moderately prominent clay skins in the B21 and B22 horizons and discontinuous moderately prominent clay skins in the C1 horizon. Potatoes in this field have been heavily fertilized with NH_4SO_4. This is the first irrigated crop after dry farmed grain.

HORIZON	DESCRIPTION
S57Calif-33-8-1 **Ap 0-9"**	**Brown (10YR 5/3 dry, dark brown 3/3 moist) loamy coarse sand; weakly defined fine crumb; slightly hard when dry, friable when moist; nonsticky and nonplastic when wet; moderately rapid permeability; pH 6.0; noncalcareous; gradual smooth lower boundary.**
S57Calif-33-8-2 **A1 9-20"**	**Brown (10YR 5/3 dry, dark brown 3/3 moist) loamy coarse sand; weakly defined fine crumb structure; slightly hard when dry, friable when moist; nonsticky and nonplastic when wet; moderately rapid permeability; pH 6.2 noncalcareous; abrupt smooth lower boundary.**
S57Calif-33-8-3 **B1 20-28"**	**Brown (7.5YR 5/4 dry, dark brown 3/4 moist) sandy loam; moderately defined medium subangular blocky; breaks to weakly defined fine crumb; slightly hard when dry, friable when moist; nonsticky and slightly plastic when wet; moderately permeable; pH 6.2; noncalcareous; clear smooth lower boundary.**
S57Calif-33-8-4 **B21 28-36"**	**Light brown to brown (7.5YR 6/4-5/4 dry, dark brown 3/4 moist) sandy clay loam; moderately defined medium subangular blocky breaking to weakly defined fine crumb; hard when dry, friable when moist; slightly sticky and plastic when wet; moderately permeable; pH 7.0; noncalcareous; gradual smooth lower boundary.**
S57 Calif-33-8-5 **B22 36-48"**	**Brown (7.5YR 5/4 dry, dark brown 3/4 moist) sandy clay loam; moderately defined medium angular blocky breaking to weakly defined fine crumb; hard when dry, firm when moist; slightly sticky and plastic when wet; moderate permeability; pH 7.5; noncalcareous; clear smooth lower boundary.**
S57 Calif-33-8-6 **C1 48-60"+**	**Yellowish brown (10YR 5/4 dry; dark brown 7.5YR 3/4 moist) light sandy clay loam; moderately defined medium angular blocky breaking to weakly defined fine crumb; hard when dry, firm when moist; slightly sticky and plastic when wet; moderately permeable; pH 8.0; slight effervescence in seams and pores.**

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Haploxeralf, fine-loamy, mixed, thermic
SOIL Tehama clay loam (taxad,junct) SOIL Nos. S64Calif-57-18 LOCATION Yolo County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64427 - 64434

Depth (in.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	Coarse fragments 1A2a: ≥ 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76 mm	
0-10	Ap	35.6	49.5	14.9	2.2	2.6	3.6	12.7	14.5	23.1	26.4	45.7	21.1			1		
10-15	B1	29.3	36.0	34.7	1.7	2.4	3.4	10.4	11.4	17.5	18.5	35.4	17.9			0		
15-29	B21t	25.9	42.4	31.7	0.9	1.6	2.8	9.8	10.8	16.8	25.6	33.7	15.1			0		
29-40	B22t	35.3	35.4	29.3	3.9	3.5	4.4	11.9	11.6	15.7	19.7	33.9	38.8			3		
40-53	B31t	44.2	33.3	22.5	6.7	6.3	6.3	12.5	12.4	16.6	16.7	35.7	31.8			24		
53-63	B32t	50.5	29.2	20.3	5.9	6.8	9.5	18.6	9.7	12.3	16.9	30.6	40.8			5		
63-75	C1	60.0	21.9	18.1	1.2	4.3	13.0	32.7	8.8	8.8	13.1	32.4	51.2			0		
75+	IIC2	73.5	14.1	12.4	1.5	6.6	17.1	41.3	7.0	6.4	7.7	30.2	66.5			0		

Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Atterberg limits: Plastic limit	Liquid limit	Plastic index	Water content: 4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility COLE in./in.	4D1 Extensibility COLE in./in.	pH: 8C1b Saturated Paste	8C1a H_2O 1:1	8C1a H_2O 1:10
	Pct.	Pct.		Pct.	Pct.	Pct. of < 0.4 mm			Pct.						
0-10	0.52	0.052	10		-	14	16	2		6.1				6.3	6.4
10-15	0.32	0.050	6		-					10.7				6.4	6.9
15-29	0.30	0.049	6		-	19	36	17		14.5				7.1	7.5
29-40	0.17				-					11.3				7.5	7.8
40-53	0.10				-					9.1				8.1	7.7
53-63	0.10				-					8.4				8.2	7.9
63-75	0.06				-	14	20	6		7.5				8.3	8.0
75+	0.06				-					5.7				8.3	8.0

Depth (in.)	Extractable bases: 6N2a Ca	6O2a Mg	6P2a Na	5B1a 6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 8A1: 6N1b Ca	6O1b Mg	6P1a Na	6Q1a K	6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter								mmho/cm
0-10	4.5	4.7	0.2	0.4	9.8	3.2	13.2										0.24
10-15	7.5	9.9	0.2	0.4	18.0	2.8	22.8										0.19
15-29	9.5	15.0	0.4	0.5	25.4		26.9										0.25
29-40	8.1	12.0	0.4	0.4	20.9		22.1										0.26
40-53	6.2	10.0	0.4	0.4	17.0		18.0										0.32
53-63	6.4	8.8	0.6	0.3	16.1		16.2										0.34
63-75	5.8	8.4	0.6	0.3	15.1		15.8										0.40
75+	5.0	5.7	0.6	0.2	11.5		12.4										0.28

Depth (in.)	8A Water at Saturation	Exch. bases: 5B3b Ca	5B3b Mg	5B1b Na	5D2 Exchangeable Na	5C2 Base Sat.	Gypsum	Clay mineralogy (< 0.002 mm.): Mont.	Verm.	Mica	Kaolin.
	Pct.	meq./100 g.			Pct.	Pct.	Pct.	X-ray			
0-10	26.8				2	74					
10-15	34.6				1	79					
15-29	45.5				2	94					
29-40	39.8				2	95					
40-53	37.9				2	94					
53-63	36.7				4	99					
63-75	32.0				4	96					
75+	32.7				5	93					

TEHAMA CLAY LOAM (taxadjunct) 1/
S64 Cal-57-18

Location: Yolo County, California. A pit located about .2 miles west of the intersection of Roads 89B and 8 and 50 feet south of Road 8 in the northwest corner of the SE¼ Sec. 27, T. 12N., R.1W. Area located about 2 miles south of Dunnigan. Photo ABB-42T-91. Date of Sampling: September 30, 1964.
Description by: G. J. Staidl. Collectors: R. E. Nelson, B. R. Brasher, G. M. Kennedy, W. F. Andrews, L. A. Bates, G. J. Staidl, C. B. Goudey.
Classification: Typic Haploxeralf, fine-loamy, mixed, thermic.
Vegetation: Cultivated, fallow, but usually barley is grown. Climate: Average annual precipitation is 15.3 inches; mean annual temperature 61°F. Parent Material: Alluvium from sedimentary rocks. Topography: Alluvial fan; plane; less than 1 percent slope. Elevation: 65 feet above sea level. Drainage: Runoff is slow; permeability is moderately slow to slow; drainage class is well drained. Soil Moisture: The profile was moist below 15 inches.
Remarks: (1) Truog soil reaction test used in field pH determination; (2) Paired sample No. 64 Cal. 57-19; (3) Diagnostic horizons-ochric epipedon and argillic horizon with over 35 percent clay; (4) B.P.R. Sample horizon Ap inches 0-10, B.P.R. sample horizon B21t inches 15-29, B.P.R. Sample horizon C1 inches 63-75; (5) The lower portion of the Ap has developed some platy structure; (6) The difference in structure of the B22t as compared to the B21t is probably due to the variation in moisture. The structure in the B22t was not readily observable in place but broke out to moderate coarse angular blocky structure; (7) In the B31 lenses of gravel varying in thickness from 1/4 to 3 inches.

HORIZON	DESCRIPTION
Ap RSL 64427	0 to 10 inches, pale brown (10YR 6/3) loam, brown to dark brown (10YR 4/3) when moist; massive lower portion platy structure; hard, friable, nonsticky and slightly plastic; medium acid (pH 6.0); abrupt smooth boundary.
B1 RSL 64428	10 to 15 inches, brown (10YR 5/3) clay loam, brown to dark brown (10YR 4/3) when moist; moderate coarse prismatic structure; very hard, friable, slightly sticky and plastic; very few very fine roots; many micro and few fine tubular pores; common thin clay films on ped faces and in pores; medium acid (pH 6.0); clear smooth boundary.
B21t RSL 64429	15 to 29 inches, yellowish brown (10YR 5/4) clay, dark yellowish brown (10YR 3/4) when moist; moderate coarse prismatic structure; extremely hard, firm, sticky and very plastic; very few micro roots; many micro tubular pores; many moderately thick clay films on ped faces and in pores; slightly acid (pH 6.5); gradual smooth boundary.
B22t RSL 64430	29 to 40 inches, yellowish brown (10YR 5/4) clay, dark yellowish brown (10YR 3/4) when moist; moderate coarse angular blocky structure; extremely hard, firm, sticky and very plastic; many micro tubular and interstitial pores; many thin clay films on ped faces, in pores and as bridges between sand grains; mildly alkaline (pH 7.5); clear smooth boundary.
B31t RSL 64431	40 to 53 inches, light yellowish brown (10YR 6/4) clay loam, dark yellowish brown (10YR 4/4) when moist; weak medium angular blocky structure; very hard, firm, slightly sticky and plastic; many micro tubular and interstitial pores; common thin clay films on ped faces, in pores and as bridges between sand grains; moderately alkaline (pH 8.0); diffuse boundary.
B32t RSL 64432	53 to 63 inches, light yellowish brown (2.5Y 6/4) gravelly sandy clay loam, dark yellowish brown (10 YR 4/4) when moist; weak medium angular blocky structure; very hard, firm, sticky and slightly plastic; many micro to very fine tubular and interstitial pores; common thin clay films on ped faces, in pores, and as bridges between sand grains; moderately alkaline (pH 8.0); clear wavy boundary.
C1 RSL 64433	63 to 75 inches, light yellowish brown (2.5Y 6/4) sandy loam, olive brown (2.5Y 4/4) when moist; massive; slightly hard, friable, slightly sticky and slightly plastic; many micro tubular pores; few thin clay films in pores; slightly effervescent disseminated lime; moderately alkaline (pH 8.0); abrupt wavy boundary.
IIC2 RSL 64434	75 inches, variegated loamy fine sand; single grain structure; soft, loose, nonsticky and nonplastic; many micro interstitial pores; moderately alkaline (pH 8.0).

1/ The Tehama series is in a fine-silty, mixed, thermic family of Typic Haploxeralfs. This pedon is in a fine-loamy family of the same subgroup.

SOIL FAMILY: Typic Haploxeralf, fine-loamy, mixed, thermic
SOIL Tehama clay loam (taxadjunct) SOIL Nos. S64Calif-57-19 LOCATION Yolo County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64435 - 64442

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	Coarse fragments 1A2a: > 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76 mm	
0-8	Ap	29.2	52.2	18.6	0.2	0.9	2.5	12.5	13.1	33.7	18.5	54.9	16.1			0		
8-15	A12	28.5	47.3	24.2	0.1	0.6	2.3	12.1	13.4	21.0	26.3	41.8	15.1			0		
15-21	B1	25.4	43.2	31.4	0.1	0.6	2.1	10.8	11.8	19.2	24.0	37.7	13.6			0		
21-32	B21t	27.4	41.2	31.4	0.1	0.5	2.4	12.2	12.2	18.7	22.5	38.7	15.2			0		
32-40	B22t	27.2	43.3	29.5	0.1	0.6	2.7	12.3	11.5	20.2	23.1	39.5	15.7			0		
40-55	B23t	31.7	41.3	27.0	0.7	2.4	5.1	13.7	9.8	17.9	23.4	35.9	21.9			0		
55-67	B3	39.0	34.9	26.1	1.5	4.9	9.2	15.8	7.6	13.5	21.4	28.6	31.4			0		
67-78+	C1	42.7	31.6	25.7	1.6	5.8	10.6	17.0	7.7	10.4	21.2	26.1	35.0			0		

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$		Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven dry		3B2 Cm	Water content	Water content: 4B1c 1/3 bar	Water content: 4B2 15 bar	4D1 Extensibility COLE	4D1 Extensibility COLE	pH: 8C1b Saturated Paste	pH: 8C1a H_2O 1:1	pH: 8C1a H_2O 1:10
	Pct.	Pct.		Pct.	Pct.		g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.	in./in.			
0-8	0.80	0.080	10	1.3	-		1.60	1.65		1.0		17.8	5.9	0.011	0.011		6.2	6.4
8-15	0.40	0.054	7	1.4	-		1.57	1.69		1.0		17.7	8.8	0.025	0.025		6.3	6.6
15-21	0.28	0.049	6	1.8	-		1.59	1.78		1.0		19.2	12.7	0.039	0.039		6.4	6.8
21-32	0.18			1.9	-		1.67	1.89		1.0		19.4	13.7	0.043	0.043		6.6	7.0
32-40	0.15			2.0	-		1.66	1.88		1.0		19.7	12.8	0.042	0.042		6.7	7.0
40-55	0.08			1.8	-		1.69	1.86		1.0		18.2	12.0	0.033	0.033		7.0	7.2
55-67	0.10			2.0	-		1.72	1.87		1.0		16.8	11.4	0.029	0.029		7.0	7.3
67-78+	0.09			2.0	-		1.68	1.84		1.0		16.6	11.5	0.030	0.030		7.1	7.3

Depth (In.)	Extractable bases 6N2a Ca	6O2a Mg	6P2a Na	5B1a 6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 8A1 6N1b Ca	6O1b Mg	6P1a Na	6Q1a K		6I1a CO_3	6J1a HCO_3	6K1a Cl	6L1a SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0-8	6.8	4.0	0.3	0.6	11.7	2.5	14.9											0.29
8-15	8.7	4.9	0.3	0.4	14.3	2.5	18.3											0.12
15-21	12.2	7.8	0.3	0.4	20.7	3.3	24.3											0.10
21-32	13.6	9.4	0.3	0.5	23.8	2.4	29.1											0.13
32-40	12.9	9.2	0.4	0.4	22.9	2.1	26.4											0.13
40-55	12.8	8.7	0.4	0.4	22.3	1.7	25.3											0.13
55-67	11.2	7.5	0.4	0.4	19.5	1.9	23.0											0.23
67-78+	11.6	7.4	0.4	0.4	19.8	1.4	21.7											0.25

Depth (In.)	8A Water at Saturation	Exch. bases 5B3b Ca	5B3b Mg	5B1b Na	5D2 Exchangeable Na	5C2 Base Sat.	Gypsum	Clay mineralogy (<0.002 mm.) 7A1: Mont.	Verm.	Mica	Kaolin.
	Pct.	meq./100 g.			Pct	Pct.	Pct.	X-ray 7A2			
0-8	35.9				2	78					
8-15	35.8				2	78		xxxx	-	-	x
15-21	42.8				1	85					
21-32	43.5				1	82					
32-40	41.6				2	87		xxxx	-	-	x
40-55	40.6				2	88					
55-67	39.7				2	85					
67-78+	36.4				2	91		xxxx	-	-	x

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

TEHAMA CLAY LOAM (taxadjunct) 1/
S64Cal-57-19

Location: Yolo County, California. A pit located 100 feet northwest of the southeast corner of Sec. 29, T. 9N., R.1W., 5 miles north of Winters. Photo ABB-2K-40. Date of Sampling: September 28, 1964.
Described by: C. B. Goudey. Collectors: R. E. Nelson, B. Brasher, G. M. Kennedy, W. F. Andrews, L. A. Bates, G. J. Staidl, C. B. Goudey.
Classification: Typic Haploxeralf, fine-loamy, mixed, thermic.
Vegetation: Barley Stubble. Climate: 19.5 inches average annual precipitation and mean annual temperature of 60°F. Parent Material: Alluvium from sedimentary rocks. Topography: Alluvial fan; plane; one percent slope (east; near crest). Elevation: 193 feet. Drainage: Runoff-slow; permeability-moderately slow to slow; well drained. Soil Moisture: Profile was moist throughout below 15 inches.
Remarks: (1) Truog field pH determinations; (2) Paired profile 64 Cal. 57-18; (3) Diagnostic horizons-ochric epipedon, argillic horizon, with over 30 percent clay; (4) 25.5° C soil temperature at 72 inches.

HORIZON	DESCRIPTION
Ap RSL 64435	0 to 8 inches, pale brown (10YR 6/3) loam, brown to dark brown (10YR 4/3) when moist; massive; hard, friable, slightly sticky and plastic; plentiful micro to very fine, few fine and few medium vertical roots; common very fine interstitial and common fine tubular pores; medium acid (pH 6.0); clear smooth boundary.
A12 RSL 64436	8 to 15 inches, pale brown (10YR 6/3) loam, brown to dark brown (10YR 4/3) when moist; massive; hard, friable, slightly sticky and plastic; plentiful micro to very fine, few fine random and few medium vertical roots; common very fine to fine tubular pores; few thin clay films in pores; medium acid (pH 6.0); clear smooth boundary.
B1 RSL 64437	15 to 21 inches, pale brown (10YR 6/3) clay loam, brown to dark brown (10YR, 4/3) when moist; moderate coarse prismatic structure; hard, firm, sticky and plastic; plentiful micro to very fine random and few fine to medium vertical roots; common micro to very fine tubular pores; common clay films on ped faces and pores; slightly acid (pH 6.2); clear smooth boundary.
B21t RSL 64438	21 to 32 inches, light yellowish brown (10YR 6/4) clay, dark yellowish brown (10YR 4/4) when moist; moderate coarse prismatic breaking to strong coarse angular blocky structure; very hard, very firm, sticky and plastic; plentiful micro to very fine horizontal and few fine to medium vertical roots; common micro tubular pores; many moderately thick clay films on ped faces and pores; slightly acid (pH 6.5); gradual smooth boundary.
B22t RSL 64439	32 to 40 inches, light yellowish brown (10YR 6/4) clay loam, dark yellowish brown (10YR 4/4) when moist; moderate coarse to medium angular blocky structure; very hard, very firm, sticky and plastic; few micro to very fine random roots; common micro tubular pores; many moderately thick clay films on ped faces and pores; slightly acid (pH 6.5); gradual smooth boundary.
B23t RSL 64440	40 to 55 inches, light yellowish brown (10YR 6/4) clay loam, dark yellowish brown (10YR 4/4) when moist; moderate coarse to medium angular blocky structure; very hard, very firm, sticky and plastic; few micro to very fine random roots; common micro and few fine tubular pores; moderately thick clay films on ped faces and pores; neutral (pH 7.0); diffuse boundary.
B3 RSL 64441	55 to 67 inches, light yellowish brown (10YR 6/4) clay loam, dark yellowish brown (10YR 4/4) when moist; weak coarse to medium angular blocky structure; very hard, very firm, sticky and plastic; few micro to very fine random roots; common micro and few fine tubular pores; moderately thick clay films on ped faces and pores; neutral (pH 7.0); clear smooth boundary.
C1 RSL 64442	67 to 78 inches, light yellowish brown (10YR 6/4) clay loam, dark yellowish brown (10 YR 4/4) when moist; massive; hard, firm, sticky and plastic; very fine, micro and very fine random roots; common micro tubular, few very fine to fine interstitial and tubular pores; common moderately thick clay films in pores; neutral (pH 7.0).

1/ The Tehama series is in a fine-silty, mixed, thermic family of Typic Haploxeralfs. This pedon is in a fine-loamy family of the same subgroup.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Unnamed silt loam **LOCATION** Alameda County, California

SOIL FAMILY: Typic Haploxeralf, fine-silty, mixed, thermic.

SOIL NOS. S59Calif-01-6 **LAB. NOS.** 59234 thru 59237

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-6	A_{11}	0.3	0.6	0.6	1.8	2.9	67.4	26.4	26.2	45.2	1	sil-sicl
6-13	A_{12}	0.1	0.4	0.4	1.1	3.5	62.2	32.3	24.1	42.3.	0	sicl
13-20	B_2	0.0	0.4	0.4	1.4	3.8	61.0	33.0	23.1	42.6	1	sicl
20-60+	D_r			not analysed								

pH 8C1b Saturated Paste 1:1	pH 8C1a 1:10	Organic Matter 6A1a Organic Carbon Pct.	6B1a Nitrogen Pct.	C/N	6E1b $CaCO_3$ Equivalent Pct.	8A1a Elec. Conduc. mmhos/cm. at 25°C.	4A3a Bulk Density gms. c.c.	4B2 Soil Water 15 atmos. Pct.
5.9	6.6	1.77	0.151	11.7		0.2	1.52	12.1
5.8	6.8	0.79	0.087	9.1		0.2	1.60	13.1
6.0	6.9	0.62	0.071	8.7		0.2	1.64	13.8

5A2a CATION EXCHANGE CAPACITY ←(Na)	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
32.0	11.9	11.5	7.1	0.3	0.4	79	1.1	0.1				49.5
33.0	12.7	13.2	6.9	0.5	0.3	80	1.2	<0.1				42.2
33.3	12.0	14.4	6.6	0.5	0.3	81	1.1	<0.1				43.3

UNNAMED SILT LOAM
S59Calif-01-6

Collectors: Dick Huff, Larry Welch, Lothair Grant.
Description by: Larry E. Welch.
Date of Sampling: May 6, 1959.

Location: Alameda County, California, in the SW1/4 of the SE1/4 of the NW 1/4 of Sec. 7, T3S, R1W, about 3 miles east of the center of Hayward.

Elevation: 450 feet.

Relief: Hilly uplands on a 25 percent southwest-facing, convex slope.

Drainage: Well drained, moderate runoff, moderate permeability.

Parent Material: Shale.

Climate: Rainfall about 20 inches.

Vegetation: Annual grasses and forbs.

Classification: Typic Haploxeralf, fine-silty, mixed, thermic.

HORIZON		DESCRIPTION
A_{11}	0- 6"	Olive (5Y 5/3) silt loam, olive brown (2.5Y 4/3) when moist; massive; hard when dry, friable when moist, slightly sticky and slightly plastic when wet; abundant very fine roots; many very fine pores; medium acid, pH 6.0; gradual, smooth lower boundary.
A_{12}	6-13"	Light olive brown (2.5Y 6/3) silt loam, olive brown (2.5Y 4/3) when moist; massive; hard when dry, friable when moist; slightly sticky and slightly plastic when wet; plentiful very fine roots; many very fine and few fine pores; few thin nearly continuous clay films in pores; medium acid, pH 6.0; clear, smooth lower boundary.
B_2	13-20"	Light yellowish brown (2.5Y 6/3) silty clay loam near silt loam, olive brown (2.5Y 4/3) when moist; massive; hard when dry, friable when moist, plastic and sticky when wet; plentiful fine roots; many fine and very fine pores; common thin continuous clay films in pores; medium acid, pH 6.0; clear, smooth lower boundary.
D_r	20-60"+	Grayish brown (2.5Y 5/2) shale, dark grayish brown (2.5Y 4/2) when moist; some tonguing of B_2 along cracks; medium acid, pH 6.0.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Pardee gravelly loam **LOCATION** Amador County, California

SOIL FAMILY: Lithic Haploxeralf, loamy-skeletal, mixed, thermic

SOIL NOS. 60Calif-3-22 **LAB. NOS.** 6096 - 60101

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)							3A1		2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0- 2	A11	4.6	17.7	6.9	9.5	5.5	44.3	11.5	28.5	26.7	22	1
2- 9	A12	6.3	15.7	6.9	9.5	6.3	44.3	11.0	29.9	26.2	26	1
9-14	B21t	5.3	14.4	6.6	8.9	5.8	42.1	16.9	27.1	25.9	18	1
14-17	B22t	7.1	14.1	7.0	9.0	5.9	39.7	17.2	26.4	24.5	33	1
17-18	B23t	4.3	12.8	5.2	4.4	2.2	14.6	56.5	9.3	10.7		c
18-41+	IIC1	11.4	39.7	11.5	6.2	2.8	10.2	18.2	8.6	7.5	57	cosl

8C1a pH H_2O 1:1	8C1c pH KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	6C1b "Free" Fe_2O_3 %	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
5.6	4.9	3.70	0.275	13.5				1.8			8.7
6.3	4.9	0.51	0.054	9.4				2.1			4.8
6.2	4.8	0.32	0.041					2.2			7.1
5.9	4.4	0.24	0.035					2.1			7.7
5.0	3.8	0.48	0.056								
5.4	4.1	0.08						1.0			16.4

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	5B1a 6Q2a K	BASE SAT. % 5C3	5A3a Sum of Cations meq/100g. soil	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →							
17.7	9.5	1.5	8.9	0.1	0.6	57	20.6	
8.9	5.6	1.0	3.2	0.1	0.3	77	10.2	
11.7	6.9	1.7	3.3	0.1	0.3	73	12.3	
13.1	6.9	2.6	3.7	0.2	0.2	73	13.6	
Not determined - sample exhausted								
28.1	17.2	9.1	3.9	0.5	0.2	87	30.9	

1/ Percent of the whole soil

PARDEE GRAVELLY LOAM 1/
S60Calif-3-22

Location: Amador County, California. On Strohm's Ranch, 0.3 mile west and 0.1 mile north of the southeast corner of Sec. 25, T. 5 N., R. 9 E., 1/2 mile east of Jackson Valley-Comanche Road, 3.5 miles northeast of Comanche; 1.6 miles southwest of Buena Vista Peaks.
Date of Sampling: May 3, 1960.
Description by: Grant Kennedy. Collectors: Grant Kennedy, Reuben Nelson, Robert Sketchley, Clifford Henry, John Rogers, Paul Nazar, and Jack McClelland.
Classification: Lithic Haploxeralf, loamy-skeletal, mixed, thermic.
Vegetation: Annuals - soft chess, filaree, ripgut, occasional stipa, scattered oaks. Climate: Mean annual rainfall - 22 inches; average temperature at Ione Station: January - 46° F.; July - 88° F.; mean annual temperature - 61° F. Parent material: Mixed coarse alluvium containing a high percentage of quartz and quartzite gravel and cobbles, overlying consolidated andesitic conglomerate. Topography: Gently sloping terrace in the lower foothills on a relatively smooth slope of 4 percent to the west with slightly hummocky micro-relief. Elevation: 550 feet.
Drainage: Well drained; moderate runoff; moderate permeability in the upper profile, moderately slow below.
Remarks: The lower IIB23t horizon is variable in thickness, the clay tonguing into the upper IIC1 horizon along cracks. The upper part of this clayey horizon appears to be degraded and has distinct gray coatings. Most of the IIB23t horizon is very thin (less than 1½ inches) but in one pocket in the pit it is 7 inches thick and the upper 2 inches is columnar. The soil was moist when described.

HORIZON	DESCRIPTION
A11 RSL No. 6096	0-2 inches, brown (7.5YR 4.5/3) gravelly loam, dark brown (7.5YR 3/4) when moist; massive; slightly hard, friable, slightly sticky and slightly plastic; abundant very fine roots; many very fine interstitial and tubular pores; slightly acid (pH 6.1); abrupt smooth boundary.
A12 RSL No. 6097	2-9 inches, brown (7.5YR 5/3.5) gravelly loam with about 15 percent cobbles, dark brown (7.5YR 3/4) when moist; massive; hard, friable, slightly sticky and slightly plastic; abundant very fine roots, many very fine pores; slightly acid (pH 6.3); gradual smooth boundary.
B21t RSL No. 6098	9-14 inches, brown (7.5YR 5/4) cobbly gravelly light clay loam with about 35 percent cobbles, reddish brown (5YR 4/4) when moist; massive; hard, friable, slightly sticky and plastic; plentiful very fine roots; many very fine, common fine, few medium, mainly tubular pores; thin, discontinuous clay films in pores; medium acid (pH 6.0); gradual smooth boundary.
B22t RSL No. 6099	14-17 inches, brown (7.5YR 5.5/4) gravelly clay loam with about 60 percent cobbles; reddish brown (5YR 4/4) when moist; massive; hard, friable, slightly sticky and plastic; plentiful very fine roots; many very fine and fine pores; thin discontinuous clay films in pores; medium acid (pH 5.8); abrupt slightly wavy lower boundary.
IIB23t RSL No. 60100	17-18 inches, brown (7.5YR 5/3) clay with 35 percent cobbles and with flecks of light gray (10YR 7/2) weathered sand, brown (7.5YR 4/2) when moist; massive; very hard, very firm, sticky and very plastic; plentiful very fine roots; common very fine tubular pores; thick clay films nearly fill all voids; strongly acid (pH 5.3); abrupt slightly wavy boundary, 1/4 to 2 inches thick, rarely up to 7 inches thick.
IIC1 RSL No. 60101	18-41 inches +, very pale brown, light brownish gray, brownish yellow, and gray (10YR 7/3, 6/2, 6/6, and 5Y 5/1) consolidated andesitic conglomerate, grayish brown, brown, gray, and dark gray (10YR 5/2, 7.5YR 4/4, and 5Y 4/1 and 5/1) when moist; massive; very hard, extremely firm, essentially no roots or pores; medium acid (pH 6.0).

1/ Note that the IIC horizon is treated as a lithic contact. Parts of the argillic horizon have base saturation of less than 75 percent, but no Lithic Ultic Haploxeralf has been provided for.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Pardee gravelly loam (taxadjunct) **LOCATION** Amador County, California

SOIL FAMILY: Lithic Haploxeralf, loamy-skeletal, mixed, thermic

SOIL NOS. 60Calif-3-23 **LAB. NOS.** 60102 - 60107

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0- 2	A11	9.6	14.7	8.6	15.8	10.4	32.2	8.7	34.0	17.9	47	sl-cosl
2- 7	A12	6.6	12.9	7.8	17.3	12.3	34.0	9.1	39.8	17.6	27	fsl
7-13	B1	6.4	12.1	7.4	14.9	14.0	33.1	12.1	38.5	17.5	23	fsl
13-17	B2t	6.2	10.3	6.3	12.4	9.2	27.5	28.1	28.2	16.1	40	cl-scl
17-29	IIC1	14.6	24.6	8.5	6.7	3.5	16.5	25.6	12.3	11.2	73	scl
29-38+	IIC2	Not determined										

pH 8C1a H_2O 1:1	pH 8C1c KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	6C1b Free iron as % Fe_2O_3	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
5.4	4.8	2.40	0.168	14.3				1.4			5.7
5.6	4.3	0.29	0.037	7.8				1.5			3.6
5.6	4.3	0.14	0.030					1.5			4.6
5.3	4.1	0.50	0.046	10.8				1.8			11.9
5.4	4.2	0.36	0.030					1.0			16.9
		Not determined									

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K	5B1a BASE SAT. % 5C3	Clay mineralogy (<0.002 mm.) Mont.	Verm.	Mixed layer Mica-Verm. X-ray 7A2	Mica	% Kaolin DTA 7A3	% Gibb. DTA 7A3
	milliequivalents per 100g. soil						←			→		
10.4	4.8	1.0	5.4	0.1	0.5	54						
6.5	2.3	0.8	3.1	0.1	0.1	52						
6.5	2.9	1.2	2.5	0.1	0.1	63	x	-	-	x	30	-
16.1	8.4	4.1	5.4	0.2	0.2	70						
26.8	15.6	7.9	6.7	0.4	0.3	78	xxx	-	-	-	25	-
		Not determined										

1/ Percent of the whole soil

\- = looked for but not found
tr = detected, very small amoun
x = detected, small amounts
xx = moderate amounts
xxx = large amounts
xxxx = predominant amounts

PARDEE GRAVELLY LOAM (taxadjunct) 1/
S60Calif-3-23

Location: Amador County, California. 0.1 mile east of the W 1/4 corner of Sec. 26, T. 5 N., R. 9 E., 1/4 mile northwest of Grapevine Gulch; 300 feet southeast of Rabbit Creek Road (Jackson Valley to Clements Road), 2.7 miles west-southwest of Buena Vista Peaks.
Date of sampling: May 3, 1960.
Description by: Grant Kennedy. Collectors: Grant Kennedy, Reuben Nelson, Robert Sketchley, Clifford Henry, John Rogers, Paul Nazar, and Jack McClelland.
Classification: Lithic Haploxeralf, loamy-skeletal, mixed, thermic.
Vegetation: Annuals - filaree, soft chess, ripgut. Climate: Mean annual rainfall - 20 inches; average temperatures (Ione Station): January 46° F.; July - 88° F.; mean annual - 61° F.
Parent material: Mixed coarse alluvium containing a high percentage of quartz and quartzite gravel and cobbles, overlying consolidated andesitic conglomerate. Topography: Gently sloping terrace in the lower foothills of the Sierra Nevada on a smooth but slightly hummocky slope of 3 percent which faces to the southwest. Elevation: 300 feet. Drainage: Well drained; moderate runoff; moderately permeable through the solum, moderately slow or slow below.
Remarks: This soil is a moderately developed Noncalcic Brown soil with many properties in common with the Perkins series but has a thinner solum and is more acid than the Perkins where modal. The soil was moist when described.

HORIZON	DESCRIPTION
A11 RSL No. 60102	0-2 inches, brown (7.5YR 4.5/3.5) gravelly loam, dark reddish brown (5YR 3/3) when moist; weak very fine granular structure; slightly hard, friable, nonsticky and slightly plastic; abundant very fine roots; many very fine tubular and interstitial pores; thin (1/4 inch) dark mulch covers surface; medium acid (pH 6.0); clear smooth boundary.
A12 RSL No. 60103	2-7 inches, brown (7.5YR 5/4) gravelly loam with 15 percent gravel and cobbles over 1 inch in diameter, dark reddish brown (5YR 3/4) when moist; massive; slightly hard, friable, nonsticky and slightly plastic; abundant very fine roots; many very fine interstitial and tubular pores; strongly acid (pH 5.5); gradual smooth boundary.
B1 RSL No. 60104	7-13 inches, brown (7.5YR 5/5) gravelly loam with 40 percent gravel and cobbles 1 to 3 inches in diameter (mainly quartzites), dark reddish brown (5YR 3/4) when moist; massive; hard, friable, slightly sticky and slightly plastic; abundant very fine roots; many very fine interstitial and tubular pores, few fine tubular pores; few thin discontinuous clay films in pores; strongly acid (pH 5.5); clear smooth boundary.
B2t RSL No. 60105	13-17 inches, reddish brown (5YR 5/5) gravelly clay loam with 50 percent gravel and cobbles 1 to 4 inches in diameter (quartzite and andesite), dark reddish brown (5YR 3/5) when moist; massive; hard, firm, sticky and plastic; plentiful very fine roots; many very fine interstitial, common very fine tubular pores; common thick clay films in some pores; strongly acid (pH 5.5); abrupt slightly wavy boundary.
IIC1 RSL No. 60106	17-29 inches, grayish brown (10YR 5/2) weathered tuffaceous conglomerate containing 50 percent andesitic gravel and cobbles over 1 inch in diameter with brown (7.5YR 5/4) seams, dark grayish brown and dark reddish brown (10YR 4/2 and 5YR 3/4) when moist; massive; very hard, extremely firm; few roots along weathered fractured planes; clay nearly fills some of larger voids between cobbles; strongly acid (pH 5.5); abrupt irregular boundary.
IIC2 RSL No. 60107	29-38 inches +, light brownish gray (10YR 6/2) consolidated tuffaceous conglomerate, dark grayish brown (10YR 4/2) when moist; massive; very hard; slightly acid (pH 6.5) when crushed.

1/ The weathered material starting at 17 inches is not as hard as typical of the series.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Millerton loam (taxadjunct) **LOCATION** Riverside County, California

SOIL FAMILY: Lithic Haploxeralf, loamy, mixed, thermic

SOIL NOS. S57Calif-33-3 **LAB. NOS.** 57483 - 57487

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)								3A1	2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0- 2	A11	3.3	6.9	5.6	13.8	11.3	41.8	17.3	43.0	18.5	35	1
2- 8	A12	1.3	5.5	4.6	12.2	11.2	45.3	19.9	41.9	22.3	13	1
8-13	B21	1.5	4.3	4.3	11.6	11.6	46.0	20.7	42.8	22.5	13	1
13-19	B22	2.4	5.4	4.0	10.0	9.8	46.2	22.2	45.8	16.9	24	1
19-25+	C1	Parent Material										

	pH		ORGANIC MATTER			6I1a	8A1a Elec.	6E1b	6J1a	MOISTURE TENSIONS		4B2
8C1b SATURATED PASTE 1:1	1:5	8C1a 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	CO_3 meq/l	Conduc. mmhos/cm. at 25° C.	$CaCO_3$ equivalent %	HCO_3 meq/l	1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
6.7		7.2	1.84	0.152	12.1	0.0	0.9	0	8.0			6.6
6.8		6.7	0.28	0.032	8.8	0.0	0.4	0	2.3			6.8
6.5		7.4	0.22	0.032		0.0	0.4	0	1.8			7.1
6.7		7.1	0.22			0.0	0.4	0	1.9			8.1
		Parent Material										

5A2a	EXTRACTABLE CATIONS 5B					BASE SAT. %	SATURATION EXTRACT SOLUBLE 8A1					8A
CATION EXCHANGE CAPACITY	5B1a Ca	5B1a Mg	6H2a H	Exch. 5B1b Na	Exch. 5B1b K	5C3	6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	MOISTURE AT SATURATION
(+(Na)	6N2b	6O2c		6P2a	6Q2a							
	milliequivalents per 100g. soil →						← milliequivalents per liter →					%
21.5	9.6	3.4	1.3	0.5	0.6	92	1.3	0.6	6.2	0.4	1.4	38.4
30.9	13.8	4.9	1.5	0.5	0.2	93	1.0	0.1	2.0	1.2	0.4	30.7
29.3	14.7	4.9	0.4	0.6	0.2	98	1.1	0.0	2.1	1.0	0.9	30.7
31.3	17.6	5.8	2.6	0.7	0.2	90	1.2	0.1	2.1	1.1	1.2	33.8
		Parent Material										

1/ Percent of the whole soil

MILLERTON LOAM (taxadjunct) 1/
S57Calif-33-3

Sampled by: George Borst, R. E. Nelson, Clifford Henry, Arnold Knecht and Fred Eggers. Date: June 4, 1957.

Description by: Fred Eggers.

Location: 400' E and 750' N of the center of Sec. 13, T5S, R4W, about 4 miles SW of Perris, Riverside County, California.

Elevation: 1430'

Precipitation: 10"

Classification: Lithic Haploxeralf, loamy, mixed, thermic.

Vegetation: California sage, wild buckwheat, wild oats, cheat grass, some salt grass, annual grasses and weeds.

Parent Material: Bedford Canyon formation. Metamorphosed fine grain sandstone.

Physiography: Low rolling hills.

Drainage: Well drained.

HORIZON		DESCRIPTION
S57Calif-33-3-1 A11	0-2"	Brown (7.5 YR 5/4 dry, dark brown 3/2 moist) loam; moderately defined medium platy breaking to weakly defined fine crumb; slightly hard when dry, friable when moist; slightly sticky and slightly plastic when wet; moderately permeable; many plant roots; pH 6.5; noncalcareous; few pores; clear smooth lower boundary.
S57Calif-33-3-2 A12	2-8"	Dark brown (7.5YR 4/4 dry, dark brown 3/2 moist) loam; moderately defined medium angular blocky; hard when dry, friable when moist; slightly sticky and plastic when wet; moderately permeable; many plant roots; pH 6.5; noncalcareous; many fine pores; diffuse wavy lower boundary.
S57Calif-33-3-3 B21	8-13"	Dark brown (7.5 YR 4/4 dry, dark brown 3/2 moist) loam; moderately defined fine angular blocky; hard when dry, friable when moist; slightly sticky and plastic when wet; moderately permeable; many plant roots; pH 6.8; many fine pores; diffuse wavy lower boundary.
S57Calif-33-3-4 B22	13-19"	Dark brown (7.5 YR 4/4 dry, dark yellowish-brown 10YR 3/4 moist) loam; strongly defined fine subangular blocky; hard when dry, friable when moist; slightly sticky and plastic when wet; moderately permeable; many plant roots; pH 6.8; noncalcareous; many fine pores, diffuse irregular lower boundary.
S57Calif-33-3-5 C1	19-25"+	Decomposing; strongly metamorphosed fine grain sandstone. There were a few roots extending down the crevices.

Remarks: Weak discontinuous clay skins throughout B horizons.

1/ The Millerton series has a hue of 5 YR in the argillic horizon. Evidence of an argillic horizon is minimal in this pedon.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Millerton gravelly loam (taxadiunct) **LOCATION** Riverside County, California

SOIL FAMILY: Lithic Haploxeralf, loamy, mixed, thermic

SOIL NOS. S57Calif-33-5 **LAB. NOS.** 57491 - 57494

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0- 5	A1	1.3	6.1	8.2	18.9	13.2	44.2	8.1	47.1	22.0	18	1
5-12	B2	0.6	5.9	8.9	18.1	11.3	40.8	14.4	41.6	21.4	19	1
12-18	C	0.4	5.7	12.3	23.3	10.7	36.2	11.4	41.3	18.5	16	fsl
18-23+	Dr	Parent Material										

		pH	ORGANIC MATTER			6I1a	8A1a	6E1b	6J1a	MOISTURE TENSIONS		
8C1b SATURATED PASTE 1:1	1:5	8C1a 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	CO_3 meq/1	Elec. Conduc. mmhos/cm at 25°C.	$CaCO_3$ equivalent %	HCO_3 meq/1	4B1a 1/10 ATMOS. %	4B1a 1/3 ATMOS. %	4B2 15 ATMOS. %
6.6		6.4	0.40	0.041	9.8	0.0	0.5	0	3.1	21.2	13.8	3.8
6.5		6.5	0.29	0.029	10.0	0.0	0.4	0	2.4			5.4
6.8		6.5	0.13			0.0	0.4	0	2.2			5.4
		Parent Material										

5A2a	EXTRACTABLE CATIONS 5B					BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1					8A
CATION EXCHANGE CAPACITY (+ Na)	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a		6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
9.1	5.7	1.5	1.9	0.5	0.4	81	1.2	0.4	2.9	0.9	1.1	24.3
13.6	9.3	2.5	2.6	0.7	0.2	83	1.3	0.1	2.0	0.7	0.7	25.5
13.6	10.8	2.7	2.2	0.5	0.1	87	1.5	0.1	1.8	0.6	0.7	27.6
		Parent Material										

1/ Percent of the whole soil

MILLERTON GRAVELLY LOAM (taxadjunct) 1/

S57Calif-33-5

Location: Riverside County, California. Near the northwest corner of the SE 1/4 of Sec. 14, T. 5 S., R. 4 W., about 5 miles southwest of Perris. Date of sampling: June 18, 1957.
Description by: Fred Eggers. Collectors: George Borst, R. E. Nelson, Clifford Henry, Arnold Knecht and Fred Eggers.
Classification: Lithic Haploxeralf, loamy, mixed, thermic.
Vegetation: California sage, wild buckwheat, dove weed, alfilaree, cactus and annual grasses. Precipitation: 10 inches. Parent material: Bedford Canyon formation. Metamorphic fine grain sandstone. Topography: Low rolling hills. The site is on a convex slope of a gently rolling ridge. Elevation: 1480 feet. Drainage: Well drained.
Remarks: There are many stone fragments throughout the soil and there are rock outcrops. The A1 horizon contains 5 percent rocks. There are weak discontinuous clay skins in the B2 horizon.

HORIZON	DESCRIPTION
A1 RSL No. 57491	0-5 inches, grayish brown to brown (10YR 5/2-5/3 dry, very dark grayish brown to dark brown 3/2-3/3 moist) gravelly loam; weakly defined very fine granular; slightly hard when dry, very friable when moist; nonsticky and slightly plastic when wet; moderately permeable; many plant roots; pH 6.5; noncalcareous; many fine pores; clear wavy lower boundary.
B2 RSL No. 57492	5-12 inches, brown to yellowish brown (10YR 5/3-5/4 dry, dark brown to dark yellowish brown 3/3-3/4 moist) gravelly loam; weakly defined fine subangular blocky; breaking to weakly defined fine granular; hard when dry, friable when moist; slightly sticky and slightly plastic when wet; moderately permeable; many plant roots; pH 6.5; noncalcareous; many fine pores; clear irregular lower boundary.
C RSL No. 57493	12-18 inches, pale brown (10YR 6/3 dry, dark brown 4/3 moist) gravelly loam; pH 6.8; diffuse irregular lower boundary. This horizon contains 75 percent rock fragmentations. There are occasional clay skins between the rock fragmentations and in crevices. There are also a few roots present.
Dr RSL No. 57494	18-23 inches +, bedrock consisting of strongly metamorphosed fine grain sandstone. Soil only in rock crevices; pH 6.8.

1/ The Millerton series has a hue of 5 YR in the argillic horizon.

SOIL SURVEY LABORATORY Riverside, California

Livermore very gravelly
OIL TYPE sandy loam (taxadjunct) **LOCATION** Alameda County, California

SOIL FAMILY: Mollic Haploxeralf, loamy-skeletal, mixed, thermic

SOIL NOS. S59Calif-01-3 **LAB. NOS.** 59218 thru 59223

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 **	*
0-4	A_{11p}	13.9	17.0	8.8	13.9	7.9	29.1	9.4	30.2	14.8	61	cosl
4-12	A_{12p}	14.4	15.1	8.0	14.4	8.6	30.2	9.3	31.1	16.0	61	cosl
12-21	A_{13}	11.2	14.7	8.5	15.5	9.4	28.7	12.0	32.1	14.9	50	cosl
21-28	B_1	12.1	16.3	8.9	15.2	9.0	27.1	11.4	30.9	14.0	59	cosl
28-34	B_2	16.8	20.8	10.2	15.4	6.9	16.4	13.5	23.6	8.4	74	cosl
34-60+	B_3	22.9	34.6	15.3	7.1	1.2	5.8	13.1	6.3	3.2	70	cosl

pH		Organic Matter			6E1b	8A1a					4B2
8C1b Saturated Paste 1:1	8C1a 1:10	6A1a Organic Carbon Pct.	6B1a Nitrogen Pct.	C/N	$CaCO_3$ Equivalent Pct.	Elec. Conduc. mmhos/cm. at 25°C.					Soil water 15 atmos. Pct.
6.4	6.7	0.72	0.066	10.9		0.4					3.9
6.7	6.9	0.58	0.061	9.5		0.2					4.6
6.8	6.9	0.50	0.052	9.6		0.2					4.9
7.0	7.1	0.36	0.043	8.4		0.3					5.4
7.1	7.4	0.23				0.3					5.8
7.1	7.2	0.13				0.3					5.9

5A2a	EXTRACTABLE CATIONS 5B					BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1					8A
CATION EXCHANGE CAPACITY (- Na)	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a		6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
9.0	3.5	2.5	1.8	0.1	0.6	79	1.0	0.5				18.1
9.2	4.0	2.9	1.7	0.1	0.4	81	0.8	0.2				20.1
11.3	4.1	3.6	3.2	0.1	0.3	72	0.9	0.1				20.3
10.0	3.7	4.7	2.5	0.2	0.3	78	1.1	0.1				19.3
11.4	3.1	6.8	2.2	0.1	0.2	82	0.8	<0.1				20.9
11.6	2.1	7.7	1.8	0.2	0.3	85	0.9	0.1				23.4

* Stones and gravel >1" diameter discarded at time of sampling

Horizon A_{11p} - 5%, A_{12p} - 5%, A_{13} -15%

Horizon B_1 - 40%, B_2 - 15%, B_3 - 30%

** Percent of whole soil < 1 inch

LIVERMORE VERY GRAVELLY SANDY LOAM (taxadjunct) 1/
S59Calif-01-3

Location: Alameda County, California. NW1/4 of the NE1/4 of the SW1/4 of Sec. 23, T. 3 S., R. 2 E., about 3 miles southeast of the center of Livermore.
Date of Sampling: May 5, 1959.
Description by: Larry E. Welch. Collectors: R. C. Huff, L. E. Welch, and L. H. Grant.
Classification: Mollic Haploxeralf, loamy-skeletal, mixed, thermic.
Vegetation: Cultivated, vineyard. Climate: Mean annual rainfall about 15 inches. Parent Material: Alluvium from sedimentary rocks. Relief: Nearly level, convex slope to the northwest of less than 1 percent, on a low terrace. Elevation: 620 feet. Drainage: Well drained; slow runoff; moderate permeability. Soil Moisture: Moist throughout.
Remarks: Few worm holes. Few stones and cobbles, mainly gravelly.

HORIZON		DESCRIPTION
A_{11p}	0-4"	Brown (10YR 5/3) very gravelly sandy loam, dark brown (10YR 3/3) when moist; weak very fine granular structure; loose when dry, friable when moist; slightly acid, pH 6.2; diffuse, smooth lower boundary.
A_{12p}	4-12"	Dark grayish brown (10YR 4/2) very gravelly sandy loam, very dark grayish brown (10YR 3/2) when moist; porous massive; slightly hard when dry, friable when moist, slightly sticky when wet; abundant fine and very fine roots; many fine and very fine pores; slightly acid, pH 6.5; diffuse, smooth lower boundary.
A_{13}	12-21"	Dark grayish brown (10YR 4/2) very gravelly loam, very dark grayish brown (10YR 3/2) when moist; weak fine granular structure; slightly hard when dry, friable when moist, slightly sticky; abundant fine and very fine roots; many fine and very fine pores; slightly acid, pH 6.5; diffuse, smooth lower boundary
B_1	21-28"	Brown (10YR 5/3) heavy very gravelly loam, dark brown (10YR 3/3) when moist; massive; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; few fine roots; many fine and very fine pores, mainly interstitial; few thin discontinuous clay films in pores; slightly acid, pH 6.5; diffuse, smooth lower boundary.
B_2	28-34"	Brown (10YR 5/3) stony, sandy clay loam, dark brown (10YR 4/3) when moist; massive; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; few fine roots; many fine and very fine interstitial pores; very thin, nearly continuous clay films in pores, Most of colloid in bridges; slightly acid, pH 6.5; diffuse, smooth lower boundary.
B_3	34-60"+	Brown (10YR 5/3) gravelly loamy coarse sand, dark brown (10YR 4/3) when moist; massive; slightly hard when dry, friable when moist, nonsticky; few fine roots; many fine and very fine pores; a small amount of colloid occurs in bridges between sand grains and stains the sand and gravel; slightly acid, pH 6.5.

1/ The Livermore series is in a loamy-skeletal, mixed, thermic family of Typic Haploxerolls. This pedon has an argillic horizon and an ochric epipedon.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Steinbeck fine sandy loam (taxadjunct) **LOCATION** Sonoma County, California

SOIL FAMILY: Mollic Haploxeralf, coarse-loamy, mixed, mesic

SOIL NOS. S61Calif-49-3 **LAB. NOS.** 61398 - 61406

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)								3A1	2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2	
0- 8	Ap	0.4	0.8	0.6	14.5	40.4	26.8	16.5	70.1	10.8	0	vfsl
8-20	A1	0.4	0.7	0.5	14.7	41.3	26.9	15.5	72.7	10.7	0	vfsl
20-34	A21	0.3	0.8	0.7	16.8	46.2	28.7	6.5	80.8	11.2	0	vfsl
34-39	A22	0.4	0.7	0.6	19.2	48.7	26.4	4.0	84.4	9.4	0	vfsl
39-48	B21t	0.2	0.6	0.5	18.5	40.2	22.9	17.1	71.9	9.3	0	vfsl
48-53	B22t	0.1	0.4	0.3	16.3	44.0	22.8	16.1	73.9	8.9	0	vfsl
53-64	B23t	0.4	1.5	0.8	20.1	41.9	20.2	15.1	73.2	8.5	0	vfsl
64-71	C1	0.7	1.7	0.9	22.4	43.3	20.1	10.9	76.5	8.7	1	vfsl
71+	A/C2	0.0	0.2	0.4	19.8	44.1	24.8	10.7	75.6	12.1	0	vfsl

pH			ORGANIC MATTER			Bulk Density		Ext. Iron as % Fe				4B2 Soil water 15 atmos. Pct.
8C1a H_2O 1:1	8C1c KCl 1:1		6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	4A3a g/cc		6C1b				
5.7	4.3		2.11	0.180	12	1.31		0.6				8.0
5.7	4.1		0.98	0.105	9	1.5		0.7				7.3
5.9	4.2		0.28	0.027		1.58		0.4				3.0
5.9	4.2		0.10			1.59		0.4				2.7
6.0	4.4		0.17			1.84		0.8				8.0
6.1	4.6		0.11			1.78		0.7				8.0
5.5	4.6		0.09			1.75		0.6				8.0
6.6	4.8		0.05			1.73		0.6				6.4
6.8	4.9		0.05			1.61		1.0				8.0

5A2a	EXTRACTABLE CATIONS 5B1a					BASE SAT. % 5C3	Sum of Cations 5A3a					MOISTURE AT SATURATION
CATION EXCHANGE CAPACITY	6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K							
← Na →	milliequivalents per 100g. soil →						neq/100g.					%
17.9	4.8	2.7	11.0	0.2	0.1	41	18.8					
15.2	3.6	2.5	9.1	0.2	0.1	41	15.4					
7.1	1.7	1.3	3.7	0.2	0.1	46	6.9					
6.3	1.9	1.8	2.4	0.2	0.1	61	6.2					
15.5	5.1	6.0	3.3	0.3	0.1	78	14.8					
15.7	5.4	6.5	2.9	0.4	0.1	81	15.3					
16.0	5.7	6.8	2.6	0.4	0.1	83	15.6					
14.2	5.2	6.3	1.7	0.4	0.2	88	13.7					
18.5	6.7	8.3	2.2	1.0	0.2	88	18.4					

STEINBECK FINE SANDY LOAM(taxadjunct) 1/
S61Calif-49-3

Location: Sonoma County, California, Northwest corner of SE1/4, NW1/4, section 22, T. 6 N., R. 10 W. (Peruchi Ranch). 41° and 1800 feet from junction of Joy Woods Road and Bodega Highway. Date of Sampling: June 21, 1961.
Collectors: Reuben Nelson, Leo C. Kiameth, V. C. Miller, G. Lambert, J. H. Kashiwagi, F. Graham.
Classification: **Mollic Haploxeralf, coarse-loamy, mixed, mesic.**

Vegetation: Annual and perennial grasses. Use: Improved dry land pasture. Climate: About 24.7 inches annual rainfall, average temperature 57.5° F., average January temperature 46.7° F., average July temperature 66.3° F. Parent Material: Merced formation - soft sedimentary marine formation. Elevation: 18 feet. Relief: Rolling hills, on an easterly facing slope of 12 percent gradient. Drainage: Moderately well drained, medium runoff, moderately rapid over moderately slow permeability. Biological Activity: Worm casts in zone from about 8 to 20 inches from the surface.

HORIZON	DESCRIPTION
Ap RSL No. 61398	0 to 8 inches, dark grayish brown (2.5Y 4/2) fine sandy loam, very dark brown (10YR 2/2) when moist; massive breaking to fine and very fine subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; abundant fine and very fine roots; many very fine interstitial and tubular pores; medium acid, pH 5.7; clear, smooth boundary.
A1 RSL No. 61399	8 to 20 inches, dark grayish brown (2.5Y 4/2) fine sandy loam, very dark brown (10YR 2/2) when moist; massive breaking to weak very fine subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; abundant fine and very fine roots; many fine interstitial and tubular pores; strongly acid, pH 5.5; gradual, wavy boundary.
A21 RSL No. 61400	20 to 34 inches, light brownish gray (2.5Y 6/2) sandy loam, very dark grayish brown (10YR 3/2) when moist; massive; slightly hard when dry, very friable when moist; nonsticky and nonplastic when wet; abundant fine and very fine roots; many very fine interstitial and tubular pores; few thin clay films in bridges; strongly acid, pH 5.5; clear, wavy boundary.
A22 RSL No. 61401	34 to 39 inches, light gray (2.5Y 7/2) fine sandy loam, yellowish brown (10YR 5/4) when moist; massive; slightly hard when dry, friable when moist, nonsticky and nonplastic when wet; few very fine roots; common fine vesicular and interstitial pores; strongly acid, pH 5.5; few large (manganese and iron) concretions; abrupt, wavy boundary.
B21t RSL No. 61402	39 to 48 inches, pale brown (10YR 6/3) with common medium distinct mottles of strong brown (7.5YR 5/8) sandy clay loam, olive brown (2.5Y 4/4) with mottles of strong brown (7.5YR 5/6) when moist; weak coarse prismatic structure; hard when dry, firm when moist, slightly sticky and slightly plastic when moist, abundant fine and very fine tubular and interstitial pores; many thick clay films on ped faces; medium acid, pH 5.7; clear, wavy boundary.
B22t RSL No. 61403	48 to 53 inches, pale brown (10YR 6/3) sandy clay loam with many large distinct mottles of reddish yellow (7.5YR 6/8) when dry, yellowish brown (10YR 5/4) with many large faint mottles of yellowish brown (10YR 5/6) when moist; weak coarse prismatic structure; hard when dry, firm when moist, slightly sticky and slightly plastic when wet; plentiful fine and very fine interstitial and tubular pores; continuous, thick clay films in pores and on ped faces; medium acid, pH 5.7; many old root channels present; incipient cementation in a few thin small lenses in this horizon; gradual, smooth boundary.
B23t RSL No. 61404	53 to 64 inches, very pale brown (10YR 7/3) sandy clay loam with many medium distinct mottles of reddish yellow (7.5YR 6/8) when dry, yellowish brown (10YR 5/4) with many medium faint mottles of yellowish brown (10YR 5/8) when moist; weak coarse prismatic structure; hard when dry, firm when moist; slightly sticky and slightly plastic when wet; few very fine roots; common fine and very fine tubular and interstitial pores; many moderately thick clay films on bridges and in pores; medium acid, pH 6.0; gradual, smooth boundary.
C1 RSL No. 61405	64 to 71 inches, light gray (10YR 7/1) fine sandy loam with many large distinct mottles of reddish yellow (7.5YR 6/8) when dry, olive brown (2.5Y 4/4) with many large distinct mottles of yellowish brown (10YR 5/8) when moist; massive breaking to weak coarse prismatic structure; slightly hard when dry, friable when moist, nonsticky and nonplastic when wet; few fine tubular discontinuous pores; slightly acid, pH 6.5; water seeping in at lower boundary; abrupt, wavy boundary.
C2 or R RSL No. 61406	71 to 76 inches +, light gray (10YR 7/2) fine sandy loam with many large distinct mottles of yellowish brown (10YR 5/8) when dry, olive brown (2.5Y 4/4) with many large prominent mottles of yellowish red (7.5YR 6/8) when moist; massive; hard when dry, very firm when moist, slightly sticky and nonplastic when wet; weakly cemented; streaks of iron stains present.

1/ The Steinbeck series is in a fine-loamy, mixed, mesic family of Mollic Haploxeralfs. This pedon has less than 18 percent clay in the argillic horizon.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Ahwahnee fine sand (taxadjunct) **LOCATION** San Luis Obispo Co., California

SOIL FAMILY: Mollic Haploxeralf, coarse-loamy, mixed, thermic.

SOIL NOS. S55Cal. 40-1 **LAB. NOS.** 55449-454

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)								3A1	2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2	
0- 4	A_{11}	0.3	1.2	14.6	72.1	2.0	4.2	5.6	28.9	2.3	0	fs
4-12	A_{12}	0.2	0.6	12.6	73.8	2.2	4.6	6.0	30.4	2.5	1	fs
12-18	A_3	0.0	0.5	10.2	75.1	2.3	5.7	6.2	33.0	3.4	1	fs
18-30	B_{21}	0.2	0.6	9.3	66.7	2.8	8.1	12.3	31.8	5.1	2	fsl
30-44	B_{22}	0.1	0.8	10.8	65.8	2.3	7.1	13.1	29.5	4.9	1	fsl
44-60	C	0.2	0.6	10.4	64.7	2.1	6.2	15.8	28.3	3.7	1	fsl

8C1b SATURATED PASTE 1:1	pH 8C1a 1:5	8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	8A1a Elec. Conduc. EC×10³ MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	6F1a GYPSUM me./100g. SOIL	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
6.6		7.0	1.18	0.092	12.8						6.8	3.7
6.5		7.0	0.52	0.041	12.7						5.5	3.3
6.5		6.9	0.29								6.1	3.5
6.3		7.0	0.22									6.0
6.4		7.1	0.16									6.4
6.4		7.3	0.14									6.8

5A2a CATION EXCHANGE CAPACITY (-Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	5B1a Na 6P2a	5B1a K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE Na	K	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →		
9.2	4.3	2.0	3.1	0.2	1.2	71			
8.1	4.3	1.7	2.0	0.3	1.2	79			
8.0	4.4	2.8	1.6	0.2	0.3	83			
14.0	6.0	6.3	1.9	0.3	0.1	87			
14.2	5.1	6.2	1.9	0.2	0.1	86			
15.1	4.8	7.3	2.1	0.3	0.1	86			

AHWAHNEE FINE SAND (taxadjunct) 1/
S55Calif-40-1

Location: 7/8 mile N.N.E. of farm buildings on the George Mello farm, San Luis Obispo County, California.

Collectors: W. M. Johnson, Rudolph Ulrich, Lewis Leifer, W. G. Harper, L. R. Wohletz, J. M. Williams. Samples taken September 7, 1955. Description by W. M. Johnson.

Elevation: About 110 feet.

Vegetation: Soil was cultivated at one time. Now is pasture in poor condition. Annual fescues, wild oats, ripgut, soft chess, California croton, tarweed, deer vetch, Astragalus sp., and other weeds; scattered live oak; California sage.

Relief: Hilly and steep eroded upland. Residual. Slope about 20 percent, slightly convex, toward the south.

Drainage: Somewhat excessively drained. Both runoff and permeability are rapid.

Parent material: Weathered marine sandstone, not identified as to age.
Classification: Mollic Haploxeralf, coarse-loamy, mixed, thermic.

HORIZON		DESCRIPTION
A_{11}	0-4"	Very dark grayish brown, moist to dark grayish brown, dry (10YR 4/2; 3/2, moist) loamy fine sand. Massive. Slightly hard, very friable, nonplastic, nonsticky. pH 6.5. Clear, smooth lower boundary.
A_{12}	4-12"	Very dark grayish brown (10YR 3/2, moist) loamy fine sand with few fine indistinct mottles (10YR 4/3, dry). Massive. Very hard, very friable, nonplastic, nonsticky. Much worm activity. pH 6.3. Gradual, wavy lower boundary.
A_3	12-18"	Dark brown (10YR 3/3, moist) loamy fine sand. Massive. Slightly hard, very friable, nonplastic, nonsticky. pH 6.3. Clear, wavy lower boundary.
B_{21}	18-30"	Finely mottled dark yellowish brown (10YR 4/4, moist) and dark brown (3/4, moist) fine sandy loam. Weak medium to coarse subangular blocky. Very firm, slightly plastic, nonsticky, numerous distinct patches of clay skins. Slightly porous. pH 6.0. Gradual lower boundary.
B_{22}	30-44"	Dark brown (10YR 3/3, moist) sandy clay loam finely mottled with dark yellowish brown (4/4). Very weak medium subangular blocky. Very firm, plastic, slightly sticky. Compact, hard to dig out. Many patches of clay skins. pH 6.0.
C	44-60+"	Dark brown (10YR 4/3, moist) stratified fine sandy loam and sandy clay loam. Massive. Friable, plastic, slightly sticky. pH 6.0.

1/ The Ahwahnee series is in a coarse-loamy, mixed, thermic family of Mollic Haploxeralfs. This pedon is a taxadjunct to the series because the surface horizon is darker and thicker than 10 inches.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Mollic Haploxeralf, fine-loamy, mixed, mesic
SOIL Hilt loam SOIL Nos. S66Calif-47-6 LOCATION Siskiyou County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 66376 - 66383

Depth (In)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand Very coarse (2–1)	Sand Coarse (1–0.5)	Sand Medium (0.5–0.25)	Sand Fine (0.25–0.1)	Sand Very fine (0.1–0.05)	Silt 0.05–0.02	Silt Int III (0.02–0.002)	Int II (0.2–0.02)	(2–0.1)	3A1a Non-carbonate clay	1/ Coarse fragments 1A2a ≥ 2	2 – 19	19 – 76
		Pct. of < 2 mm												Pct.	Pct. of < 76mm		
0-2	A1	50.4	35.2	14.4	0.9	6.0	9.8	20.5	13.2	15.4	19.8	39.9	37.2	14	-	-	-
2-9	A3	49.2	33.8	17.0	0.7	5.7	9.9	19.5	13.4	15.6	18.2	40.0	35.8	17	-	-	-
9-16	B1t	47.4	31.9	20.7	0.5	5.2	9.8	19.1	13.3	14.1	17.8	38.0	34.1	21	-	-	-
16-23	B21t	46.5	30.7	22.9	0.5	5.2	9.8	18.6	12.9	13.8	16.9	37.2	33.6	23	-	-	-
23-37	B22t	45.4	28.9	25.7	0.4	5.3	9.5	18.4	11.8	13.4	15.5	35.2	33.6	26	-	-	-
37-52	B3t	49.1	28.8	22.1	0.8	6.7	10.2	19.5	11.9	13.9	14.9	36.5	37.2	22	-	-	-
52-60+	C	46.2	29.1	24.7	0.8	6.9	9.4	17.6	11.5	13.9	15.2	34.8	34.7	25	-	-	-
0-9	A 2/														-	-	-

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Bulk density 4A1f 1/3 bar	Bulk density 4A1h Oven dry	Bulk density	3B2	Water content	Water content 4B1c 1/3 bar	Water content 4B2 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH 8C1a H_2O 1:1	pH
	Pct	Pct		Pct.	Pct	g/cc	g/cc	g/cc		Pct	Pct.	Pct.	in./in.	in./in.		
0-2	2.54	0.157	16	1.3		1.59	1.62		1.00		15.1	6.7	0.008	0.008	7.0	
2-9	0.88	0.070	13	1.4		1.61	1.65		1.00		13.8	7.0	0.007	0.007	6.7	
9-16	0.38			1.6		1.65	1.72		1.00		13.9	7.6	0.015	0.015	6.4	
16-23	0.29			1.6		1.66	1.77		1.00		14.5	8.6	0.022	0.022	6.0	
23-37	0.25			1.6		1.69	1.80		1.00		15.8	10.0	0.020	0.020	5.5	
37-52	0.18			1.5		1.71	1.82		1.00		14.8	9.2	0.022	0.022	5.7	
52-60+	0.17			1.5		1.69	1.79		1.00		17.9	10.5	0.020	0.020	5.7	
0-9	1.48	0.107	14	1.4								7.5			6.8	

Depth (In)	Extractable bases 5B1a 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity 5A1a NH_4OAc	Cation Exch. Capacity 5A3a Sum	6G1d KCl Ext. Al^{+++}	Base saturation 5C1 NH_4OAc	Base saturation 5C3 Sum
	meq/100 g									Pct.	Pct.
0-2	12.4	2.1	0.1	0.8	15.4	2.6	16.9	18.0		91	86
2-9	8.9	1.9	0.1	0.7	11.6	2.6	13.7	14.2		85	82
9-16	7.3	2.8	0.1	0.7	10.9	3.0	13.7	13.9		80	78
16-23	7.1	3.8	0.2	0.6	11.7	4.0	15.6	15.7	0.1	75	75
23-37	9.8	5.7	0.2	0.4	16.1	5.2	20.6	21.3	0.3	78	76
37-52	9.4	6.0	0.4	0.3	16.1	5.2	20.6	21.3	0.4	78	76
52-60+	11.1	7.2	0.6	0.3	19.2	5.0	23.8	24.2	0.4	81	79
0-9	10.6	1.7	0.1	1.0	13.4	3.0	15.4	16.4		87	82

Depth (In.)	Clay mineralogy (<0.002 mm) 7A Mont.	Verm.	Illite	Kaolin
	X-ray			
0-2	t		xxx	xx
2-9				
9-16				
16-23				
23-37	xx		x	x
37-52				
52-60+	x	xx		t
0-9				

1/ From characterization sample (5 kg).

2/ Composite of 20 subsamples taken in a 15x12' grid adjacent to the master pedon.

- - = looked for but not found
- t = trace
- x = small
- xx = moderate
- xxx = abundant
- xxxx = dominant

HILT CLAY LOAM
S66Calif-47-6

Location: Siskiyou County, California. A pit located on the Cedar Grove Ranch, about 3 miles north of the California Quarantine Station on Interstate Highway No. 5. Site is located 400 feet west of Interstate Highway No. 5 where the Southern Pacific Railroad and highway intersect, or 2000 feet east and 200 feet north of the SW corner of Sec. 25, T48N, R7W. Date of Sampling: May 24, 1966.
Description by: J. J. Newlun. Collectors: K. W. Flach, S. B. Johnson and L. Mann.

Classification: Mollic Haploxeralf, fine-loamy, mixed, mesic.

Vegetation: In order of dominance - white oak, tall oatgrass, big bluegrass, annual bromes, and other grasses and forbs, (Ceanothus cuneatus), Juniper, and common manzanita. An occasional ponderosa pine occurs in the surrounding area. The site area has been grazed heavily and is heavily trampled. Climate: Average annual precipitation is approximately 16 inches with some in the form of snow. Average January temperature is 32°F., July temperature 72°F., and mean annual temperature 51°F. This site occurs in the upper limits of the precipitation zone in which this soil series occurs in this area. Parent Material: Residium from the sedimentary rock of the Chico Formation. This soil has developed from the sandstone in this formation. The sandstone is fairly fine textured and weathers to heavy sandy clay loam or silty clay loam in most cases. The sandstone has formed from sediments from mixed rock sources that were dominantly basic. The dominant clay mineral is probably montmorillonitic. Topography: The site is located on hilly upland with a single convex slope, a SE aspect and a 17 percent gradient. Site is near midslope. Elevation: 2880 feet. Drainage: Well drained, moderately slow permeability, medium runoff. Soil Moisture: The A horizons approximately 30 percent of field capacity. B horizons about 70 percent of field capacity.

Remarks: Reactions determined by the Truog soil reaction test. Paired profile is S66Calif-47-8. This profile has an ochric epipedon and an argillic horizon. Epipedon not thick enough for mollic. This soil varies mainly in color and depth. Depths to paralithic contact range from 20 to about 60 inches with average depth about 38 inches. Colors range from the 10YR hue to 5YR hue with most having colors in the 7.5YR hue. The A horizons range in texture from sandy loam to light clay loam. The B horizon textures range from clay loam to heavy silty clay loam. The C horizons where present have the structure and fabric of the parent rock but are friable to slightly firm when moist. Some soils in the area may have thicker A horizons. Most of the cultivated soils are eroded and have thinner A horizons. There may be a few quartzite gravels throughout the profile.

HORIZON	DESCRIPTION
A11 RSL 66376	0 to 2 inches, brown (10YR 5/3) light clay loam, dark brown (10YR 3/3) moist; moderate coarse platy structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; few fine and common medium tubular pores; slightly acid (pH 6.5); abrupt smooth boundary.
A3 RSL 66377	2 to 9 inches, brown (7.5YR 5/4) clay loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure to massive; hard, friable, sticky and plastic; common very fine and fine roots; many fine and few medium tubular pores; few thin clay films in pores; slightly acid (pH 6.2); abrupt smooth boundary.
B1 RSL 66378	9 to 16 inches, brown (7.5YR 5/4) heavy clay loam, dark brown (7.5YR 3/4) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; many medium and common fine roots; many fine and common medium tubular pores; few moderately thick clay films in pores and many thin films in pores and on ped faces.
B21t RSL 66379	16 to 23 inches, brown (7.5YR 5/4) light silty clay loam, dark reddish brown (5YR 3/3) moist and rubbed, with reddish brown (5YR 4/4) moist ped faces; weak medium prismatic breaking to moderate medium subangular blocky structure; very hard, friable, sticky and plastic; many medium and coarse and few fine roots; many fine and common medium tubular pores; continuous thin clay films in pores and on ped faces with a few moderately thick films in pores; medium acid (pH 5.8); clear wavy boundary.
B22t RSL 66380	23 to 37 inches, strong brown (7.5YR 5/6) silty clay loam, dark brown (7.5YR 4/4) moist; weak medium prismatic breaking to moderate medium subangular blocky structure; very hard, friable, very sticky, very plastic; many medium and coarse and few fine roots; common fine tubular pores; many thin and common moderately thick clay films in pores and on ped faces; strongly acid (pH 5.5); clear wavy boundary.
B23t RSL 66381	37 to 52 inches, brown (7.5YR 5/4) silty clay loam, dark brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; very hard, slightly firm, very sticky and very plastic; many coarse and medium, few fine roots; few fine tubular pores; many thin and few moderately thick clay films on ped faces and in pores; strongly acid (pH 5.5); this horizon retains some rock structure; sandy loam material accumulating in seams; clear wavy boundary
C RSL 66382	52 to 60 inches, yellowish brown (10YR 5/4) heavy sandy clay loam, dark yellowish brown (10YR 4/4) moist; rock structure; very hard, slightly firm, very sticky and very plastic; many medium and coarse roots; few fine tubular pores; many thin, few moderately thick clay films on structural faces and many moderately thick films in pores; strongly acid (pH 5.5).

U S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Mollic Haploxeralf, fine-loamy, mixed, mesic
SOIL Hilt loam SOIL Nos. S66Calif-47-8 LOCATION Siskiyou County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 66384 - 66392

Depth (In.)	Horizon	1B1b Size class and particle diameter (mm) 3A1 Total Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Non-carbonate clay	1/ Coarse fragments 1A2a > 2	2 - 19	19 - 76
		Pct. of < 2 mm													Pct.	Pct. of < 76mm	
0-2	A11	64.2	25.4	10.4	3.8	8.3	7.2	29.8	15.1	12.6	12.8	47.4	49.1	10	8	7	1
2-6	A12	60.7	23.0	16.3	2.5	6.2	6.6	28.9	16.5	10.6	12.4	46.9	44.2	16	4	3	1
6-11	A3	57.4	23.8	13.8	2.4	6.7	6.8	26.6	14.9	11.5	12.3	45.0	42.5	19	1	1	-
11-23	B1t	55.6	22.8	21.6	2.0	5.5	6.2	26.5	15.4	10.7	12.1	45.1	40.2	22	2	2	-
23-31	B21t	52.7	21.7	25.6	2.2	6.2	5.8	24.2	14.3	10.1	11.6	41.6	38.4	26	3	2	1
31-38	B22t	46.5	23.7	29.8	2.5	6.5	6.1	20.5	10.9	12.4	11.3	37.2	35.6	30	5	1	4
38-47	B3t	59.2	18.1	22.7	2.5	12.9	10.6	22.6	10.6	9.6	8.5	34.5	48.6	23	1	1	-
47-49+	R																
0-6	A 2/														6	5	1

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Bulk density: 4A1f 1/3 bar	4A1h Oven dry		3B2 C'	Water content:	4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH: 8C1a H_2O 1:1		
	Pct.	Pct		Pct.	Pct	g/cc	g/cc	g/cc		Pct.	Pct.	Pct	in./in.	in./in.			
0-2	1.24	0.107	12									5.6			6.7		
2-6	0.62	0.054	11			1.66	1.71		0.97		12.0	6.6	0.011	0.010	6.6		
6-11	0.51	0.052	10									7.5			6.4		
11-23	0.44											8.5			6.4		
23-31	0.31					1.62	1.76		0.98		14.5	9.7	0.027	0.027	6.5		
31-38	0.25											11.4			6.6		
38-47	0.17											10.1			6.9		
47-49+															6.6		
0-6	0.77	0.069	11									6.4			6.6		

Depth (In.)	Extractable bases 5B1a 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	5A3a Sum		6G1d KCl Ext. Al^{+++}	Base saturation: 5C1 NH_4OAc	5C3 Sum
	meq/100 g										Pct	Pct.
0-2	7.5	2.3	0.1	0.5	10.4	3.9	12.8	14.3			81	73
2-6	6.7	1.5	0.1	0.7	9.0	3.9	11.2	12.9			80	70
6-11	7.9	2.8	0.2	0.4	11.3	3.9	14.0	15.2			81	74
11-23	9.2	3.5	0.1	0.3	13.1	3.9	16.2	17.0			81	77
23-31	11.6	4.5	0.2	0.3	16.6	3.9	19.2	20.5			86	81
31-38	14.0	5.8	0.2	0.4	20.4	3.9	24.2	24.3			84	84
38-47	16.7	5.9	0.2	0.3	23.1	2.4	25.4	25.5			91	91
47-49+												
0-6	7.7	2.1	0.1	0.5	10.4	3.9	12.3	14.3			85	73

Depth (In.)	Clay mineralogy (<0.002 mm) 7A Mont.	Verm.	Mica	Kaolin
	X-ray			

1/ From characterization sample (5 kg). Sample 66391 was crushed whole.

2/ Composite of 20 subsamples taken in a 15x12' grid adjacent to the master pedon.

HILT CLAY LOAM
S66Calif-47-8

Location: Siskiyou County, California. A pit located on the Flying S Ranch about 6 miles N. of Montague off the Yreka-Ager Road. 2600 feet W. and 1750 feet S. of the NE corner of Sec. 26, T46N, R6W. Date of Sampling: May 24, 1966.
Description by: J. J. Newlun. Collectors: K. W. Flach, S. B. Johnson, D. Lucas.
Classification: Mollic Haploxeralf, fine-loamy, mixed, mesic.
Vegetation: Dominantly annual brome grasses, with scattered patches of ceanothus cuneatus, an occasional Juniper and white oak tree, wild buckwheat and other annual grasses and weeds. The site area is being used as grazing land and is overgrazed and well trampled. Climate: Average annual precipitation is approximately 13 inches with some in the form of snow. Average January temperature is 33°F., average July temperature 72°F., mean annual temperature 52°F. Precipitation occurs mainly during the winter and early spring months. Summers are warm and dry. This site occurs in the lower limits of the precipitation zone in which this soil series occurs in this area. Parent Material: Residium from the sedimentary rock of the Chico Formation. This soil has developed in the sandstone of this formation. The sandstone is fairly fine textured and weathers to heavy sandy clay loam or silty clay loam in most cases. The sandstone has formed from mixed rock sources that were dominantly basic. The dominant clay mineral is probably montmorillonitic. Topography: Site is located in hilly upland with a single convex slope, 17 percent gradient, east aspect and near midslope. There was no significant microrelief. Elevation: 2840 feet. Drainage: Well drained, moderately slow permeability, medium runoff. Soil Moisture: The A horizons were nearly air dry. The B horizons were at about 50 percent of field capacity.
Remarks: Reactions determined by Truog soil reaction test. This soil has an ochric epipedon (<1 percent O.M.) and an argillic horizon. Paired profile is S66Calif-47-6. This soil varies mainly in color and depth. Depth to bedrock ranges from 20 to over 60 inches and averages about 38 inches. The colors range from the 10YR hue to the 5YR hue with most soil colors in the 7.5YR hue. The A horizons range in texture from sandy loam to light clay loam. The B horizon textures range from clay loam to heavy silty clay loam. The C horizons, when present, have the structure and fabric of the parent rock but are friable to slightly firm when moist. The cultivated soils are usually eroded and have thinner A horizons than uncultivated soils. A few quartzite gravels may occur throughout the profile.

HORIZON	DESCRIPTION
A11 RSL 66384	0 to 2 inches, brown (10YR 5/3) light clay loam, very dark grayish brown (10YR 3/2) moist; weak medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; many fine roots; many fine tubular pores; slightly acid (pH 6.5); abrupt smooth boundary.
A12 RSL 66385	2 to 6 inches, brown (10YR 5/3) light clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium platy structure; slightly hard, friable, sticky and slightly plastic; many fine roots; common fine tubular pores; slightly acid (pH 6.5); abrupt smooth boundary.
A3 RSL 66386	6 to 11 inches, dark brown (7.5YR 4/4) sandy clay loam, dark brown (10YR 3/3) moist; moderate medium platy structure; slightly hard, friable, sticky and plastic; many fine roots; many fine tubular pores; few thin clay films in pores; slightly acid (pH 6.5); clear wavy boundary.
B1t RSL 66387	11 to 23 inches, dark brown (7.5YR 4/4) heavy sandy clay loam, dark brown (10YR 3/3) moist and rubbed with dark brown (7.5YR 3/2) ped faces moist; weak medium prismatic structure; hard, friable, sticky and very plastic; common fine roots; common fine and medium tubular pores; common thin clay films on ped faces and in pores; slightly acid (pH 6.5); clear wavy boundary.
B21t RSL 66388	23 to 31 inches, yellowish red (5YR 4/6) silty clay loam, dark yellowish brown (10YR 3/4) moist and rubbed with dark brown (7.5YR 3/4) moist ped faces; weak medium prismatic breaking to moderate medium subangular blocky structure; very hard, friable to slightly firm, very sticky and very plastic; common fine roots; common thin and few moderately thick clay films on ped faces and in pores; slightly acid (pH 6.5); clear wavy boundary.
B22t RSL 66389	31 to 38 inches, yellowish red (5YR 4/6) silty clay loam, dark brown (7.5YR 4/4) moist and rubbed with dark brown (7.5YR 3/4) moist ped faces; moderate medium prismatic breaking to moderate medium subangular blocky structure; very hard, slightly firm, very sticky and very plastic; few fine roots; common fine and few medium tubular pores; continuous thin and common moderately thick clay films on ped faces and in pores; neutral (pH 6.8); clear wavy boundary.
B3t RSL 66390	38 to 47 inches, yellowish red (5YR 4/8) silty clay loam, dark brown (7.5YR 4/4) moist; weak medium prismatic breaking to moderate medium subangular blocky structure; very hard, firm, very sticky and very plastic; few fine roots; few fine tubular pores; many thin and common moderately thick clay films on ped faces and in pores; neutral (pH 7.0); this horizon has a small amount of rock structure; abrupt wavy boundary.
R RSL 66391	47 to 49 inches, moderately weathered sandstone bedrock. A few fine roots in seams or cracks, continuous moderately thick clay films on structural faces of the rock. Some B3t material in cracks and seams.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Steinbeck loam **LOCATION** Sonoma County, California

SOIL FAMILY: Mollic Haploxeralf, fine-loamy, mixed, mesic

SOIL NOS. 861Calif-49-4 **LAB. NOS.** 61407 - 61413

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0- 8	Ap	0.4	0.7	0.6	10.4	35.2	36.5	16.2	67.5	13.9	0	1
8-18	A1	0.4	0.6	0.4	9.4	35.1	36.1	18.0	65.4	14.9	0	1
18-28	A21	0.3	0.5	0.3	10.5	36.6	37.4	14.4	69.0	15.2	0	1
28-35	A22	0.3	0.5	0.3	12.0	38.7	38.9	9.3	74.2	15.1	0	1-vfsl
35-45	B21t	0.3	0.4	0.3	9.4	35.5	33.7	20.4	64.6	13.7	0	1
45-56	B22t	0.1	0.4	0.3	8.8	32.3	34.2	23.9	60.3	14.8	0	1
56-68+	B3	0.0	0.1	0.3	19.3	38.5	33.8	8.0	74.4	16.6	0	vfsl

8C1a pH H_2O 1:1	8C1c KCl 1:1		6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	4A3a Bulk Density g/cc		Ext. Iron as % Fe 6C1b				4B2 Soil water 15 atm s. Pct.
5.4	4.2		2.21	0.173	13	1.42		0.7				7.8
5.5	4.2		1.47	0.128	11	1.43		0.7				7.9
5.8	4.2		0.82	0.071	12	1.54		0.6				6.2
5.9	4.2		0.29	0.039		1.55		0.5				4.2
5.8	4.1		0.18			1.71		0.9				9.4
5.7	4.1		0.14			1.67		1.0				11.6
5.9	4.2		0.02					1.1				10.1

5A2a CATION EXCHANGE CAPACITY (← Na)	EXTRACTABLE CATIONS 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K (milliequivalents per 100g. soil →)	BASE SAT. % 5C3	5B1a Sum of Cations 5A3a meq/100g.					MOISTURE AT SATURATION %
17.7	3.9	2.4	12.0	0.3	0.9	38	19.5					
17.0	3.6	2.5	11.2	0.3	0.2	37	17.8					
13.4	3.1	2.7	7.7	0.3	0.1	45	13.9					
9.6	2.5	2.4	4.6	0.2	0.1	53	9.8					
17.1	5.0	6.1	5.0	0.4	0.1	70	16.6					
21.2	7.1	8.3	4.9	0.5	0.2	77	21.0					
23.3	8.7	9.6	3.7	0.5	0.2	84	22.7					

STEINBECK LOAM
S61Calif-49-4

Location: Sonoma County, California. Near center of NE1/4 of section 34, T. 6 N., R. 10 W. (Coronet Ranch) 390 feet south of Valley Ford cutoff road, 5180 feet west of junction with Freestone - Valley Ford Road. Date of Sampling: June 22, 1961.
Collectors: Reuben Nelson, Leo C. Klameth, V. C. Miller, G. Lambert, J. H. Kashiwagi, F. Graham.
Classification: **Mollic Haploxeralf, fine-loamy, mixed, mesic.**

Vegetation: Annual and perennial grasses. Use: Improved dry land pasture. Climate: Average rainfall about 24.7 inches, average temperature 57.5° F., January temperature 46.7° F., July temperature 66.3° F. Parent Material: Merced formation - soft sedimentary marine formation. Elevation: About 160 feet. Relief: Rolling hills on 9 percent slightly concave west facing slope. Drainage: Moderately well drained, medium runoff, moderately rapid over moderately slow permeability. Biological Activity: Worm casts to 28 inches.

HORIZON	DESCRIPTION
Ap RSL No. 61407	0 to 8 inches, dark gray (10YR 4/1) loam (silty), very dark grayish brown (10YR 3/2) when moist; massive breaking to fine and very fine subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; abundant very fine and fine roots; common very fine and fine interstitial and tubular pores; strongly acid, pH 5.5; clear, wavy boundary.
A1 RSL No. 61408	8 to 18 inches, dark gray (10YR 4/1) loam (silty), black (10YR 2/1) when moist; massive breaking to very fine subangular blocky structure; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; abundant very fine and fine roots; common fine and very fine tubular and interstitial pores; strongly acid, pH 5.5; gradual, wavy boundary.
A21 RSL No. 61409	18 to 28 inches, gray (10YR 5/1) fine sandy loam, mixed very dark grayish brown and dark grayish brown (10YR 3/2 and 10YR 4/2) when moist; massive; hard when dry, friable when moist, slightly sticky and slightly plastic when wet; abundant very fine and fine roots; many very fine and fine tubular and interstitial pores; strongly acid, pH 5.5; gradual, wavy boundary.
A22 RSL No. 61410	28 to 35 inches, light gray (10YR 7/2) fine sandy loam (loamy fine sand), brown (10YR 5/3) when moist; massive; slightly hard when dry; friable when moist, nonsticky and nonplastic when wet; abundant very fine and fine roots oriented vertically; many very fine and fine tubular and interstitial pores; few moderately thick clay films in pores; strongly acid, pH 5.5; clear, wavy boundary.
B21t RSL No. 61411	35 to 45 inches, light yellowish brown (10YR 6/4) clay with common medium distinct mottles of yellowish brown (10YR 5/8) when dry, yellowish brown (10YR 5/6) with common medium distinct mottles of strong brown (7.5YR 5/8) when moist; massive breaking to weak very coarse prismatic structure; hard when dry, very firm when moist, sticky and plastic when wet; abundant very fine and fine roots oriented vertically; many very fine tubular pores; continuous, thick clay films in pores and on ped faces; medium acid, pH 5.8; scattered shot size (manganese) concretions; gradual, wavy boundary.
B22t RSL No. 61412	45 to 56 inches, light yellowish brown (10YR 6/4) clay with common medium distinct mottles of yellowish brown (10YR 5/8) when dry, yellowish brown (10YR 5/6) with common medium distinct mottles of reddish yellow (7.5YR 6/8) when moist; massive breaking to weak coarse prismatic structure; hard when dry, very firm when moist, very sticky and very plastic when wet; plentiful fine and very fine roots; many very fine tubular pores; continuous, moderately thick and thick clay films on ped faces and in pores; medium acid, pH 6.0; abrupt, wavy boundary in parts of the pit.
B3 RSL No. 61413	56 to 68 inches +, light brownish gray (2.5Y 7/2) sandy loam with many fine distinct mottles of strong brown (10YR 5/8) when dry; yellowish brown (10YR 5/6) with mottles of light brownish gray and strong brown (2.5Y 6/2 and 7.5YR 5/6) when moist; massive; hard when dry, friable when moist, slightly sticky and nonplastic when wet; few discontinuous tubular pores; continuous, thick clay films; slightly acid, pH 6.5; some clam shell imprints are evident; weakly cemented.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Mollic Haploxeralf, fine-loamy, mixed, thermic

SOIL Fallbrook sandy loam (taxadjunct) SOIL Nos. S64Calif-37-6 LOCATION San Diego County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 6423 - 6429

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt (0.05–0.02)	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	* Clay <.002	** Clay <.002	1/ Coarse fragments: ≥ 2	1A2a: 2 – 19	1A2a: 19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76 mm	
0- 3	Ap	64.8	26.4	8.8	10.2	14.7	10.0	17.8	12.1	13.6	12.8	35.5	52.7	8.5	8.1	5	5	0
3-13	A12	61.6	26.2	12.2	7.9	13.9	9.0	17.9	12.9	12.8	13.4	35.0	48.7	9.8	9.4	4	4	0
13-18	B1	58.5	25.2	16.3	8.6	13.7	8.5	16.6	11.1	12.1	13.1	32.4	47.4	18.4	17.3	6	6	0
18-27	B21t	52.8	22.6	24.6	7.7	11.4	7.5	15.7	10.5	10.6	12.0	30.1	42.3	23.3	22.0	5	5	0
27-41	B22t	56.9	23.7	19.4	8.1	12.1	8.0	17.1	11.6	11.3	12.4	32.0	45.3	19.3	17.6	9	9	0
41-62	C1	73.9	14.7	11.4	20.8	19.1	8.4	17.0	8.6	6.7	8.0	24.3	65.3	11.1	7.9	29	29	0
62-70+	C2	76.6	16.4	7.0	23.4	19.4	8.6	16.4	8.8	7.1	9.3	23.9	67.8	6.7	4.6	31	31	0

Depth (In.)	* 6A1a Organic carbon	6B1a * Nitrogen	C/N	*6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven dry	3B2 C'	Water content: 4B1c 1/3 bar	Water content: 4B2* 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH: 8C1b Saturated Paste	pH: 8C1a H_2O 1:1	pH: 8C1a H_2O 1:10
	Pct	Pct.		Pct.	Pct	g/cc	g/cc	g/cc	Pct	Pct.	Pct.	in./in.	in./in.			
0- 3	2.1	0.178	12	0.6							6.6			7.0	7.2	
3-13	0.83	0.042	20	0.8							5.1			6.9	7.3	
13-18	0.30			1.3							7.8			6.9	7.2	
18-27	0.23			1.2							9.5			6.8	7.0	
27-41	0.16			1.1							8.5			6.8	7.0	
41-62	0.03			1.1							7.3			7.0	7.2	
62-70+	0.01			1.0							5.7			7.2	7.3	

Depth (In.)	Extractable bases: 6N2a* Ca	6O2a* Mg	6P2a* Na	5B1a 6Q2a* K	* Sum of bases	6H2a* Ext. Acidity	Cation Exch. Capacity: 5A2a* NaOAc	5A3a* Sum	Water extract from saturated paste: 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K	8A1 6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter								mmho/cm
0- 3	8.8	4.2	0.5	0.6	14.1	2.0	16.2	16.1									
3-13	6.6	3.1	0.7	0.1	10.5	1.5	12.4	12.0									
13-18	10.2	4.0	1.3	0.1	15.6	1.9	18.1	17.5									
18-27	11.0	4.6	1.6	0.1	17.3	2.3	20.9	19.6									
27-41	11.3	5.1	1.8	0.1	18.3	2.0	18.7	20.3									
41-62	16.1	6.1	1.6	0.1	23.9	1.4	25.1	25.3									
62-70+	17.3	4.9	2.0	0.1	24.3	1.0	24.8	25.3									

Depth (In.)	8A Water at Saturation	5D2 Exchangeable Na	5B1b Exch. Na meq / 100g	Base Sat. Cations	Base Sat. NaOAc CEC	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Mica	Kaolin.
	Pct.	Pct.		Pct.	Pct.	X-ray			
0- 3		3		88	88				
3-13		6		85	85				
13-18		7		89	86				
18-27		8		88	83				
27-41		9		90	98				
41-62		6		94	95				
62-70+		8		96	98				

1/ From characterization sample; determined by shaking overnight in a sodium hexametaphosphate solution.

* Analysis of ground whole soil; results expressed on <2-mm basis.

** Analysis of ground whole soil; results expressed on whole-soil basis.

FALLBROOK SANDY LOAM (taxadjunct) 1/
S64Calif-37-6

Location: San Diego County, California. A soil profile pit located about 1-1/2 miles south and 1-1/2 miles east of Fallbrook in the SW1/4 of the NW1/4 of section 29, T. 9 S., R. 3 W. Date of Sampling: February 20, 1964.
Description By: Roy H. Bowman, Gerald Kester. Collectors: Klaus Flach, Gerald Kester, George Borst, Lothair Grant and Donald Markewich.
Classification: Mollic Haploxeralf, fine-loamy, mixed, thermic.
Vegetation: Wild oats and annual weeds. Climate: Annual precipitation is 15 inches and mean annual temperature is 60° F. Parent Material: Tonalite grus. Topography: East-facing, smooth 9 percent slopes in middle backslope positions on rolling upland. Elevation: 685 feet above sea level. Drainage: Well drained; medium runoff; moderately slowly permeable. Soil Moisture: Moist to 18 inches.

HORIZON	DESCRIPTION
Ap RSL No. 6423	0 to 3 inches, brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; weak fine crumb structure; slightly hard, very friable, slightly sticky and nonplastic; abundant very fine and fine roots; many very fine and fine interstitial pores; neutral (pH 6.6); abrupt smooth boundary.
A12 RSL No. 6424	3 to 13 inches, brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; massive; hard, friable, slightly sticky and nonplastic; abundant very fine and fine roots; many very fine to medium tubular pores; slightly acid (pH 6.5); clear smooth boundary.
B1 RSL No. 6425	13 to 18 inches, reddish brown (5YR 5/3) sandy clay loam, dark reddish brown (5YR 3/3) moist; weak coarse subangular blocky structure; hard, firm, slightly sticky and slightly plastic; plentiful very fine roots; common very fine and fine tubular pores; slightly acid (pH 6.3); clear smooth boundary.
B21t RSL No. 6426	18 to 27 inches, reddish brown (5YR 4/3) sandy clay loam, dark reddish brown (5YR 3/3) moist; moderate coarse prismatic structure; very hard, firm, sticky and plastic; few very fine roots; common very fine and fine tubular pores; common moderately thick clay skins on ped faces; slightly acid (pH 6.3); clear smooth boundary.
B22t RSL No. 6427	27 to 41 inches, reddish brown (5YR 5/4) sandy clay loam, dark reddish brown (5YR 3/4) moist; weak coarse prismatic structure; very hard, firm, sticky and plastic; few very fine roots; few very fine tubular pores; slightly acid (pH 6.3); clear wavy boundary.
C1 RSL No. 6428	41 to 62 inches, dark reddish brown (5YR 3/2) to light reddish brown (5YR 6/4) and pinkish gray (5YR 6/2) tonalite grus of fine gravelly sand texture; slightly acid (pH 6.2); clear wavy boundary.
C2 RSL No. 6429	62 to 70 inches, reddish brown (5YR 5/4) to light gray (10YR 7/2) tonalite grus of fine gravelly sand texture; slightly acid (pH 6.2).

1/ The Fallbrook series is in a fine-loamy, mixed, thermic family of Typic Haploxeralfs. This pedon has an A1 horizon that, throughout the upper 10 cm., has a moist color value of less than 3.5 and has more than 0.7 percent organic carbon.

CONSECUTIVE PEDON NUMBER C 69 56 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES PACHAPPA TAXADJUNCT SOIL NO. S69 CALI. 36-24 SAMPLE NO. 9 299-9 301 SAN BERNARDINO AREA

SOIL FAMILY MOLLIC HAPLOXERALF FINE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SAMPLE NO.	DEPTH CM.	HORZ.	SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION 2- .05	SILT .05- .002	CLAY LT .002	SANDS VCS 2-1	CS 1- .5	MS .5- .25	FS .25- .10	VFS .1- .05	SILTS CSI .05- .02	FSI .02- .002	CLAYS CO. 2- .2U	FINE LT .2U	CARBO NATE 3A1A	INT. 1A2A .02 WHOLE SOIL	COARSE FRAGMENTS- PCT. OF 20 I 75- II 20-5 III 5-2
			PERCENT OF LESS THAN 2MM														PCT. OF
9 299	0- 15	AP	40.8	40.1	19.1	3.6	6.0	4.9	10.0	16.3	25.8	14.3			47.8	--A	-- -- --
9 300	15- 28	B1	35.7	33.6	30.7	3.3	6.3	5.1	8.3	12.7	19.1	14.5			36.2	--A	-- -- --
9 301	43- 74	B22T	37.4	32.7	29.9	4.2	6.5	5.4	8.7	12.6	18.7	14.0			36.0	--A	-- -- --

SAMPLE NO.	DEPTH CM.	ORG. CAR- BON 6A1A	MATTER NITRO GEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B	19-2 6E1B	EXT. IRON FE 6C2B	ATTERBERG L L 4F2	I M I T PL 4F1	BULK DENSITY EST 1/3 BAR 4A1F	1/3 BAR 4A1F	DRY 4AH	CM 3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2	EXTENSBLTY LEF 4D1	LE 4D1	PH H2O 1/1 8C1A	H2O 1/10 8C1A	CACL2 8C1E
		PERCENT		PERCENT		PCT.	PCT.	NO.40	GRAMS PER CC				PERCENT			PERCENT				
9 299	0- 15	1.40	0.148						1.46	1.63	1.00		19.6	8.7	3.7	3.7	7.8			7.3
9 300	15- 28	0.46	0.039						1.49		1.00			13.2			7.6			6.9
9 301	43- 74	0.38								1.52	1.93	1.00		24.6	13.2	8.3	8.3	8.1		7.2

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6O2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	BASE SAT.	C E C NA- OAC 5A2A	NH4- OAC 5A6A	EC 8A1A	WATER EXTRACT FROM SATURATED PASTE CA 6N1B	MG 6O1B	NA 6P1A	K 6Q1A	CO3 6I1A	HCO3 6J1A	CL 6K1A	SO4 6L1B	B 6T1A	PH SAT. PASTE 8C1B
		MEQ/100G					PCT.	MEQ/100G		MMHO	MEQ/1000 ML								PPM	
9 299	0- 15	15.0	7.9	0.2	0.6	23.7	100+		19.5	0.91										
9 300	15- 28	18.1	13.3	1.5	0.3	33.2	100+		30.5											
9 301	43- 74	17.1	12.9	2.9	0.3	33.2	100+		30.8	0.58										

SAMPLE NO.	DEPTH CM.	WATER AT SAT. 8A PCT.	EXCHANGBLE NA 5B4B MEQ.	NA 5D2 PCT.	SAR 5E	GYPSUM- AMT. 6F1B PERCENT	REQ. 6P3A	CLAY MINERALOGY LESS THAN 0.002 MM X RAY I 7A2E	II 7A2E	III 7A2E	DTA IV 7A3	PCT. 7A2E	L.T. .0002 MM- X RAY I 7A2E	II 7A2E	III 7A2E	MINERAL CODE	RELATIVE AMOUNT
9 299	0- 15		0.2	1													1 TRACE
9 300	15- 28		1.5	5												MT	MONTMORT 2 SMALL
9 301	43- 74		2.9	9				MT 5	MI 2							MI	MICA 3 MODERATE
																	4 ABUNDANT
																	5 DOMINANT
																	6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

PACHAPPA LOAM (TAXADJUNCT) 1/
S69Calif-36-24

Location: San Bernardino County, California; about 1/2 mile south of Chino-Corona Road and Cucamonga Avenue intersection; about 100 feet east of Cucamonga Avenue; SW¼ NE¼ SE¼ of sec. 5, T. 3 S., R. 7 W. Date of Sampling: June 10, 1969.
Description by: A. A. Knecht, W. D. Nettleton, W. Z. Brock. Collectors: A. A. Knecht, W. D. Nettleton, W. Z. Brock.
Classification: Mollic Haploxeralf, fine-loamy, mixed, thermic.
Vegetation: Small grain stubble, mustard, cheatgrass and sunflower weed. Climate: Average annual precipitation about 16 inches. Mean temperature about 61°F. Parent Material: Acid igneous alluvium. Topography: Alluvial fan, moderately sloping, about 5 percent slopes. Elevation: 550 feet. Drainage: Well drained; medium runoff; moderate permeability. This area is above flood plain and water table is below five feet. Soil Moisture: Profile was dry throughout when sampled.
Remarks: Field reaction was determined by the Truog method. Three samples (0-6", 6-11", 17-29") were analyzed in the Riverside Soil Survey Laboratory. *Color value of the Bt horizon slightly lower than currently defined.

HORIZON	DESCRIPTION
	(0-15 cm.)
Ap RSL 69299	0 to 6 inches, grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, plastic; many very fine roots; many very fine discontinuous tubular pores; moderately alkaline (pH 8.0); clear smooth boundary.
	(15-28 cm.)
B1 RSL 69300	6 to 11 inches, dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak medium prismatic parting to moderate medium subangular blocky structure; very hard, firm, very sticky, very plastic; many very fine inped roots; common very fine discontinuous tubular pores; moderately alkaline (pH 8.0); clear smooth boundary.
	(28-43 cm.)
B21t	11 to 17 inches, dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic parting to moderate medium subangular blocky structure; extremely hard, very firm, very sticky, very plastic; common very fine inped roots; few very fine vertical interstitial pores; very few thin clay films occur on faces of peds; moderately alkaline (pH 8.0); gradual smooth boundary.
	(43-74 cm.)
B22t RSL 69301	17 to 29 inches, dark grayish brown (10YR 4/2) clay loam, very dark brown (10YR 2/2) moist; moderate medium prismatic parting to moderate medium subangular blocky structure; extremely hard, very firm, very sticky, very plastic; few very fine roots; few very fine discontinuous tubular pores; few thin clay films occur on faces of peds; slightly effervescent; strongly alkaline (pH 8.5); clear smooth boundary.
	(74-100 cm.)
B3t	29 to 40 inches, dark grayish brown (10YR 4/2) sandy clay loam, very dark grayish brown (10YR 3/2) moist; weak coarse prismatic parting to moderate medium angular blocky structure; very hard, very firm, sticky, plastic; very few roots; very few discontinuous tubular pores; common moderately thick clay films on faces of peds; strongly effervescent; medium generally rounded segregated lime occurs in soft masses; strongly alkaline (pH 8.5); clear irregular boundary.
	(100-135 cm.)
C1	40 to 54 inches, reddish yellow (7.5YR 6/6) very coarse loamy sand, strong brown (7.5YR 5/6) moist; massive; hard, friable, nonsticky, nonplastic; strongly effervescent; strongly alkaline (pH 8.5); clear wavy boundary.
	(135-170 cm.)
C2	54 to 67 inches, very pale brown (10YR 7/3) very coarse loamy sand, pale brown (10YR 6/3) moist; massive; hard, firm, nonsticky, nonplastic; moderately alkaline (pH 8.0).

1/ The Pachappa series is in a fine-loamy, mixed, thermic family of Mollic Haploxeralfs. This pedon is in the same family and subgroup but has a Bt horizon with a color value of less than 5.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Pleasanton gravelly loam **LOCATION** Alameda County, California

SOIL FAMILY: Mollic Haploxeralf, fine-loamy, mixed, thermic

SOIL NOS. S60Calif-01-1 **LAB. NOS.** 60377 thru 60382

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0-9	A_{1p}	6.2	12.7	8.7	20.2	10.1	29.0	13.1	36.1	14.9	55	fsl
9-21	A_{12}	7.0	11.8	8.1	18.7	10.3	29.9	14.2	35.8	15.7	27	fsl
21-32	B_{21}	7.2	12.8	7.9	18.0	10.0	27.2	16.9	24.0	14.0	49	fsl
32-48	B_{22}	6.1	13.5	6.6	17.3	10.3	26.3	19.9	34.1	13.4	40	fsl-scl
48-64	B_3	3.8	7.0	6.4	17.6	14.5	31.6	19.1	40.0	16.7	42	l
64-72	C	3.0	5.4	6.9	14.9	22.0	29.9	17.9	43.6	14.9	30	fsl-l

pH 8C1b Saturated Paste 1:1	8C1a 1:10	Organic Matter 6A1a Organic Carbon Pct.	6B1a Nitrogen Pct.	C/N	6E1b $CaCO_3$ equivalent Pct.	8A1a Elec. conduc. mmhos/cm. at 25°C	Saturation Ext. Soluble 6I1a CO_3	6J1a HCO_3	6L1a SO_4	6M1a NO_3	6C1b Free Fe_2O_3 Pct.	4B2 Soil water 15 atmos. Pct.
							milliequivalents per liter					
6.3	6.6	2.02	0.172	11.7		0.5	0	3.8				3.6
6.8	7.0	0.96	0.087	11.0		0.3	0	2.0				3.5
7.1	7.3	0.45	0.052	8.7		0.3	0	1.5				5.7
7.3	7.7	0.23	0.032			0.2	0	1.0				7.6
7.3	7.6	0.17				0.2	0	1.1				7.4
7.4	8.1	0.12				0.3	0	1.1				4.4

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a N	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil						milliequivalents per liter					
17.3	10.1	2.0	4.6	0.1	0.6	74	0.8	0.3	3.7	0.8	1.3	29.6
14.4	9.3	1.5	2.7	0.1	0.4	81	0.7	0.1	2.2	0.5	0.4	23.8
15.4	9.4	3.6	2.3	0.1	0.3	85	0.9	<0.1	1.6	0.7	0.4	22.7
18.0	8.4	7.1	2.1	0.2	0.3	93	1.0	<0.1	0.9	0.9	0.2	26.1
19.6	8.0	8.9	2.0	0.4	0.3	90	1.1	<0.1	0.6	0.7	0.2	27.8
17.2	7.3	8.0	1.6	0.4	0.3	91	1.6	<0.1	1.0	0.6	0.6	27.6

1/ Percent of the whole soil

PLEASANTON GRAVELLY LOAM
S60Calif-01-1

Location: Alameda County, California. SE1/4 of the NE1/4 of the NE1/4 of Sec. 24, T. 3 S., R. 2 E., about 5 miles southeast of the center of Livermore.
Date of Sampling: August 5, 1960.
Description by: L. E. Welch. Collectors: W. C. Fischer and L. E. Welch.
Classification: Mollic Haploxeralf, fine-loamy, mixed, thermic.
Vegetation: Cultivated, barley. Climate: Mean annual rainfall about 14 inches.
Parent Material: Alluvium from sedimentary rock. Relief: Slightly convex south-facing slope of 1 percent, on low terrace. Elevation: 710 feet. Drainage: Well drained, medium runoff, moderate permeability over moderately slow permeability.
Remarks: Moist below 24 inches. Occasional cobbles throughout. Few worm holes.

HORIZON		DESCRIPTION
A_{1p}	0-9"	**Gray brown (10YR 5/2) gravelly loam, very dark gray brown (10YR 3/2) when moist; massive to very weak granular structure; hard when dry; friable when moist; slightly sticky and slightly plastic when wet; abundant very fine, plentiful fine, plentiful medium, random roots; common very fine, common fine and few medium, random, inped open, interstitial pores; slightly acid, pH 6.5; abrupt, smooth lower boundary.**
A_{12}	9-21"	**Gray brown (10YR 5/2) gravelly loam, very dark gray brown (10YR 3/2) when moist; massive; hard when dry; friable when moist; slightly sticky and slightly plastic when wet; abundant very fine, plentiful fine and few medium random roots; common very fine, common fine and few medium random, inped, open interstitial pores; slightly acid, pH 6.5; clear, smooth lower boundary.**
B_{21}	21-32"	Brown (10YR 4/3) gravelly clay loam, dark brown (10YR 3/3) when moist; moderate, medium, subangular blocky; very hard when dry; friable when moist; sticky and plastic when wet; plentiful very fine, plentiful fine, random roots; many very fine, many fine, and few medium, random, inped, open, tubular pores; common, moderately thick clay films on ped faces and pores; slightly acid, pH 6.5; gradual, wavy lower boundary.
B_{22}	32-43"	Brown (10YR 4/3) gravelly clay loam, dark brown (10YR 3/3) when moist; moderate, medium, subangular blocky structure; very hard when dry; friable when moist; sticky and plastic when wet; plentiful very fine, few fine, random roots; many very fine, common fine, few medium, random, inped, few exped, open, tubular pores; common, moderately thick clay films on ped faces and pores; neutral, pH 7.0; gradual, wavy lower boundary.
B_3	43-64"	Brown (10YR 4/3) gravelly silty clay loam; dark brown (10YR 3/3) when moist; weak, medium subangular structure; very hard when dry; friable when moist; sticky and plastic when wet; very few, very fine roots; common very fine, common fine, random, open, tubular pores; few thick and few thin clay films on ped faces and pores; mildly alkaline, pH 7.5; gradual, wavy lower boundary.
C	64-72"	Yellowish brown (10YR 5/4) gravelly silt loam, dark yellowish brown (10YR 4/4) when moist; massive to weak, angular blocky structure; hard when dry, friable when moist; sticky and slightly plastic when wet; void of roots; common very fine, common fine, and few medium random inped, open, tubular pores; few thin clay films on ped faces and pores; mildly alkaline, pH 7.5.

SOIL SURVEY LABORATORY — Riverside, California

SOIL TYPE Pleasanton gravelly loam (taxadjunct) LOCATION Alameda County, California

SOIL FAMILY: Mollic Haploxeralf, fine-loamy, mixed, thermic

SOIL NOS. S60Calif-01-2 LAB. NOS. 60383 thru 60388

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0-6	A_{1p}	8.9	7.9	5.9	13.2	13.1	38.9	12.1	42.4	17.8	38	1
6-17	A_{12}	6.7	8.5	5.6	13.1	13.7	36.8	15.6	42.3	16.4	31	1
17-31	B_{21}	9.1	8.6	5.4	11.5	12.6	37.4	15.4	40.7	16.6	28	1
31-48	B_{22}	8.7	8.8	5.0	8.6	11.9	39.1	17.9	36.3	19.7	23	1
48-61	B_3	9.0	10.6	6.0	11.5	10.9	36.1	15.9	36.6	17.2	32	1
61+	C	7.9	8.0	4.5	9.4	11.5	39.0	19.7	37.5	18.6	21	1

pH 8C1b Saturated Paste 1:1	8C1a 1:10	Organic Matter 6A1a Organic Carbon Pct.	6B1a Nitrogen Pct.	C/N	6E1b $CaCO_3$ Equivalent Pct.	8A1a Elec. Conduc. mmhos/cm. at 25° C	Saturation Ext. Soluble 6I1a CO_3	6J1a HCO_3	6L1a SO_4	6M1a NO_3	6C1b Free Fe_2O_3 Pct.	4B2 Soil water 15 atm s. Pct.
							milliequivalents per liter					
6.4	6.7	1.79	0.140	12.8		0.5	0	3.5				5.9
6.4	6.9	0.85	0.080	10.6		0.3	0	1.9				6.9
6.9	7.1	0.50	0.047	10.6		0.3	0	1.4				6.8
7.2	7.4	0.46	0.046	10.0		0.2	0	1.2				7.6
7.1	7.3	0.28	0.035	8.0		0.2	0	0.8				6.6
6.9	7.1	0.14				0.3	0	0.8				8.5

5A2a CATION EXCHANGE CAPACITY (+ Na)	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil						milliequivalents per liter					
16.3	8.0	2.8	4.4	0.3	0.7	73	1.0	0.5	3.4	1.2	1.0	31.8
18.6	10.3	4.2	3.2	0.2	0.4	83	0.8	0.1	1.7	0.9	0.3	27.7
18.4	8.1	6.6	2.2	0.2	0.2	87	0.8	<0.1	1.0	1.0	0.4	28.0
19.1	8.7	8.0	2.2	0.2	0.2	87	0.9	<0.1	1.0	0.7	0.3	28.1
16.0	7.0	6.9	1.9	0.3	0.2	88	1.2	<0.1	0.8	0.8	0.2	21.1
19.9	7.7	8.6	2.4	0.5	0.2	88	1.5	<0.1	0.7	0.4	0.6	26.0

1/ Percent of the whole soil

PLEASANTON GRAVELLY LOAM (taxadjunct) 1/
S60Calif-01-2

Location: Alameda County, California, SW1/4 of the NW1/4 of the SW1/4 of Sec. 22, T. 3 S., R. 2 E., about 2 miles southeast of the center of Livermore.
Date of Sampling: August 5, 1960
Description by: L. E. Welch. Collectors: L. E. Welch and W. C. Fischer.
Classification: Mollic Haploxeralf, fine-loamy, mixed, thermic.
Vegetation: Cultivated in past, annual grasses at present. Parent Material: Alluvium from sedimentary rock. Relief: Slightly convex west-facing slope of 1 percent, on low terrace. Elevation: 590 feet. Drainage: Well drained, medium runoff, moderate permeability over moderately slow permeability. Soil Moisture: Moist below 17 inches.
Remarks: Few worm holes. Occasional cobbles throughout.

HORIZON		DESCRIPTION
A_{1p}	0-6"	Gray brown (10YR 5/2) gravelly loam, very dark gray brown (10YR 3/2) when moist; massive; hard when dry; friable when moist; slightly sticky and slightly plastic when wet; abundant very fine, abundant fine, plentiful medium, few coarse, random roots; many very fine, many fine, few medium, inped, open, interstitial pores; slightly acid, pH 6.5; gradual, smooth lower boundary.
A_{12}	6-17"	Gray brown (10YR 5/2) gravelly loam, very dark gray brown (10YR 3/2) when moist; massive; hard when dry, friable when moist, slightly sticky and slightly plastic when wet; abundant very fine, abundant fine, few medium, random roots; many very fine, many fine, common medium, inped, open, interstitial pores; slightly acid, pH 6.5; gradual, smooth lower boundary.
B_{21}	17-31"	Gray brown (10YR 5/2) gravelly clay loam, very dark gray brown (10YR 3/2) when moist; weak medium subangular blocky structure; very hard when dry, friable when moist, sticky and plastic when wet; abundant very fine, abundant fine, few medium, random roots; many very fine, many fine and common medium, inped, open, tubular pores; common, thin clay films on ped faces and pores; slightly acid, pH 6.5; gradual, smooth lower boundary.
B_{22}	31-43"	Brown (10YR 4/3) gravelly clay loam, dark brown (10YR 3/3) when moist; weak, medium subangular blocky structure; very hard when dry; friable when moist; sticky and plastic when wet; plentiful very fine, plentiful fine, random roots; many very fine, many fine, few medium inped, open, tubular pores; common, moderately thick clay films on ped faces and pores: neutral, pH 7.0; gradual, smooth lower boundary.
B_3	43-61"	Brown (10YR 4/3) gravelly light clay loam, dark brown (10YR 3/3) when moist; weak, medium angular blocky structure; very hard when dry; friable when moist; sticky and plastic when wet; few very fine roots; many very fine, many fine, few medium inped, open tubular pores; few thin to common thin clay films on ped faces and pores; neutral, pH 7.0; gradual, smooth lower boundary.
C	61"+	Yellowish brown (10YR 5/4) heavy gravelly clay loam, dark yellowish brown (10YR 4/3) when moist; massive to weakly medium subangular blocky; very hard when dry; friable when moist; sticky and plastic when wet; void of roots; many very fine, many fine, few medium inped, open and tubular pores; common, moderately thick clay skins on ped faces and pores.

1/ The Pleasanton series is in a fine-loamy, mixed, thermic family of Mollic Haploxeralfs. This pedon is in the same family but slightly less clay than is required of the series.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Rescue loam **LOCATION** El Dorado County, Calif.

SOIL FAMILY: Mollic Haploxeralf, fine-loamy, mixed, thermic

SOIL NOS. S61Calif-9-1 **LAB. NOS.** 6179 - 6185

DEPTH INCHES	HORIZON	181b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0- 5	A_1	6.8	16.1	8.1	16.1	9.0	29.8	14.1	29.1	19.3	8	sl
5-10	A_3	7.7	16.2	8.4	15.0	8.5	29.1	15.1	27.3	19.1	5	sl
10-14	B_1 t	9.2	18.6	6.8	12.0	7.4	25.7	20.3	21.8	18.3	4	scl-sl
14-26	B_2 t	9.4	12.1	4.2	13.3	8.6	21.3	31.1	23.6	14.8	4	scl
26-34	B_3 t	10.1	10.6	5.9	21.1	11.7	20.4	20.2	31.6	14.1	6	scl-sl
34-55	C_1	13.9	13.8	7.6	25.0	12.2	17.3	10.2	35.5	9.9	6	cosl
55-66+	C_2	23.0	14.8	7.2	24.5	11.0	15.2	4.3	33.4	8.9	14	lcos

pH 8C1a H_2O 1:1	pH 8C1c KCl 1:1	Organic Matter 6A1a Organic Carbon Pct.	Organic Matter 6B1a Nitrogen Pct.	C/N	$CaCO_3$ equivalent	Elec. Conduc. mmhos/cm. @ 25°C.	Free Fe_2O_3 6C1a %	Bulk Den. 4A3a gm/cc	4B2 Soil water 15 atmos. Pct.
6.4	5.0	1.21	0.094	12.9			3.6	1.75	7.5
6.4	5.0	0.77	0.057	13.5			4.1	1.78*	7.9
6.4	4.9	0.41	0.034	12.1			4.4	1.81	10.0
6.5	5.0	0.26	0.024				4.0	1.86	13.9
6.6	4.7	0.14					2.3	1.98	10.7
6.6	4.5	0.07					1.3	1.87	6.6
6.7	4.4	0.02					0.9	1.78	4.4

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K	BASE SAT. % 5C3	Sum of Cations soil	Calc. Sum of Cations clay	Calc. Sum of Cations clay + fine silt
	milliequivalents per 100g. soil →						← milliequivalents per 100 g. →		
14.1	7.8	2.5	4.5	0.1	0.2	70	15.1	107	34
14.2	8.3	2.8	4.0	0.2	0.2	74	15.5	103	35
18.1	9.7	3.9	4.0	0.2	0.1	78	17.9	88	39
23.4	11.0	5.8	4.1	0.2	0.1	81	21.2	68	40
19.6	8.7	5.0	3.0	0.3	0.1	83	17.1	65	42
16.4	7.1	4.1	2.3	0.2	<0.1	83	13.7	134	50
14.5	6.6	3.6	1.8	0.2	<0.1	85	12.2	284	63

* Single determination

1/ Percent of the whole soil

Collectors: Grant Kennedy, Reuben Nelson, John Rogers, Paul Nazar, David Estrada, Lothair Grant, Lynn Brittan. Description by: Grant Kennedy.
Date of Sampling: April 26, 1961
Location: El Dorado County, California, 2.0 miles north of Bass Lake, NE1/4SE1/4 sec. 19, T. 10 S., R. 9 E.
Elevation: 1100 feet
Relief: Undulating uplands with a 3 percent slope to the northwest.
Drainage: Well drained; medium runoff; moderate over slow permeability
Parent Material: Gabbro, Diorite
Climate: Mean annual rainfall - 29 inches; T. 62°, J. 46.4°, J 78°
Vegetation: Mainly filaree, with scattered clumps of stipa, buck brush, poison oak, blue oaks and Digger pine
Classification: Mollic Haploxeralf, fine-loamy, mixed, thermic.
Remarks: The C1 and C2 horizons are well weathered, but show original rock structure. The C1 has red (2.5YR 5/6) horizontal bands 1/4 to 1/8 inches thick at intervals of 4 to 6 inches. There were no stones in the profile, but about 5 percent stone cover nearby, with occasional rock outcrops. Shrubs appear to be invading; 100 feet across the road there is a dense cover of chamise, yerba santa, poison oak, and manzanita.

HORIZON		DESCRIPTION
A1	0- 5"	Reddish brown (5YR 5/4) loam, dark reddish brown (5YR 3/4) when moist; massive; slightly hard when dry, friable when moist; and slightly sticky and slightly plastic when wet; abundant very fine, plentiful fine roots; many very fine tubular and interstitial pores, few fine tubular pores; medium acid, pH 6.0; clear smooth boundary.
A3	5-10"	Reddish brown (5YR 4/4) loam near clay loam, dark reddish brown (5YR 3/4) when moist; massive; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; abundant very fine, plentiful fine roots; many very fine tubular and interstitial pores, few fine tubular pores; few thin clay films in pores; slightly acid; pH 6.2; clear slightly wavy boundary.
B1t	10-14"	Yellowish red (5YR 4/6) clay loam, yellowish red (5YR 3/6) when moist; massive; hard when dry, friable when moist, sticky and plastic when wet; plentiful very fine and fine roots; common very fine tubular pores; many thin clay films in pores and bridges; slightly acid, pH 6.2; gradual smooth boundary.
B2t	14-26"	Yellowish red (5YR 4/6) clay loam near clay, dark red (2.5YR 3/6) when moist; massive; extremely hard when dry, firm when moist, and sticky and plastic when wet; few fine to coarse roots; few very fine and fine tubular pores; many moderately thick clay films in pores; slightly acid, pH 6.4; gradual smooth boundary.
B3t	26-34"	Reddish yellow (5YR 6/8) sandy clay loam variegated reddish brown, reddish yellow (5YR 4/4), 6/6) when moist; massive; extremely hard when dry; firm when moist, sticky and plastic when wet; very few fine to coarse roots; few very fine tubular and interstitial pores; many thin clay films in pores and bridges; slightly acid, pH 6.5; clear slightly wavy boundary.
C1	34-55"	Reddish yellow (5YR 7/8) sandy loam near heavy loam, yellowish red (5YR 5/6) when moist; massive; very hard when dry, firm when moist, slightly sticky and slightly plastic when wet; very few fine to coarse roots; few very fine tubular and interstitial pores; few thin clay films in pores and bridges; slightly acid, pH 6.5; clear slightly wavy lower boundary.
C2	55-66"+	Very pale brown (10YR 7/4) loamy coarse sand, strong brown (7.5YR 5/6) when moist; massive; slightly hard when dry, firm when moist, non-sticky and nonplastic when wet; very few fine to coarse roots; few very fine tubular and interstitial pores; slightly acid, pH 6.5.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Rescue loam **LOCATION** El Dorado County, Calif.

SOIL FAMILY: Mollic Haploxeralf, fine-loamy, mixed, thermic

SOIL NOS. S61Calif-9-2 **LAB. NOS.** 6186 - 6192

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)							3A1		2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0-2½	A_1	8.4	16.2	10.1	16.9	8.0	27.8	12.6	28.0	17.0	10	sl
2½-8	A_3	11.3	14.5	9.2	14.1	7.6	27.7	15.6	25.3	18.1	7	cosl
8-12	B_1	10.6	16.1	8.7	12.9	7.2	25.6	18.9	23.4	16.6	7	cosl
12-24	B_{2t}	13.3	13.3	6.3	10.3	5.8	23.8	27.2	18.9	16.7	7	scl
24-37	B_3	12.1	21.8	7.2	13.9	6.8	22.5	15.7	22.8	14.3	13	cosl
37-54	C_1	10.1	24.2	8.9	17.0	7.5	23.5	8.8	24.4	15.9	11	cosl
54+	C_2	14.7	29.6	8.3	13.7	5.5	18.2	10.0	19.7	11.2	17	cosl

pH		Organic Matter			6E1b $CaCO_3$ equivalent Pct.	8A1a Elec. conduc. mmhos/cm. at 25°C	6C1a "Free" Fe_2O_3 %	4A3a Bulk Density g/cc			4B2 Soil water 15 atmos. Pct.
8C1b Saturated Paste 1:1	8C1c KCl 1:10	6A1a Organic Carbon Pct.	6B1a Nitrogen Pct.	C/N							
6.3	5.3	3.58	0.184	19.5			4.9	1.47			9.8
6.3	4.9	1.17	0.064	18.3			5.4	1.72			8.5
6.2	4.8	0.57	0.031	18.4			5.6	1.87			9.8
6.3	4.6	0.32	0.021				4.5	1.96			13.1
6.5	4.3	0.10					2.1	1.95			9.6
6.6	4.2	0.05					1.4	1.79			7.6
6.6	4.2	0.03					2.4	1.87			7.9

5A2a CATION EXCHANGE CAPACITY	EXTRACTABLE CATIONS 5B1a					BASE SAT. %	5A3a Sum of Cations / soil	Calc. Sum of Cations / clay	Calc. Sum of Cations / clay + finc silt
	6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K	5C3			
(+(Na)	milliequivalents per 100g. soil →						← milliequivalents per 100-g →		
27.3	13.7	3.5	8.2	0.2	0.4	69	26.0	206	64
20.5	9.4	4.0	5.6	0.2	0.3	71	19.5	125	45
20.1	9.8	5.3	4.5	0.2	0.1	77	19.9	105	45
26.1	13.2	8.3	4.1	0.2	0.1	84	25.9	95	51
22.6	11.8	7.7	2.5	0.2	0.1	89	22.3	142	58
20.0	10.2	6.8	1.7	0.2	0.1	91	19.0	216	59
24.0	12.2	8.4	2.0	0.3	<0.1	91	22.9	229	61

1/ Percent of the whole soil

RESCUE LOAM
S61Calif-9-2

Location: El Dorado County, California, 2.5 miles northwest of Bass Lake, SE 1/4 NE 1/4, Sec. 20, T. 10 N., R. 9 E. Date of Sampling: April 25, 1961. Description by: Grant Kennedy. Collectors: Grant Kennedy, Reuben Nelson, John Rogers, Paul Nazar, David Estrada, Lothair Grant, and Lynn Brittan. Classification: Mollic Haploxeralf, fine-loamy, mixed, thermic. Vegetation: Filaree, soft chess, ripgut, wild oats, clover. Climate: Mean annual rainfall 30 inches - mean annual temperature is 62° F., the average January temperatures is 46.7° F., and the average July temperature is 78° F. Parent material: Gabbro, diorite. Topography: Undulating uplands with a 5 percent slope to the east. Elevation: 1,380 feet. Drainage: Well drained; medium runoff; moderate over slow permeability.
Remarks: This area may have been farmed at one time and turkey manure may have been spread in recent years. C1 and C2 horizons are well weathered, but show original rock structure. There was a thin quartz ledge on the left side of the pit. Less than 5 percent of the are contained well-scattered rock outcrops. The dry color of the B2t is between hue 2.5YR and 5YR.

HORIZON		DESCRIPTION
A1	0-2½	Yellowish red (5YR 3/6) loam, dark reddish brown (5YR 3/2) when moist; massive; slightly hard when dry, friable when moist and slightly sticky and slightly plastic when wet; abundant very fine roots; many very fine tubular and interstitial pores; medium acid, pH 6.0; clear smooth boundary.
A3	2½-8"	Reddish brown (5YR 4/4) loam near clay loam, dark reddish brown (5YR 3/4) when moist; massive; slightly hard when dry, friable when moist, and slightly sticky and slightly plastic when wet; abundant very fine, plentiful fine roots; many very fine, common fine tubular and interstitial pores; few thin clay films in pores; medium acid, pH 6.0; clear smooth boundary.
B1	8-12"	Reddish brown (5YR 4/4) clay loam, dark reddish brown (5YR 3/4) when moist; massive; very hard when dry, friable when moist, and sticky and plastic when wet; plentiful very fine to medium few coarse roots; many very fine, common fine tubular and interstitial pores; common thin clay films in pores; slightly acid, pH 6.2; clear slightly wavy boundary.
B2t	12-24"	Dark red (2.5YR 3/6) clay loam near clay, dark red (2.5YR 3/6) when moist; massive; extremely hard when dry, firm when moist, and sticky and plastic when wet; plentiful very fine, few fine and medium roots; few very fine and fine tubular and interstitial pores; many moderately thick clay films in bridges and pores; slightly acid, pH 6.2; gradual slightly wavy boundary.
B3	24-37"	Variegated yellowish brown, light yellowish brown (10YR 5/4, 10YR 6/4) sandy clay loam, yellowish brown, strong brown (10YR 5/4, 7.5YR 5/6) when moist; massive; very hard when dry, firm when moist, sticky and plastic when wet; few very fine roots; few very fine and fine tubular and interstitial pores; common thin clay films in bridges and pores; slightly acid, pH 6.2; gradual slightly irregular boundary.
C1	37-54"	Light yellowish brown (10YR 6/4) sandy loam, variegated strong brown, dark yellowish brown (7.5YR 5/6, 10YR 4/4) when moist; massive; very hard when dry, firm when moist, slightly sticky and slightly plastic when wet; few very fine tubular and interstitial pores; very few thin clay films in bridges; slightly acid, pH 6.7; gradual smooth boundary.
C2	54"+	Light yellowish brown (10YR 6/4) loamy coarse sand, variegated dark yellowish brown, strong brown and black (7.5YR 5/6, 10YR 4/4, N 2/0) when moist; massive; hard when dry, firm when moist, nonsticky and nonplastic when wet; slightly acid, pH 6.5.

CONSECUTIVE PEDON NUMBER C 68117 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES TRABUCO TAXADJUNCT SOIL NO. S68 CALI. 29-30 SAMPLE NO. 8 875-8 882 NEVADA COUNTY AREA

SOIL FAMILY MOLLIC HAPLOXERALF FINE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION 2- .05	SILT .05- .002	CLAY LT .002	SANDS VCS 2-1	CS 1-.05	MS .5-.25	FS .25-.10	VFS .1-.05	SILTS CSI .05-.02	FSI .02-.002	CLAYS CO. 2-.2U	FINE LT .2U	CARBONATE 3A1A	INT. II .2-.02	COARSE FRAGMENTS- I 75-20	II 20-5	III 5-2
			PERCENT OF LESS THAN 2MM													PCT. OF WHOLE SOIL	PCT. OF LT 75		
8 875	0- 10	AP	51.3	35.6	13.1	4.0	10.0	8.7	16.9	11.7	15.3	20.3			36.4	--A	--	--	--
8 876	10- 25	A12	49.4	33.8	16.8	3.3	8.6	8.4	17.0	12.1	13.1	20.7			34.9	--A	--	--	--
8 877	25- 38	B1	45.0	33.4	21.6	2.4	7.3	7.7	16.0	11.6	12.2	21.2			33.2	--A	--	--	--
8 878	38- 69	B21T	27.7	34.4	37.9	0.8	4.0	4.2	10.7	8.0	9.6	24.8			23.8	--A	--	--	--
8 879	69- 99	B22T	38.0	35.9	26.1	1.6	6.3	6.0	14.0	10.1	11.4	24.5			29.4	--A	--	--	--
8 880	99-130	B3 T	42.3	36.3	21.4	2.3	6.9	6.6	16.3	10.2	12.8	23.5			32.3	--A	--	--	--
8 881	130-170	C	66.0	21.2	12.8	5.9	19.6	11.7	19.8	9.0	8.7	12.5			27.3	--A	--	--	--
8 882	0- 10	AP1														--A	--	--	--

SAMPLE NO.	DEPTH CM.	ORG.MATTER CARBON 6A1A	NITROGEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B	2-20 6E1B	SESQUIOXIDES DI-CIT FE 6C2B	EXT AL 6G7A	PYROP FE 6C5A	EXT AL 6G5A	ATTERBERG LL 4F2	PL 4F1	BULK DENSITY 1/3 BAR 4A1F	DRY 4A1F	4A1H	CM 3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2	EXTNSBLTY LEF 4D1	LE 4D1
		-PERCENT-		-PERCENT-		-------PERCENT--------				PCT.	NO.40	GRAMS PER CC				-----PERCENT----			-PERCENT-	
8 875	0- 10	2.69				2.1	0.1			NP	NP		1.69	1.70	1.00		17.5	8.7	0.2	0.2
8 876	10- 25	0.72				2.2	0.2					1.60			1.00			8.5		
8 877	25- 38	0.44				2.4	0.2			29	22	1.58			1.00			10.3		
8 878	38- 69	0.26				2.8	0.1					1.57			1.00			19.4		
8 879	69- 99	0.12				2.0	0.1			44	27		1.57	1.73	1.00		25.6	17.2	3.3	3.3
8 880	99-130					1.8	TR					1.58			1.00			15.2		
8 881	130-170					1.1	0.1			32	27		1.59	1.71	1.00		22.5	9.7	2.5	2.5
8 882	0- 10	2.80										1.69			1.00			9.2		

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6Q2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACI- DITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 5A3A	NH4- OAC 5A6A	BASE SATURATION SUM+ ACI- DITY	SUM+ AL	NH4- OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA-CL2 8C1E
		MEQ/100G									PERCENT					
8 875	0- 10	10.2	3.1	0.1	0.4	13.8			13.8	17.3	100+		80		5.8	5.3
8 876	10- 25	8.4	5.4	0.1	0.1	14.0			14.0	15.2	100+		92		6.2	5.7
8 877	25- 38	10.0	7.6	0.1	0.1	17.8			17.8	19.0	100+		94		6.3	5.8
8 878	38- 69	16.5	17.7	0.1	0.1	34.4			34.4	33.7	100+		100+		6.3	5.8
8 879	69- 99	18.5	16.6	0.2	0.1	35.4			35.4	36.0	100+		98		6.5	6.0
8 880	99-130	19.6	17.4	0.2	0.1	37.3			37.3	34.4	100+		100+		6.5	6.1
8 881	130-170	15.2	12.5	0.2	0.1	28.0			28.0	26.3	100+		100+		6.6	6.0
8 882	0- 10														6.0	5.4

CLAY MINERALOGY

SAMPLE NO	DEPTH CM.	LESS THAN 0.002 MM X RAY 7A2E I	7A2E II	7A2E III	7A2E IV	DTA 7A3 -PERCENT-	L.T. 0.0002 MM X RAY 7A3	7A2E I	7A2E II	7A2E III	MINERAL CODE
8 875	0- 10	KK 4	MI 3								KK KAOLINIT
8 876	10- 25										MI MICA
8 877	25- 38	KK 4	MI 3								
8 878	38- 69										MT MONTMORT
8 879	69- 99	KK 4	MT 3								
8 880	99-130										
8 881	130-170	KK 4	MT 2	MI 1							
8 882	0- 10										

RELATIVE AMOUNT
1 TRACE
2 SMALL
3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

TRABUCO LOAM (TAXADJUNCT) 1/
S68Calif-29-30

Location: Nevada County, California. 1,350 feet east of Pleasant Valley Road, 7.5 miles west of Grass Valley, California; 1,000 feet east and 1,100 feet south of W 1/4 corner sec. 21, T.16N., R. 7E. Date of Sampling: September 4, 1968.
Description by: L. A. Brittan, G. Staidl. Collectors: L. A. Brittan, G. Staidl, C. B. Goudey, T. M. Ryan, G. M. Kennedy.
Classification: Mollic Haploxeralf, fine-loamy, mixed, thermic.
Vegetation: This field has been cultivated recently. Irrigated pasture now, mostly annual grasses but some perennials. Ponderosa pine, Digger pine, blue oak. Climate: Average annual precipitation is 35 inches. Mean annual temperature 61°F. Parent Material: Granodiorite, coarse grained. Topography: Mountainous upland, strongly sloping, convex, 10 percent slope, southeast aspect. Elevation: 1,260 feet. Drainage: Well drained; runoff is medium; permeability is moderate to very slow. Soil Moisture: Dry to 10 inches, very slightly moist 10 inches to 36 inches.
Remarks: pH taken by Hellige method. This site was flood irrigated in past. See Ap and A12 horizons, which are mottled, probably due to past irrigation. Thickness and sequence of horizons in this profile very similar to S68Calif-29-29. An occasional quartz gravel occurs in the upper 15 inches of this profile. No remarks regarding fertilization can be made.

HORIZON	DESCRIPTION
	(0-10 cm.)
Ap RSL 68875	0 to 4 inches, brown (7.5YR 5/4) loam, dark brown (7.5YR 3/2) moist; common fine distinct yellowish red and red (5YR 5/8, 2.5YR 4/6) mottles, yellowish red and red (5YR 5/8 and 2.5YR 4/6) moist; moderate very coarse platy structure; hard, friable, slightly sticky, slightly plastic; common very fine and few fine random roots; common very fine tubular and interstitial pores; strongly acid (pH 5.5); abrupt smooth boundary.
	(10-25 cm.)
A12 RSL 68876	4 to 10 inches, brown (7.5YR 5/4) heavy loam, dark reddish brown (5YR 3/3) moist; common fine prominent red (2.5YR 4/8) mottles, dark red (2.5YR 3/6) moist; weak coarse prismatic structure; hard, friable, sticky, plastic; common very fine and fine vertical roots; common very fine tubular and interstitial pores; slightly acid (pH 6.2); clear wavy boundary.
	(25-38 cm.)
B1 RSL 68877	10 to 15 inches, reddish brown (5YR 4/4) clay loam, dark reddish brown (5YR 3/4) moist; weak medium and coarse prismatic structure: hard, friable, sticky, plastic; few very fine vertical, medium and coarse horizontal roots; common very fine tubular and interstitial pores; few thin clay films line pores and as bridges; slightly acid (pH 6.2); clear wavy boundary.
	(38-69 cm.)
B21t RSL 68878	15 to 27 inches, reddish brown (5YR 5/4) clay, dark reddish brown (5YR 3/4) moist; moderate coarse prismatic parting to moderate coarse angular blocky structure; very hard, firm, sticky, very plastic; few very fine, fine vertical, and medium and coarse horizontal roots; common very fine tubular pores; continuous moderately thick clay films on faces of peds and lining pores; light mineral grains apparent; slightly acid (pH 6.2); gradual wavy boundary.
	(69-99 cm.)
B22t RSL 68879	27 to 39 inches, brown (7.5YR 5/4) clay, dark reddish brown (5YR 3/4) moist; moderate medium prismatic parting to moderate coarse angular blocky structure; very hard, firm, sticky, very plastic; few very fine vertical roots; few very fine tubular pores; many moderately thick dusky red (2.5YR 3/2 moist) clay films on faces of peds and continuous thick clay films line pores; mica and light mineral grains apparent; slightly acid (pH 6.2); gradual wavy boundary.
	(99-130 cm.)
B3t RSL 68880	39 to 51 inches, pale brown (10YR 6/3) light clay, brown and dark brown (10YR 4/3) moist; weak medium prismatic parting to weak coarse angular blocky structure; hard, firm, sticky, very plastic; few very fine and fine vertical roots; few very fine tubular pores; many moderately thick dark red (2.5YR 3/6) clay films, dusky red (2.5YR 3/3) moist, on faces of peds and lining pores; mica and light mineral grains apparent; slightly acid (pH 6.2); gradual wavy boundary.
	(130-170 cm.)
C RSL 68881	51 to 66 inches, light yellowish brown (10YR 6/4) heavy clay loam, brown and dark brown (7.5YR 4/4) moist; massive; hard, firm, sticky, very plastic; very few very fine random roots; few very fine tubular pores; common moderately thick red (2.5YR 4/6) clay films, dark red (2.5YR 3/6) moist, lining pores and as bridges; mica and other light mineral grains apparent; medium acid (pH 6.0).

1/ **The Trabuco series is in a fine, mixed, thermic family of Mollic Haploxeralfs. This pedon has less than 35 percent clay in the upper 20 inches of the argillic horizon.**

CONSECUTIVE PEDON NUMBER C 68111 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES SECCA SOIL NO. S68 CALI. 29- 7 SAMPLE NO. 8 832-8 838 NEVADA COUNTY AREA

SOIL FAMILY MOLLIC HAPLOXERALF FINE,MIXED,MESIC RIVERSIDE SOIL SURVEY LABORATORY

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION SAND 2- .05	SILT .05- .002	CLAY LT .002	SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 SANDS VCS 2-1	CS 1- .05	MS .5- .25	FS .25- .10	VFS .1- .05	SILTS CSI .05- .02	FSI .02- .002	CLAYS CO. 2- .2U	FINE LT .2U	CARBO NATE 3A1A	1A2A INT. II .2-.02	COARSE FRAGMENTS PCT. OF WHOLE 20	I 75- 20	II 20-5	III 5-2
			PERCENT OF LESS THAN 2MM														SOIL	PCT. OF LT 75		
8 832	0- 15	A1	23.5	58.8	17.7	2.4	3.9	2.8	6.6	7.8	18.7	40.1				30.6	61*	10	44	5
8 833	15- 38	A3	18.8	57.4	23.8	2.2	2.8	2.2	5.1	6.5	15.6	41.8				25.3	59*	9	25	2
8 834	38- 56	B1 T	17.7	50.7	31.6	2.7	3.5	2.0	4.2	5.3	13.5	37.2				21.4	45*	9	1	1
8 835	56- 91	B2 T	10.0	29.5	60.5	1.0	1.1	1.2	3.0	3.7	7.4	22.1				13.0	41*	--	TR	2
8 836	91-115	B3 T	22.4	35.3	42.3	3.8	4.8	2.8	6.1	4.9	6.1	29.2				14.7	35A	--	24	11
8 837	115-145	C	33.2	35.2	31.6	7.6	6.7	4.0	8.3	6.6	9.0	26.2				20.5	50A	--	22	28
8 838	0- 15	A1															41A	--	37	4

SAMPLE NO.	DEPTH CM.	ORG.MATTER CARBON 6A1A	NITROGEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B	2-20 6E1B	SESQUIOXIDES DI-CIT EXT FE 6C2B	AL 6G7A	PYROP EXT FE 6C5A	AL 6G5A	ATTERBERG L I M I T LL 4F2	PL 4F1	BULK DENSITY EST. 1/3 4A1F	1/3 BAR 4A1F	DRY 4A1H	CM 3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2	EXTNSBLTY LEF 4D1	LE 4D1
		PERCENT		PERCENT		PERCENT				PCT.	NO.40	GRAMS PER CC				PERCENT			PERCENT	
8 832	0- 15	1.50	0.050			4.9	0.4			35	30		0.99	0.99	0.64		19.8	11.0		
8 833	15- 38	0.71	0.045			5.5	0.3						1.22	1.32	0.60		33.9	12.6	2.7	1.6
8 834	38- 56	0.64				6.0	0.4			40	27		1.36	1.45	0.70		29.5	14.9	2.2	1.5
8 835	56- 91	0.23				5.5	0.4			64	30		1.32	1.79	0.74		35.8	24.7	10.7	7.5
8 836	91-115					3.3	0.2						0.98	1.27	0.83		60.4	25.6	9.0	7.3
8 837	115-145					4.4	0.2			54	35		1.12	1.33	0.71		53.3	22.8	5.9	4.0
8 838	0- 15	1.69	0.099									0.99			0.80			11.1		

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6O2D	NA 5B4A 6P2A	K 6O2A	SUM	EXT. ACI- DITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 5A3A	NH4-OAC 5A6A	BASE SATURATION SUM+ ACI- DITY	SUM+ AL	NH4-OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA-CL2 8C1E
		MEQ/100G									PERCENT					
8 832	0- 15	10.4	6.8	0.1	0.2	17.5	7.9		25.4	20.8	69		84		6.2	5.7
8 833	15- 38	9.9	7.9	0.1	0.1	18.0	5.6		23.6	20.9	76		86		6.4	5.9
8 834	38- 56	10.2	10.7	0.1	0.1	21.1	6.4		27.5	23.5	77		90		6.3	5.8
8 835	56- 91	16.3	20.1	0.2	0.2	36.8			36.8	36.4	100+		100+		6.6	6.2
8 836	91-115	17.3	20.8	0.3	0.1	38.5			38.5	40.6	100+		95		6.7	6.3
8 837	115-145	12.6	15.6	0.3	0.1	28.6	4.6		33.2	31.7	86		90		6.3	6.1
8 838	0- 15														6.1	5.7

SAMPLE NO	DEPTH CM.	CLAY MINERALOGY <0.002 MM X RAY 7A2E I	7A2E II	7A2E III	7A2E IV	DTA 7A3 -PERCENT-	7A3	L.T. 0.0002 MM X RAY 7A2E I	7A2E II	7A2E III	MINERAL CODE
8 832	0- 15	KK 4	MT 3								KK KAOLINIT
8 833	15- 38										MT MONTMORT
8 834	38- 56	KK 4	MT 2	MI 2							MI MICA
8 835	56- 91	KK 4	MT 3								
8 836	91-115										
8 837	115-145	KK 4	MT 3								
8 838	0- 15										

RELATIVE AMOUNT
1 TRACE
2 SMALL
3 MODERATE
4 ABUNDANT
5 DOMINANT
6 INDETER.

SAMPLE PREPARATION CODES
*=THE 75-250MM FRACTION IS INCLUDED.
A=STANDARD PREPARATION.

SECCA GRAVELLY SILT LOAM
S68Calif-29-7

Location: Nevada County, California, 1,300 feet east and 500 feet north of W 1/4 corner, sec. 16, T. 15 N., R.8E., 5 miles SSW of Grass Valley, California; 1.6 miles SSE of intersection of McCourtney and Wolf Creek Mountain Lookout Roads, 100 feet SE of Wolf Creek Mountain Lookout Road. Date of Sampling: September 3, 1968.
Description by: L. A. Brittan, C. B. Goudey. Collectors: G. M. Kennedy, L. A. Brittan, C. B. Goudey, T. M. Ryan, G. Staidl.
Classification: Mollic Haploxeralf, fine, mixed, mesic.
Vegetation: Manzanita, ceanothus, scattered Digger pine, blue oak, squirrel tail, very scattered ponderosa pine. Not cultivated. Climate: Average annual precipitation 45 inches. Mean annual temperature 56°F. Parent Material: Metabasic rock similar to diabase. C horizon (45-57") listed as weathered fractured metabasic rock or diabase on geology map (California Division of Mines and Geology.) Topography: Moderately steep, concave slope, 17 percent, aspect W., near top of slope. Elevation: 2,260 feet. Drainage: Well drained; runoff is medium; permeability is moderate over very slow in subsoil. Soil Moisture: Dry to 15 inches. Very slightly moist 15 inches to 57 inches.
Remarks: pH taken by Hellige method. pH approximately 1/2 unit lower in lower portions of profile S68Calif-29-7 than in S68Calif-29-5. About 10 to 25 percent of surface covered by stone fragments. Lower part of B1t, 15 to 22 inches, contained a stoneline, approximately 25 percent by volume of fragments greater than 3 inches in diameter. Gravel pavement on A1 horizon 1/2 to 1 inch thick. Few Mn shot in B3t horizon. The A1 horizon, 0 to 6 inches, specifically contains 2 percent by volume of fragments greater than 3 inches in diameter.

HORIZON	DESCRIPTION
	1 to 0 inches, gravel pavement.
	(0-15 cm.)
A1 RSL 68832	0 to 6 inches, brown (7.5YR 5/4) gravelly silt loam, dark reddish brown (5YR 3/4) moist; strong fine medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky, plastic; many very fine and very few fine roots; common very fine tubular and interstitial pores; a few cobblestones and about 40 percent gravel by volume; medium acid (pH 6.0); clear wavy boundary.
	(15-38 cm.)
A3 RSL 68833	6 to 15 inches, reddish brown (5YR 5/4) gravelly silt loam, dark reddish brown (5YR 3/4) moist; moderate medium and coarse subangular blocky structure; slightly hard, friable, sticky, plastic; very few fine and common very fine, medium and coarse roots; common very fine tubular and interstitial pores; few thin clay films on faces of peds and lining pores; a few cobblestones and about 25 percent gravel; slightly acid (pH 6.3); clear wavy boundary.
	(38-56 cm.)
B1t RSL 68834	15 to 22 inches, yellowish red (5YR 5/6) cobbly silty clay loam, dark reddish brown (5YR 3/4) moist; moderate medium and coarse subangular blocky structure; hard, friable, sticky, plastic; very few fine and common very fine, medium and coarse roots; many fine interstitial pores; common thin clay films on faces of peds and lining pores; some cobblestones and about 10 percent gravel; slightly acid (pH 6.5); abrupt wavy boundary.
	(56-91 cm.)
B2t RSL 68835	22 to 36 inches, strong brown (7.5YR 5/6) cobbly clay, brown (7.5YR 4/4) moist; moderate coarse prismatic structure; extremely hard, very firm, very sticky, very plastic; very few very fine and fine roots; very few very fine tubular and interstitial pores; continuous moderately thick clay films on faces of peds; common pressure faces and few fine manganese shot; neutral (pH 7.0); clear wavy boundary.
	(91-115 cm.)
B3t RSL 68836	36 to 45 inches, light yellowish brown (2.5Y 6/4) light gravelly clay, yellowish brown (10YR 5/6) moist; weak coarse angular blocky structure; very hard, firm, very sticky, plastic; very few very fine and fine roots; very few very fine tubular and interstitial pores; many moderately thick clay films on faces of peds and lining pores; mildly alkaline (pH 7.5); gradual wavy boundary.
	(115-145 cm.)
C RSL 68837	45 to 57 inches, weathered metabasic rock.

CONSECUTIVE PEDON NUMBER C 68116 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES TRABUCO SOIL NO. S68 CALI. 29-29 SAMPLE NO. 8 865-8 874 NEVADA COUNTY AREA

SOIL FAMILY MOLLIC HAPLOXERALF, FINE, MIXED, THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION 2- .05 SAND	.05- .002 SILT	.002 CLAY	SANDS VCS 2-1	CS 1-.05	MS .5-.25	FS .25-.10	VFS .1-.05	CSI .05-.02	FSI .02-.002	SILTS-- CO. 2-.2U	CLAYS---- FINE LT .2U	CARBONATE 3A1A	INT. II .2-.02	COARSE FRAGMENTS- PCT. OF WHOLE SOIL	I 75-20 PCT.	II 20-5 OF 20	III 5-2 LT 75
			PERCENT OF LESS THAN 2MM																	
8 865	0- 10	AP	38.1	40.4	21.5	2.5	7.6	7.5	14.4	6.1	14.7	25.7				27.7	--A	--	--	--
8 866	10- 25	A12	37.5	38.0	24.5	1.9	7.2	7.1	13.9	7.4	13.6	24.4				28.4	--A	--	--	--
8 867	25- 38	B1 T	33.2	35.4	31.4	1.5	6.3	6.2	11.9	7.3	11.1	24.3				24.7	--A	--	--	--
8 868	38- 74	B21T	23.4	27.3	49.3	0.5	4.4	4.7	8.8	5.0	8.1	19.2				17.6	--A	--	--	--
8 869	74-100	B22T	24.8	31.8	43.4	1.1	4.7	4.1	8.6	6.3	8.8	23.0				20.0	--A	--	--	--
8 870	100-140	B31T	35.4	32.9	31.7	2.5	7.0	5.0	11.5	9.4	11.0	21.9				27.3	--A	--	--	--
8 871	140-170	B32T	38.5	33.4	28.1	2.6	8.1	5.4	12.8	9.6	10.7	22.7				27.8	--A	--	--	--
8 872	170-205	C 1	42.6	34.3	23.1	4.4	9.0	5.7	14.5	9.0	9.8	24.5				27.4	--A	--	--	--
8 873	205-235	C 2	58.8	26.3	14.9	4.6	13.8	9.3	20.7	10.4	8.4	17.9				30.6	--A	--	--	--
8 874	0- 10	AP1															--A	--	--	--

SAMPLE NO.	DEPTH CM.	ORG. CAR- BON 6A1A	MATTER NITRO GEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B	2-20 6E1B	SESQUIOXIDES DI-CIT FE 6C2B	EXT AL 6G7A	PYROP FE 6C5A	EXT AL 6G5A	ATTERBERG L I M I T LL 4F2	PL 4F1	EST. 1/3 BAR 4A1F	BULK DENSITY 1/3 BAR 4A1F	DRY 4A1H	CM 3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2	EXTMSBLTY LEF 4D1	LE 4D1
		PERCENT		PERCENT		PERCENT				PCT.	NO.	40 GRAMS PER CC				PERCENT			PERCENT	
8 865	0- 10	2.55	0.198			3.5	0.1			37	30		1.45	1.50	1.00	25.2	10.6	1.1	1.1	
8 866	10- 25	0.73	0.068			3.8	0.2			32	9		1.47	1.53	1.00	23.2	10.4	1.3	1.3	
8 867	25- 38	0.44				4.2	0.3						1.53	1.63	1.00	22.6	13.4	2.1	2.1	
8 868	38- 74	0.29				4.9	0.3			47	27		1.45	1.63	1.00	29.3	20.1	4.0	4.0	
8 869	74-100	0.20				4.4	0.2			48	23		1.40	1.61	1.00	30.8	22.2	4.8	4.8	
8 870	100-140	0.14				3.8	0.3						1.48	1.62	1.00	28.6	20.6	3.1	3.1	
8 871	140-170					3.2	0.1			41	17		1.49	1.64	1.00	28.2	18.8	3.2	3.2	
8 872	170-205					2.1	0.1					1.51			1.00		15.3			
8 873	205-235					1.3	TR			32	27		1.54	1.55	1.00	23.0	10.8	0.2	0.2	
8 874	0- 10	7.95	0.505									1.45			1.00		18.2			

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6O2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACI- DITY 6H2A	KCL EXT. AL 6G1E	CEC SUM 5A3A	NH4- OAC 5A6A	BASE SATURATION SUM+ ACI- DITY	SUM+ AL	NH4- OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA-CL2 8C1E
		MEQ/100G									PERCENT					
8 865	0- 10	9.4	2.9	0.1	0.5	12.9			12.9	18.1	100+		71		5.7	5.3
8 866	10- 25	7.5	2.7	0.1	0.3	10.6			10.6	14.5	100+		73		5.9	5.4
8 867	25- 38	8.1	4.1	0.1	0.2	12.5		0.1	12.5	16.7	100+	99	75		6.0	5.6
8 868	38- 74	10.8	7.0	0.1	0.1	18.0			18.0	22.6	100+		80		6.0	5.6
8 869	74-100	13.8	11.2	0.1	0.1	25.2			25.2	27.6	100+		91		6.1	5.8
8 870	100-140	14.1	12.7	0.2	0.1	27.1			27.1	27.9	100+		97		6.3	5.9
8 871	140-170	17.2	15.0	0.2	0.1	32.5			32.5	27.7	100+		100+		6.3	6.0
8 872	170-205	12.6	10.9	0.1	0.1	23.7			23.7	27.8	100+		85		6.5	6.1
8 873	205-235	14.0	11.0	0.1	0.1	25.2			25.2	23.1	100+		100+		6.6	6.2
8 874	0- 10														6.0	5.7

CLAY MINERALOGY

SAMPLE NO	DEPTH CM.	LESS THAN 0.002 MM X RAY 7A2E I	7A2E II	7A2E III	7A2E IV	DTA 7A3 -PERCENT-	7A3	L.T. 0.0002 MM X RAY 7A2E I	7A2E II	7A2E III
8 865	0- 10	KK	3	MI	2					
8 866	10- 25									
8 867	25- 38									
8 868	38- 74	KK	3							
8 869	74-100									
8 870	100-140									
8 871	140-170									
8 872	170-205									
8 873	205-235	KK	4	MI	2					
8 874	0- 10									

CODE	MINERAL	RELATIVE AMOUNT
KK	KAOLINIT	1 TRACE
MI	MICA	2 SMALL
		3 MODERATE
		4 ABUNDANT
		5 DOMINANT
		6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

TRABUCO LOAM
S68Calif-29-29

Location: Nevada County, California; 600 feet north of N 1/4 corner sec. 9, T. 16 N., R. 7 E.; 1,400 feet NNW of intersection of Pleasant Valley and Beckman Hill Roads; 8½ miles NW of Grass Valley, California. Date of Sampling: September 4, 1968.
Description by: George Staidl and Lynn Brittan. Collectors: L. A. Brittan, G. Staidl, C. B. Goudey, T. M. Ryan, G. M. Kennedy.
Classification: Mollic Haploxeralf, fine, mixed, thermic.
Vegetation: Not cultivated. Oak-grass cover. Live oak, blue oak, Digger pine, ripgut, soft chess, annual grasses, forbs. Climate: Average annual precipitation is 35 inches. Mean annual temperature is 61°F. Parent Material: Granodiorite. Coarse grained granitic rock. Reaction slightly acid. C1 and C2 horizons weathered to loam. Light and dark mineral grains and mica particles apparent in the C1 and C2 horizons. These horizons were not sampled, but were augered. Topography: Moderately sloping, plain slope, 6 percent, west aspect near crest of slope. Elevation: 1,300 feet. Drainage: Well drained; runoff is medium; permeability is moderate over very slow. Soil Moisture: Dry to 15 inches. Very slightly moist 15 to 92 inches.
Remarks: pH taken by Hellige method. There is only an occasional gravel in the profile. Light and dark mineral grains and mica particles are quite apparent from 15 inches to 92 inches. The Ap and A12 horizons combined, B21t and B22t combined, and B32t horizon were sampled for the California Division of Highways. Moist chroma is one unit lower than characteristic of the series in all parts of the epipedon.

HORIZON	(0-10 cm.) DESCRIPTION
Ap	0 to 4 inches, reddish brown (5YR 4/4) loam, dark reddish brown (5YR 3/3) moist;
RSL	moderate medium and coarse prismatic structure; hard, friable, sticky and plastic;
68865	common very fine random roots; common very fine tubular and interstitial pores;
	medium acid (pH 6.0); abrupt wavy boundary.
A12	4 to 10 inches, reddish brown (5YR 4/4) heavy loam, dark reddish brown (5YR 3/3) moist;
RSL	weak medium and coarse prismatic structure; hard, friable, slightly sticky, plastic;
68866	common very fine and fine random, and medium oblique roots; common very fine tubular
(10-25 cm.)	and interstitial pores; medium acid (pH 6.0); clear smooth boundary.
B1t	10 to 15 inches, reddish brown (5YR 4/4) clay loam, dark reddish brown (2.5YR 3/4)
RSL	moist; weak medium and coarse prismatic structure; hard, friable, sticky, plastic;
68867	common very fine and fine random and medium oblique and horizontal roots; common
(25-38 cm.)	very fine tubular and interstitial, few fine tubular pores; common thin clay films
	line pores; medium acid (pH 6.0); abrupt wavy boundary.
B21t	15 to 29 inches, dark red (2.5YR 3/6) clay, dark reddish brown (2.5YR 3/4) moist;
RSL	moderate coarse prismatic parting to moderate coarse angular blocky structure; hard,
68868	firm, sticky, very plastic; common very fine, fine random, medium and coarse oblique roots,
(38-74 cm.)	common medium and coarse horizontal roots at lower boundary; common very fine tubular
	pores; continuous moderately thick clay films on faces of peds and lining pores;
	medium acid (pH 6.0); clear wavy boundary.
B22t	29 to 40 inches, dark red (2.5YR 3/6) clay, dark reddish brown (2.5YR 3/4) moist;
RSL	moderate coarse prismatic parting to moderate coarse angular blocky structure; hard,
68869	firm, sticky, very plastic; few very fine and fine random roots; common very fine
(74-100 cm.)	tubular pores; continuous moderately thick clay films on faces of peds and lining
	pores; mica and other mineral grains apparent; medium acid (pH 6.0); clear irregular
	boundary.
B31t	40 to 55 inches, dark red (2.5YR 3/6) light clay, dark reddish brown (2.5YR 3/4) moist;
RSL	moderate coarse angular blocky structure; hard, firm, slightly sticky and very plastic;
68870	few very fine and fine random and medium oblique roots; common very fine tubular pores;
(100-140 cm.)	many moderately thick clay films on faces of peds and lining pores; mica and other
	mineral grains apparent; medium acid (pH 5.8); gradual wavy boundary.
B32t	55 to 67 inches, yellowish red (5YR 4/6) heavy clay loam, dark reddish brown (2.5YR 3/4)
RSL	moist; moderate coarse angular blocky structure; hard, firm, slightly sticky, very
68871	plastic; few very fine and fine random and medium oblique roots; few very fine tubular
(140-170 cm.)	pores; many moderately thick clay films on faces of peds and lining pores; mica and
	other mineral grains very apparent; medium acid (pH 5.8); gradual wavy boundary.
C1	67 to 80 inches, variegated yellowish red, red (5YR 5/6, 2.5YR 5/6) loam, yellowish
RSL	red, red (5YR 4/6, 2.5YR 4/6) moist; massive; very hard, firm, slightly sticky, slightly
68872	plastic; common thin clay films line pores and occur as bridges; slightly acid
(170-205 cm.)	(pH 6.5); gradual wavy boundary.
C2	80 to 92 inches, variegated yellowish red, red (5YR 5/6, 2.5YR 5/6) loam, yellowish red,
RSL	red (5YR 4/6, 2.5YR 4/6) moist; massive; slightly hard, friable, slightly sticky,
68873	slightly plastic; few thin clay films line pores, many moderately thick clay films line
(205-235 cm.)	larger pores and in fracture planes; slightly acid (pH 6.3).

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Argonaut gravelly loam **LOCATION** Amador County, Calif rnia

SOIL FAMILY: Mollic Haploxeralf, fine, montmorillonitic, thermic.

SOIL NOS. 59Calif-3-6 **LAB. NOS.** 59300 - 59305

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)							3A1		2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0-2	A_{11}	1.9	5.1	4.8	11.9	7.6	50.0	18.7	34.5	29.8	21	1-sil
2-6	A_{12}	2.8	4.7	4.7	11.6	8.1	46.7	21.4	32.0	29.7	20	l
6-10	B_1	2.2	4.3	4.4	11.2	8.2	44.9	24.8	31.6	28.1	15	l
10-14	B_{21}	1.8	3.8	4.2	10.2	7.2	42.3	30.5	27.7	27.9	8	cl
14-21	B_{22}	1.7	3.2	3.3	7.5	5.5	29.6	49.2	19.4	20.3	22	c
21-27+	C_2D_r	26.5	23.1	8.2	10.7	6.3	16.9	8.3	18.4	10.7	21	2/

pH			ORGANIC MATTER			"Free" Fe_2O_3	ELECTRICAL CONDUCTIVITY			MOISTURE TENSIONS		
8C1a H_2O 1:1	8C1c KCl 1:1	1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	as % 6C1b	EC×10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
6.1	4.8		2.21	0.167	13.2	3.7						10.7
6.3	4.6		0.67	0.059	11.4	4.1						10.1
6.2	4.6		0.47	0.051	9.2	4.0						11.2
6.1	4.5		0.43	0.045	9.6	3.4						13.6
6.1	4.3		0.25	0.028	8.9	1.5						22.6
7.1	3.5		0.01	--	--	N.D.						8.8

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B1a					BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE		MOISTURE AT SATURATION %
	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Na 6P2a	K 6Q2a		Na	K	
	milliequivalents per 100g. soil						milliequivalents per liter		
23.9	10.3	7.0	7.3	0.3	0.3	71			
24.1	10.3	8.2	5.3	0.1	0.1	78			
26.6	11.6	9.5	4.9	0.1	0.1	81			
30.8	14.1	11.5	5.2	0.1	0.2	83			
51.5	26.3	19.4	4.8	0.4	0.3	91			
Not determined									

1/ Percent of the total soil

2/ Incompletely dispersed

ARGONAUT GRAVELLY LOAM
S59Calif-3-6

Collectors: Grant Kennedy, Reuben Nelson, Bob Sketchley.
Date of Sampling: June 16, 1959. Description by: Grant Kennedy.
Location: Amador County, California, 1/2 mile west of Martel on Hwy. 88 in the SE1/4 of the NW1/4 of Section 19, T6N, R11E.
Elevation: 1,400 feet.
Relief: Gently sloping foothills with a 6 percent slope to the southwest.
Drainage: Moderately well drained; moderately rapid runoff when wet; moderately permeable over very slow.
Parent Material: Porphyritic meta-andesite.
Climate: Mean annual rainfall 27 inches.
Vegetation: Oak-grass with scrub oak, white oak, Digger pine, annual grasses, filaree, and sedge.
Remarks: This soil is a maximal Noncalcic Brown near the Brunizem soil zone. Some stones are present but mainly above the B_2. The sample site is included in a very stony mapping unit.
Classification: Mollic Haploxeralf, fine, montmorillonitic, thermic.

HORIZON		DESCRIPTION
A_{11}	0-2"	Brown (7.5YR 5/4) gravelly loam, near silt loam, dark reddish brown (5YR 3/4) when moist; very weakly platy; hard when dry, friable when moist; abundant very fine roots, few fine and medium; many fine and very fine pores; slightly acid, pH 6.1; abrupt smooth lower boundary.
A_{12}	2-6"	Yellowish red (5YR 5/6) heavy loam, yellowish red (5YR 3/6) when moist, nonsticky and slightly plastic when wet; massive; hard when dry, friable when moist; plentiful very fine, few fine and medium roots; plentiful very fine, common fine, few medium pores; occasional thin, discontinuous clay films in pores; slightly acid, pH 6.3; clear, smooth lower boundary.
B_1	6-10"	Yellowish red (5YR 4/6) heavy clay loam, yellowish red (5YR 3/6) when dry; massive; hard when dry, friable when moist, slightly sticky and plastic when wet; roots and pores as above; thin discontinuous clay films in most pores; slightly acid, pH 6.2; clear, smooth lower boundary.
B_{21}	10-14"	Similar to above but of clay texture, firm consistence, and clay films are thin and continuous in all pores; abrupt, wavy lower boundary.
B_{22}	14-21"	Brown (10YR 5/3) clay with brown (7.5YR 5/4) coatings, yellowish brown and brown (10YR 5/4 and 7.5YR 5/4) when moist; massive; very hard when dry, firm when moist, sticky and very plastic when wet; few very fine to coarse roots; few pores; thick, continuous clay films in pores; few slickensides; slightly acid, pH 6.1; abrupt, wavy lower boundary; 4 to 7 inches thick.
C_2/D_r	21-27"+	Light yellowish brown (2.5Y 6/4) deeply weathered meta-andesite with yellowish red (5YR 5/6) moderately thick, continuous clay films and occasional black (manganese?) stains along fracture planes, light olive brown (2.5Y 5/4) yellowish red (5YR 4/6) and black when moist; the weathered rock crumbles to gravelly coarse sandy loam when disturbed but becomes firmer with increasing depth; neutral, pH 7.1.

CONSECUTIVE PEDON NUMBER C 68115 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES DUBAKELLA VARIANT SOIL NO. S68 CALI. 29-36 SAMPLE NO. 8 860-8 864 NEVADA COUNTY AREA

SOIL FAMILY MOLLIC HAPLOXERALF FINE,SERPENTINITIC,MESIC RIVERSIDE SOIL SURVEY LABORATORY

SAMPLE NO.	DEPTH CM.	HORZ.	SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2- .05	SILT .05- .002	CLAY LT .002	SANDS VCS 2-1	CS 1- .05	MS .5- .25	FS .25- .10	VFS .1- .05	CSI .05- .02	FSI .02- .002	SILTS CO. .2U	CLAYS FINE LT .2U	CARBONATE 3A1A	1A2A INT. II .2- .02	COARSE FRAGMENTS PCT. OF WHOLE SOIL I 75- 20 PCT.	II 20-5 PCT. OF LT 75	III 5-2
8 860	0- 5	A11	60.3	30.9	8.8	6.6	10.8	8.3	19.4	15.2	19.2	11.7	5.1	3.7		45.4	22A	--	7	15
8 861	5- 15	A12	56.3	33.4	10.3	6.7	10.0	7.6	16.9	15.1	19.3	14.1	5.3	5.0		44.0	7A	--	4	3
8 862	15- 41	B2 T	30.2	30.2	39.6	2.3	5.3	4.5	10.4	7.7	12.3	17.9	15.8	23.8		25.8	6A	--	--	6
8 863	41- 66	C	37.6	28.8	33.6	3.2	7.3	6.1	13.1	7.9	9.5	19.3				24.7	13A	--	1	12
8 864	0- 15	A1															5A	--	1	4

SAMPLE NO.	DEPTH CM.	ORG.MATTER CARBON 6A1A -PERCENT-	NITROGEN 6B1A -PERCENT-	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	2-20 6E1B -PERCENT-	SESQUIOXIDES DI-CIT FE 6C2B	EXT AL 6G7A	PYROP FE 6C5A	EXT AL 6G5A	ATTERBERG LIMIT LL 4F2 PCT.	PL 4F1 NO.40	BULK DENSITY EST. 1/3 4A1F GRAMS	1/3 BAR 4A1F PER	DRY 4A1H CC	CM 3B2	WATER CONTENT 1/10 BAR 4B1C -PERCENT-	1/3 BAR 4B1C	15 BAR 4B2	EXTNSBLTY LEF 4D1 -PERCENT-	LE 4D1
8 860	0- 5	1.58	0.073			2.7	0.2			NP	NP		1.54	1.58	0.86	18.0	7.2	0.9	0.7	
8 861	5- 15	0.62	0.031			2.9	0.3						1.47	1.54	0.96	18.7	7.2	1.6	1.5	
8 862	15- 41	0.33	0.031			3.1	0.2			63	31		1.11	1.41	0.97	48.3	23.8	8.3	8.3	
8 863	41- 66	0.20				2.7	0.2			66	37		0.76	0.86	0.96	91.0	27.8	4.2	4.2	
8 864	0- 15	1.50	0.072									1.50			0.97		7.0			

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6Q2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACI- DITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 5A3A	NH4- OAC 5A6A	BASE SATURATION SUM+ ACI- DITY	SUM+ AL	NH4- OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA-CL2 8C1E
		MEQ/100G									PERCENT					
8 860	0- 5	3.6	8.1	TR	0.2	11.9	4.7		16.6	15.3	72		78		5.8	5.3
8 861	5- 15	1.6	9.7	TR	0.1	11.4			11.4	13.2	100+		87		5.9	5.4
8 862	15- 41	1.3	43.1	0.1	TR	44.5			44.5	37.9	100+		100+		6.1	5.9
8 863	41- 66	1.5	44.8	0.1	TR	46.4			46.4	41.7	100+		100+		6.3	6.1
8 864	0- 15														6.0	5.5

CLAY MINERALOGY

SAMPLE NO	DEPTH CM.	LESS THAN 0.002 MM X RAY 7A2E I	7A2E II	7A2E III	DTA 7A2E IV	7A3 -PERCENT-	L.T. 0.0002 MM X RAY 7A3 I	7A2E II	7A2E III	MINERAL CODE	RELATIVE AMOUNT
8 860	0- 5	MT 4	KK 2	TL 2						MT MONTMORT	1 TRACE
8 861	5- 15									KK KAOLINIT	2 SMALL
8 862	15- 41	MT 5	KK 1							TL TALK	3 MODERATE
8 863	41- 66	MT 5	KK 1								4 ABUNDANT
8 864	0- 15										5 DOMINANT
											6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

DUBAKELLA LOAM, SHALLOW VARIANT 1/
S68Calif-29-36

Location: Nevada County, California; 800 feet west and 750 feet north of E 1/4 corner, sec. 10, T. 16 N., R. 8 E. BLM property; dozer cut (pit) 60 feet west of dirt road and 650 feet south of Newtown Road. Date of Sampling: September 9, 1968.
Description by: L. A. Brittan and T. M. Ryan. Collectors: L. A. Brittan, G. Staidl, C. B. Goudey, T. M. Ryan and G. M. Kennedy.
Classification: Mollic Haploxeralf, fine, serpentinitic, mesic.
Vegetation: Digger pine, manzanita, yerba santa, ceanothus, live oak, blue oak, McNabb cypress, perennial and annual grasses, forbs. Not cultivated. Climate: Average annual precipitation 47 inches. Mean annual temperature 56°F. Parent Material: Ultrabasic rock. Topography: Moderately sloping, plain slope, 7 percent north northeast aspect; crest of slope. Elevation: 2,500 feet. Drainage: Well drained; runoff is medium; permeability is moderate over very slow in the subsoil. Soil Moisture: Dry to 6 inches. Very slightly moist 6 inches to 26 inches.
Remarks: pH taken by Hellige method. There is gravel pavement covering 50 to 60 percent of the surface. Of this pavement approximately 20 percent is 3/4 to 3 inches in diameter. There are few pebbles in the argillic horizon. The boundary between the A11 and A12 horizons is listed in the description as abrupt wavy; however, it is clear wavy in places. Most of these profiles are skeletal or nearly so. Vegetation is very poor. This profile was available because equipment could be gotten into the area. These profiles are usually lithic and skeletal.

HORIZON	DESCRIPTION
O1	½ to 0 inches, leaves, litter, undecomposed.
	(0-5 cm.)
A11 RSL 68860	0 to 2 inches, brown (7.5YR 5/4) loam, dark reddish brown (5YR 3/4) moist; moderate medium and coarse platy structure; slightly hard, friable, nonsticky and slightly plastic; common very fine roots; few very fine tubular and many very fine interstitial pores; medium acid (pH 6.0); abrupt wavy boundary.
	(5-15 cm.)
A12 RSL 68861	2 to 6 inches, brown (7.5YR 5/4) light loam, dark reddish brown (5YR 3/4) moist; moderate fine and medium granular structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine, fine, medium and coarse roots; few very fine tubular and common very fine and fine interstitial pores; few thin clay films as bridges and as colloid stains on mineral grains; medium acid (pH 6.0); abrupt wavy boundary.
	(15-41 cm.)
B2t RSL 68862	6 to 16 inches, dark yellowish brown (10YR 4/4) clay, dark yellowish brown (10YR 3/4) moist; moderate medium and coarse prismatic structure; very hard, very firm, sticky, plastic; common very fine, fine, medium and coarse roots; very few very fine interstitial pores; continuous thick clay films on faces of peds and lining pores; some very fine and fine pores appear to be root channels; neutral (pH 6.7); clear wavy boundary.
	(41-66 cm.)
C RSL 68863	16 to 26 inches, variegated very pale brown, light brownish gray, and pale olive (10YR 7/4, 2.5Y 6/2 and 5Y 6/3) weathered basic rock, dark brown, very dark grayish brown and dark grayish brown (10YR 3/3, 2.5Y 3/2, 4/2) moist; massive; very hard, very firm; very few very fine and fine and few medium and coarse roots; common moderately thick clay films as bridges and as colloid stains on mineral grains; neutral (pH 6.8); clear wavy boundary.
	(66-79 cm.)
R	26 to 31 inches, slightly weathered ultrabasic rock.

1/ The Dubakella series is in a clayey-skeletal, serpentinitic, mesic family of Mollic Haploxeralfs. This pedon has less than 35 percent coarse fragments by volume.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Traver loamy fine sand **LOCATION** Riverside County, California

SOIL FAMILY: Natric Haploxeralf, coarse-loamy, mixed, thermic

SOIL NOS. S57Calif-33-14 **LAB. NOS.** 57549 - 57555

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-6	Ap	0.3	2.9	8.3	47.5	22.1	15.5	3.4	64.8	5.0	0	lfs
6-13	A1	0.2	1.9	6.1	44.5	24.2	18.8	4.3	69.0	6.0	0	lfs
13-19	B21	0.1	1.0	4.1	39.5	23.7	20.2	11.4	65.9	7.4	0	fsl
19-24	B22	0.1	0.6	2.2	39.9	23.3	21.2	12.7	67.5	7.7	0	fsl
24-38	B23	0.1	0.6	2.5	36.1	24.3	23.6	12.8	65.8	10.0	0	fsl
38-53	Bca	0.3	0.6	1.3	22.2	21.9	37.6	16.1	59.6	18.3	0	l
53-60+	C1	0.0	0.4	1.0	21.1	27.6	35.8	14.1	65.7	15.3	0	l

8C1b pH SATURATED PASTE 1:1	CO_3 meq/l.	8C1a pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6J1a HCO_3 * meq./l.	6A1a Elec. Conduc. EC×10³ MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	4A3a Bulk Density* g/cc	MOISTURE TENSIONS 4B 1/10 ATMOS. %	4B 1/3 ATMOS. %	4B2 15 ATMOS. %
6.6		6.7	0.67	0.065	10.3	2.8	0.5	0	1.46	16.2	7.3	2.2
6.4		6.8	0.29	0.031	9.4	1.1	0.8	0	1.49	18.1	7.8	2.1
8.2		8.5	0.14			4.4	5.6	0	1.71			5.7
8.8		9.6	0.08			2.5	7.5	1.0	1.58			6.6
9.0		9.8	0.05			3.1	7.2	2.7	1.58			6.6
9.0		9.8	0.06			2.5	9.5	4.7	1.61			9.6
8.9		9.8	0.01			2.3	11.0	4.7	1.62			8.0

5A2a CATION EXCHANGE CAPACITY (+ Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	5D1 EXCH. Na %	SATURATION EXTRACT SOLUBLE 6P1a Na	6Q1a K	6N1a	6O1a	6K1a	8A1 8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
5.0	2.6	0.7	1.2	0.5	0.7	10	2.8	1.1	1.1	0.4	1.6	35.1
5.4	2.4	0.8	1.2	1.2	0.5	22	6.2	0.4	0.8	0.3	3.6	30.9
8.5	2.9	2.3	0.1	3.6	0.5	42	57.0	0.3	2.1	2.0	11.5	35.8
10.9	12.2	3.2	-	6.7	0.6	61	66.0	0.2	1.0	1.2	15.4	42.1
10.3	13.6	2.7	-	7.0	0.5	68	66.0	0.1	0.4	0.7	15.5	45.5
16.2	13.5	4.6	-	13.4	1.2	83	90.0	0.1	0.5	0.9	21.3	54.5
14.2	14.6	4.8	-	12.2	0.9	86	106.0	0.2	0.8	1.0	25.2	52.9

* no $CO_3^{=}$ or gypsum found

TRAVER LOAMY FINE SAND
S57Calif-33-14

Location: Riverside County, California. 2200 feet east of the southwest corner of Sec. 30, T. 4 S., R. 1 W. On the Clayton Record Ranch, about 4 miles west of San Jacinto. Date of Sampling: June 6, 1957.
Description by: Fred Eggers. Collectors: George Borst, R. E. Nelson, Cliff Henry, Arnold Knecht, and Fred Eggers.
Classification: Natric Haploxeralf, coarse-loamy, mixed, thermic.
Vegetation: Barley, good stand, was pastured, weeds present including spike weed, alkali lettuce and Russian thistle. Precipitation: 12 inches. Parent Material: Granitic alluvium. Physiography: Alluvial fan, lower end approaching basin.
Elevation: 1,495 feet. Drainage: Well drained at present.

HORIZON	DESCRIPTION
S57Calif-33-14-1 Ap 0-6"	Gray (10YR 5/1 dry, very dark gray 3/1 moist) loamy fine sand; weakly defined medium subangular blocky breaks to weakly defined fine granular; soft when dry, very friable when moist; nonsticky and nonplastic when wet; moderately rapid permeability; occasional plant roots; many fine pores; pH 8.0-; noncalcareous; clear smooth lower boundary.
S57Calif-33-14-2 A1 6-13"	Gray (10YR 5/1 dry, very dark gray 3/1 moist) loamy fine sand; weakly defined medium blocky breaking to weakly defined fine granular; slightly hard when dry, very friable when moist; nonsticky and nonplastic when wet; moderately permeable; many plant roots; many fine pores; pH 8.0-; noncalcareous; a definite cultivation pan; abrupt wavy lower boundary.
S57Calif-33-14-3 B21 13-19"	Gray to dark gray (10YR 5/1-4/1 dry, very dark gray 3/1 moist) fine sandy loam; moderately defined medium angular blocky; very hard when dry, friable when moist; nonsticky and nonplastic when wet; moderate permeability; occasional plant roots; many pores; pH 8.0-; gradual smooth lower boundary.
S57Calif-33-14-4 B22 19-24"	Grayish brown (10YR 5/2 dry, dark grayish brown 4/2 moist) fine sandy loam; moderately defined medium angular blocky; very hard when dry, friable when moist; nonsticky and nonplastic when wet; occasional roots; occasional small pores; moderate permeability; pH 8.4; slight effervescence; small pockets of soft lime present; clear smooth lower boundary.
S57Calif-33-14-5 B23 24-38"	Light brownish gray (10YR 6/2 dry, dark grayish brown 4/2 moist) fine sandy loam; massive, very hard when dry, firm when moist; slightly sticky and plastic when wet; moderately permeable; few roots; occasional pores; pH 9.4; strong effervescence; lime throughout; gradual irregular lower boundary.
S57Calif-33-14-6 Bca 38-53"	Light brownish gray (10YR 6/2 dry, dark grayish brown 4/2 moist) loam; massive; slightly hard when dry, friable when moist; slightly sticky and plastic when wet; moderate permeability; no roots; very few pores; pH 9.2; violent effervescence; calcareous, nodular concretions, most of them soft; gradual irregular lower boundary.
S57Calif-33-14-7 C1 53-60"+	Light brownish gray (10YR 6/2 dry, dark grayish brown 4/2 moist) loam; massive; slightly hard when dry, friable when moist; slightly sticky and slightly plastic when wet; moderate permeability; no roots; very few pores; pH 9.2; strong to violent effervescence.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Traver loamy fine sand **LOCATION** Riverside County, California

SOIL FAMILY: Natric Haploxeralf, coarse-loamy, mixed, thermic

SOIL NOS. S57Calif-33-15 **LAB. NOS.** 57556 - 57563

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-11	Ap	1.0	4.0	8.7	49.5	23.8	9.1	3.9	63.9	2.8	0	lfs
11-18	B21	1.0	3.0	5.0	34.2	23.6	17.2	16.0	54.8	11.0	0	fsl
18-22	B22	1.1	3.8	5.1	27.3	20.6	22.5	19.6	52.6	10.0	0	fsl
22-29	B23ca	1.4	3.5	4.7	25.0	20.1	27.9	17.4	53.2	13.0	0	fsl
29-39	Bcs	1.1	5.9	8.2	23.5	15.9	28.9	16.5	44.3	15.6	0	fsl
39-47	C1	2.6	9.7	12.7	30.9	12.9	20.6	10.6	40.9	10.3	0	fsl
47-62	C2	1.2	4.7	6.9	31.3	19.8	26.3	9.8	54.3	13.0	0	fsl
62-70+	C3	1.6	4.1	4.6	19.6	18.1	39.7	12.3	51.4	20.4	0	l

8C1b pH SATURATED PASTE 1:1	6J1a HCO_3 meq/l.	8C1a pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6F1a CO_3 meq./l.	8A1a Elec. Conduc. EC×10³ MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	4A3a* Bulk Density g/cc	MOISTURE TENSIONS 4B1a 1/10 ATMOS. %	4B1a 1/3 ATMOS. %	4B2 15 ATMOS. %
7.0	3.5	7.4	0.25	0.025	10.0	0.0	0.8	0	1.45	10.1	4.9	2.0
7.8	1.5	8.5	0.19	0.028		0.7	6.0	0	1.78			7.0
7.8	1.2	9.0	0.12	0.018		0.7	10.0	Tr	1.62			8.9
7.9	1.7	9.5	0.10			0.0	12.5	<1	1.46			8.6
7.9	0.8	8.2	0.09			0.0	16.0	2.3	1.50			8.0
8.2	1.3	9.5	0.06			0.0	14.0	1.9	1.51			5.5
8.3	1.2	9.7	0.06			0.0	11.0	3.1	1.51			5.6
8.3	1.4	9.5	0.10			0.0	9.5	3.9	1.47			7.4

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	5D1 EXCH. Na %	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a	6O1a	6K1a	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil						milliequivalents per liter					
5.0	2.2	2.1	0.5	0.3	0.4	6	3.1	1.0	1.9	1.5	1.1	29.9
12.6	4.4	4.2	0.4	4.0	0.3	32	44.5	0.2	1.9	2.2	17.0	36.3
17.5	7.0	16.9	0.3	7.1	0.3	41	91.0	0.3	5.1	5.5	28.3	43.7
18.8	12.2	5.3		8.6	0.4	46	122.0	0.1	8.4	9.2	31.2	44.0
17.3	24.0	30.0		9.6	0.3	55	167.0	0.3	22.4	17.2	31.3	40.3
12.7	15.1	3.9		7.0	0.3	55	133.0	0.2	11.1	10.8	23.4	33.1
12.9	15.2	4.0		6.9	0.1	53	105.0	0.1	3.0	4.5	21.4	38.8
15.8	13.2	5.0		9.9	0.2	63	91.0	0.1	2.0	3.6	19.9	48.5

* no gypsum found

TRAVER LOAMY FINE SAND
S57Calif-33-15

Location: Riverside County, California. 650 feet west and 1,600 feet south of the northeast corner of Sec. 9, T. 4 S., R. 2 W. Along fence 300 feet north of road. On the Mott Bros. Ranch, about 2 miles east of Lakeview. Date of Sampling: June 7, 1957.
Description by: Fred Eggers. Collectors: George Borst, R. E. Nelson, Cliff Henry, Arnold Knecht, and Fred Eggers.
Classification: Natric Haploxeralf, coarse-loamy, mixed, thermic.
Vegetation: Fallow. Has been in dry farmed grain. Precipitation: 12 inches. Parent material: Granitic alluvium. Physiography: Lower part of alluvial fan approaching basin. Elevation: 1,435 feet. Drainage: Well drained at present.

HORIZON	DESCRIPTION
Ap RSL No. 57556	0-11 inches, gray to grayish brown (10YR 5/1-5/2 dry, dark gray to dark grayish brown 4/1-4/2 moist) loamy fine sand; weakly defined fine subangular blocky breaking to single grain; soft when dry, very friable when moist; nonsticky and nonplastic when wet; moderately rapid permeability; many roots; many fine pores; pH 8.0; noncalcareous; abrupt smooth lower boundary.
B21 RSL No. 57557	11-18 inches, light olive brown (2.5Y 5/4 dry, olive brown 4/3 moist) loam; strongly defined medium angular blocky breaking to moderately defined fine granular; hard when dry, firm when moist; slightly sticky and plastic when wet; moderate permeability; many roots; many pores; pH 8.4; noncalcareous; weak fragmentary clay skins; clear wavy lower boundary.
B22 RSL No. 57558	18-22 inches, light yellowish brown (2.5Y 6/3, dark grayish brown 4/2 moist) loam; strongly defined medium angular blocky breaking to moderately defined fine granular; hard when dry, firm when moist; slightly sticky and plastic when wet; many roots; many fine pores; pH 8.4; noncalcareous; prominent fragmentary clay skins; clear wavy lower boundary.
B23ca RSL No. 57559	22-29 inches, grayish brown (2.5Y 5/2 dry, dark grayish brown 4/2 moist) loam; moderately defined medium subangular blocky breaking to weakly defined fine granular; slightly hard when dry, firm when moist; slightly sticky and plastic when wet; moderate permeability; occasional roots; many pores; pH 8.4; violent effervescence; gradual wavy lower boundary.
Bcs RSL No. 57560	29-39 inches, light brownish gray (2.5Y 6/2 dry, dark grayish brown 4/2 moist) loam; massive; slightly hard when dry, firm when moist; slightly sticky and plastic when wet; moderate permeability; occasional roots; many pores; pH 8.2; strong effervescence; gypsum in seams; gradual wavy lower boundary.
C1 RSL No. 57561	39-47 inches, light olive gray (5Y 6/2 dry, olive gray 4/2 moist) loam; massive; slightly hard when dry, firm when moist; slightly sticky and plastic when wet; moderate permeability; few roots; occasional pores; pH 8.4; violent effervescence; gradual wavy lower boundary.
C2 RSL No. 57562	47-62 inches, light olive gray (5Y 6/2 dry, olive gray 4/2 moist with slight mottling) very fine sandy loam; massive; slightly hard when dry, friable when moist; nonsticky and slightly plastic when wet; moderate permeability; few roots; occasional pores; pH 8.6; violent effervescence; clear wavy lower boundary.
C3 RSL No. 57563	62-70 inches +, light gray to pale yellow (5Y 7/2-7/3 dry, olive gray to olive 5/2-5/3 moist) silt loam (very fine sandy loam with silt lenses); stratified; slightly hard when dry, friable when moist; slightly sticky and plastic when wet; no roots; occasional pores; pH 8.6; violent effervescence.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Natric Haploxeralf, fine-loamy, mixed, thermic.
SOIL Bonsall sandy loam (taxadjunct) SOIL Nos. S64Calif-37-5 LOCATION San Diego County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 6440 - 6449

Depth (In.)	Horizon	1B1b Total: Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	* Clay <.002	** Clay <.002	1/ Coarse fragments: >2	2 – 19	19 – 76
		Pct. of <2 mm										3A1				Pct.	Pct. of <76 mm	
0-10	Ap	60.2	30.7	9.1	7.2	13.4	9.1	17.8	12.7	16.8	13.9	38.9	47.5	8.4	8.1	3	3	0
10-15	A2	58.9	30.3	10.8	8.1	13.2	8.6	16.8	12.2	16.4	13.9	37.9	46.7	10.7	10.4	3	3	0
15-20	B1	57.7	28.2	14.1	9.2	12.6	8.5	15.9	11.5	15.3	12.9	35.3	46.2	14.6	13.9	5	5	0
20-29	B21t	52.3	23.3	24.4	9.6	12.1	7.8	13.7	9.1	11.0	12.3	27.2	43.2	25.6	23.7	8	8	0
29-41	B22t	52.8	24.5	22.7	8.8	11.6	7.5	14.9	10.0	11.8	12.7	30.1	42.8	22.4	21.5	4	4	0
41-59	B23t	59.4	24.2	16.4	11.3	12.4	7.4	16.1	12.2	11.8	12.4	33.4	47.2	17.2	15.3	11	11	0
59-73	B24t	55.8	26.3	17.9	12.0	12.0	7.0	14.2	10.6	12.1	14.2	30.4	45.2	21.1	18.3	11	11	0
73-85	B25t	48.7	29.7	21.6	7.7	10.4	6.6	13.3	10.7	13.2	16.5	31.6	38.0	22.3	20.6	8	8	0
85-92	B3	45.8	33.2	21.0	9.4	10.3	5.8	11.3	9.0	12.2	21.0	27.5	36.8	21.8	18.7	14	14	0
92-100+	C	52.5	33.6	13.9	15.7	11.7	5.7	11.0	8.4	13.8	19.8	28.3	44.1	15.3	11.0	28	28	0

Depth (In.)	6A1a * Organic carbon	6B1a * Nitrogen	C/N	* 6C2a Ext. Iron as Fe	6E1b ** Carbonate as $CaCO_3$	Bulk density: 4A1f 1/3 bar	4A1h Oven dry	3B2 C'	Water content: 4B1c 1/3 bar	4B2* 15 bar	4D1 Extensibility COLE	4D1 Extensibility COLE	pH: 8C1b Saturated Paste	8C1a H_2O 1:1	8C1a H_2O 1:10
	Pct.	Pct		Pct.	Pct.	g/cc	g/cc	Pct.	Pct.	Pct	in./in.	in./in.			
0-10	0.94	0.080	12	0.8		1.53	1.54	0.98	11.5	4.7	0.002	0.002	6.7	6.8	
10-15	0.26			0.8		1.59	1.60	0.98	13.0	5.2	0.002	0.002	7.0	7.2	
15-20	0.15			1.1		1.78	1.83	0.97	12.9	6.4	0.009	0.009	6.7	6.9	
20-29	0.16			1.2		1.75	1.85	0.95	16.2	10.6	0.019	0.018	6.8	7.1	
29-41	0.06			1.1						10.2			7.6	8.0	
41-59	0.04			1.0		1.66	1.71	0.93	21.9	8.5	0.010	0.009	7.8	8.1	
59-73	0.03			0.9						10.2			7.8	8.3	
73-85	0.04			1.1	<1	1.77	1.85	0.95	16.8	11.7	0.015	0.014	7.7	8.1	
85-92	0.01			1.2						13.5			7.6	8.0	
92-100+	0.01			1.5		1.65	1.71	0.81	19.5	12.0	0.012	0.010	7.7	8.1	

Depth (In.)	Extractable bases 6N2a * Ca	6O2a* Mg	6P2a* Na	6Q2a* K	5B1a Sum of bases	6H2a * Ext. Acidity	Cation Exch. Capacity: 5A2a* NaOAc	5A3a* Sum	Water extract from saturated paste 8A1 ** 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K	6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter								mmho/cm
0-10	5.0	2.2	0.2	0.3	7.7	1.6	9.7	9.3	2.9	2.2	1.5	0.3	-	5.4	0.3		0.58
10-15	5.3	2.4	0.4	0.1	8.2	1.4	10.7	9.6	1.4	1.0	3.1	tr.	-	2.8	1.0		0.52
15-20	5.9	3.4	0.8	0.1	10.2	1.9	12.6	12.1	1.8	1.8	5.6	0.1	-	1.2	5.4		1.00
20-29	8.7	6.0	1.3	0.1	16.1	2.3	19.6	18.4	1.5	2.6	6.5	0.1	-	1.0	5.9		1.11
29-41	10.2	6.4	1.6	0.1	18.3	2.0	19.8	20.3	2.5	2.3	7.9	0.1	-	3.2	6.8		1.33
41-59	9.7	5.8	1.9	0.1	17.5	1.0	19.0	18.5	2.3	2.3	10.4	tr.	-	2.9	9.2		1.55
59-73	13.4	7.5	3.7	0.1	24.7	1.2	25.3	25.9	1.9	1.6	13.5	tr.	-	2.9	11.0		1.78
73-85	14.4	8.4	4.5	0.1	27.4	1.0	27.1	28.4	1.8	1.7	14.1	0.1	-	2.6	11.6		1.90
85-92	17.6	9.7	6.6	0.1	34.0	1.4	34.7	35.4	1.2	1.4	13.4	tr.	-	2.0	11.6		1.74
92-100+	18.1	8.8	7.1	0.1	34.1	1.2	33.6	35.3	1.0	0.8	11.1	tr.	-	1.8	9.2		1.46

Depth (In.)	8A * Water at Saturation	5D2 Exchangeable Na	5F SAR	Base Sat. Cations	Base Sat. NaOAc CEC	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Mica	Kaolin.
	Pct.	Pct.		Pct.	Pct.	X-ray			
0-10	27.7	2	1	82	80				
10-15	21.6	4	3	85	76				
15-20	26.2	5	4	84	79				
20-29	39.0	6	5	87	81				
29-41	38.9	6	5	90	91				
41-59	37.6	8	7	94	91				
59-73	41.1	12	10	95	96				
73-85	43.3	14	11	96	99				
85-92	47.0	17	12	96	96				
92-100+	42.8	19	12	96	100				

1/ From characterization sample; determined by shaking overnight in a sodium hexametaphosphate solution.

* Analysis of ground whole soil; results expressed on <2-mm basis.

** Analysis of ground whole soil; results expressed on whole-soil basis.

BONSALL SANDY LOAM (taxadjunct) 1/
S64Calif-37-5

Location: San Diego County, California. A soil profile pit located 1.5 miles south and 1.5 miles east of Fallbrook in the SW1/4 of the NW1/4 of section 29, T. 9 S., R. 3 W. Date of Sampling: February 19, 1964.
Description By: David C. Estrada and Gerald Kester. Collectors: Klaus Flach, Gerald Kester, George Borst, Clifford Henry, Roy Bowman, and Gerald Anderson.
Classification: Natric Haploxeralf, fine-loamy, mixed, thermic.
Vegetation: Idle at present (few annual weeds and grasses). Climate: The annual rainfall is 15 inches. The mean annual temperature is 60° F., the mean January temperature 54° F., and the mean July temperature 70° F. Parent Material: Tonalite grus. Topography: East-facing, smooth concave 7 percent slopes in lower backslope positions on rolling upland. Elevation: 665 feet above sea level. Drainage: Moderately well drained; very slowly permeable. Soil Moisture: Profile dry.
Remarks: The parent material is deeply weathered. In the B23t and B25t horizons the roots are concentrated in the ped faces and are predominantly very fine. Manganese staining increases from the B23t to B25t horizon.

HORIZON	DESCRIPTION
Ap RSL No. 6440	0 to 10 inches, brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; moderate medium to fine crumb structure; hard, friable, slightly sticky and nonplastic; abundant fine roots; common fine and very fine tubular pores; slightly acid (pH 6.5); abrupt smooth boundary.
A2 RSL No. 6441	10 to 15 inches, color, texture, and consistence same as above, massive; few fine and very fine roots; common fine and very fine tubular pores; neutral (pH 7.0); abrupt smooth boundary.
B1 RSL No. 6442	15 to 20 inches, brown (7.5YR 5/4) coarse sandy loam, dark brown (7.5YR 4/4) moist; massive; very hard, friable, slightly sticky and nonplastic; plentiful very fine roots; common fine and very fine tubular pores; slightly acid (pH 6.3); gradual smooth boundary.
B21t RSL No. 6443	20 to 29 inches, brown (7.5YR 5/4) heavy sandy clay loam, dark brown (7.5YR 4/4) moist; moderate medium to coarse prismatic structure; extremely hard, very firm, sticky and slightly plastic; few very fine roots; common very fine tubular pores; many moderately thick clay skins on ped surfaces; slightly acid (pH 6.3); gradual smooth boundary.
B22t RSL No. 6444	29 to 41 inches, brown (10YR 5/3) sandy clay loam, dark brown (10YR 4/3) moist, with brown (7.5YR 5/4) coatings on ped surfaces; moderate medium to coarse prismatic structure; extremely hard, very firm, sticky and slightly plastic; few very fine roots; common very fine tubular pores; continuous thick clay skins on ped surfaces; mildly alkaline; gradual smooth boundary.
B23t RSL No. 6445	41 to 59 inches, same as above except for black manganese stains on ped surfaces.
B24t RSL No. 6446	59 to 73 inches, light brownish gray (2.5Y 6/2) sandy clay loam, dark grayish brown (2.5Y 4/2) moist, with yellowish brown (10YR 5/4) coatings on ped surfaces; moderate coarse prismatic structure; extremely hard, very firm, sticky and slightly plastic; very few very fine roots and few very fine tubular pores; many moderately thick clay skins and manganese stains on ped surfaces; mildly alkaline (pH 7.8); gradual smooth boundary.
B25t RSL No. 6447	73 to 85 inches, same as above except texture is heavy clay loam; no roots; common thick clay skins on ped surfaces; moderately alkaline (pH 8.0); clear smooth boundary.
B3 RSL No. 6448	85 to 92 inches, pale brown (10YR 6/3) clay loam, brown (10YR 5/3) moist; massive; very hard, friable, sticky and slightly plastic; common thick clay skins; moderately alkaline (pH 8.0); abrupt smooth boundary.
C1 RSL No. 6449	92 to 100 inches +, light gray (10YR 7/2) and yellowish brown (10YR 5/4) tonalite grus; mildly alkaline (pH 7.5).

1/ The Bonsall series is in a fine, montmorillonitic, thermic family of Natric Palexeralfs. This pedon has less than 35 percent clay in the argillic horizon. It could be classed as a Mollic Haploxeralf since it has a dark surface horizon.

U. S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Natric Haploxeralf, fine-loamy, mixed, thermic.
SOIL Redding sandy loam (taxadjunct) **SOIL Nos.** S66Calif-37-4 **LOCATION** San Diego County, California

SOIL SURVEY LABORATORY Riverside, California **LAB. Nos.** 66250 - 66258

Depth (In)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)			1/ Coarse fragments 1A2a: > 2 Pct.	2 - 19 Pct. of < 76mm	19–76 Pct. of < 76mm	
		Pct. of < 2 mm																	
0- 4	A1	56.0	38.7	5.3	2.2	11.6	17.0	18.6	6.6	20.2	18.5	34.5	49.4	0	5	18	12	6	2/
4-10	A2	53.6	41.5	4.9	2.3	10.6	16.1	18.4	6.2	19.1	22.4	32.8	47.4	0	5	15	11	4	2/
10-17	B11	46.6	35.6	17.8	1.7	8.9	13.6	16.1	6.3	16.4	19.2	29.4	40.3	0	18	19	14	5	2/
17-30	B12	42.9	33.0	24.1	1.6	7.7	12.6	15.0	6.0	14.8	18.2	27.0	36.9	0	24	15	11	4	2/
30-36	B13	39.9	31.5	28.6	1.6	6.8	11.6	14.1	5.8	14.3	17.2	26.0	34.1	0	29	25	13	6	3/
36-45	B2t	27.5	20.9	51.6	1.9	6.0	7.6	8.5	3.5	8.8	12.1	15.9	24.0	0	52	13	5	0	3/
45-49	B31sim	53.5	12.1	34.4	15.1	16.1	9.0	9.9	3.4	5.8	6.3	13.4	50.1	0	34	40	35	0	3/
49-59	B32sim	85.2	8.2	6.6	24.3	25.1	14.8	16.1	4.9	6.1	2.1	17.6	80.3	0	7	44	39	0	3/
59-72	IIB33sim	86.7	9.4	3.9	13.9	18.5	23.8	24.5	6.0	6.7	2.7	20.9	80.7	0	4	73	15	58	4/

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven dry		3B2 Cm	Water content:	Water content: 4B1c 1/3 bar	Water content: 4B2 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH: 8C1a H_2O 1:1		
	Pct.	Pct		Pct.	Pct	g/cc	g/cc	g/cc		Pct	Pct.	Pct	in./in.	in./in.			
0- 4	2.30					1.29	1.31		0.90		10.7	4.1	0.007	0.007	5.3		
4-10	0.26					1.81	1.81		0.89		9.0	2.0	0.000	0.000	5.5		
10-17	0.29					1.79	1.86		0.86		12.9	6.5	0.012	0.011	4.6		
17-30	0.25					1.71	1.78		0.90		15.1	8.6	0.014	0.012	4.5		
30-36	0.28					1.68	1.77		0.83		17.0	10.9	0.018	0.015	4.3		
36-45	0.30					1.53	1.87		0.92		25.7	20.1	0.070	0.064	4.1		
45-49	0.24					1.36	1.48		0.74		29.8	18.4	0.029	0.021	4.2		
49-59	0.13					1.43	1.43		0.71		20.8	9.8	0.001	0.000	4.5		
59-72	0.10														4.5		

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	5A3a Sum	6G1d KCl Ext. Al^{+++}	Water extract from saturated paste 8A1: 6N1b Ca	6O1b Mg	6P1a Na	6Q1a K	6I1a CO_3	6J1a HCO_3	6K1a Cl	6L1b SO_4	8A1a Electrical conductivity
	meq/100 g									meq/liter								mmho/cm
0- 4	3.6	0.9	0.2	0.4	5.1	5.0	7.9	10.1	0.2	2.4	1.6	1.0	0.4	-	2.4	1.5		0.52
4-10	1.2	0.8	0.3	0.1	2.4	1.3	3.0	3.7	0.1	1.0	0.4	3.0	0.1	-	1.0	1.0		0.39
10-17	1.9	3.3	0.8	0.2	6.2	4.9	9.6	11.1	1.3	0.4	0.3	3.8	tr.	-	0.4	1.0		0.33
17-30	2.4	4.9	2.4	0.2	9.9	5.1	12.2	15.0	0.9	1.0	2.2	19.4	0.1	-	0.2	17.3		2.43
30-36	2.9	6.5	4.7	0.2	14.3	6.8	14.9	21.1	0.7	4.5	11.6	53.0	0.2	-	0.4	61.6		6.2
36-45	5.6	5.9	7.9	0.3	19.7	9.0	27.9	28.7	1.1	7.4	20.4	69.0	0.3	-	1.9	85.9	10.6	8.2
45-49	5.9	6.6	10.3	0.3	23.1	10.4	35.2	33.5	1.5	8.9	23.2	86.5	0.3	-	0.6	103	11.6	10.3
49-59	4.3	9.8	7.2	0.2	21.5	7.9	28.7	29.4	2.2	3.1	5.7	52.5	0.2	-	0.7	51.8	8.8	5.67
59-72	4.2	10.2	6.6	0.2	21.2	8.1	25.4	29.3	2.2	1.6	3.7	39.4	0.2	-	0.7	37.4		4.68

Depth (In)	8A Water at Saturation	5D2 Exchangeable Na	Clay mineralogy (<0.002 mm.) 7A: Mont.	Verm.	Mica	Kaolin.	Base saturation: 5C3 Sum	5C1 NH_4OAc
	Pct.	Pct.	X-ray				Pct.	Pct.
0- 4	30.8	2.5					50	65
4-10	12.4	10.0	t	-	xx	xx	65	80
10-17	21.4	7.3					56	65
17-30	31.3	14.8	x	-	-	xx	66	81
30-36	39.8	17.4					68	96
36-45	66.7	11.8	xxx	-	-	xxx	69	71
45-49	50.7	17.0	xxx	-	-	xx	69	66
49-59	41.7	17.4					73	75
59-72	39.9	19.6	xxxx	-	-	x	72	83

1/ From characterization sample (5 kg)(except as noted).
2/ 2-19 mm. from characterization sample, 19-76 mm. from field weight (>50 kg).
3/ 2-19 mm. from characterization sample, 19-76 mm. from field weight; >2 mm. includes volume estimate of >76 mm. fraction.
4/ Calculation of % >2 mm. of RSL 66258 differs from that of the horizons above only in that a 1/3 bar Bd of 1.92 g./cc. was assumed.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

REDDING SANDY LOAM (taxadjunct) 1/
S66Calif-37-4

Location: San Diego County, California; Miramar Transect No. 2, station 9.0; 100 feet east and 50 feet north of the southwest corner of section 19, T. 15 S., R. 2 W. Date of sampling: June 14, 1966.
Description by: George Borst, Roy Bowman, David Estrada, and Gerald Kester. Samples collected by: Leo Klameth and Dennis Nettleton.
Classification: Natria Haploxeralf, fine-loamy, mixed, thermic.
Vegetation: Sparse chamise and flattop buckwheat. Climate: Weather record for San Diego, near the sampling site, is mean winter air temperature 55° F., mean summer air temperature 68° F., mean annual precipitation 10 inches. Parent Material: Stream deposit over Pleistocene marine terrace.
Topography: Flat marine terrace of less than 1 percent slope. Elevation: About 425 to 450 feet.
Drainage: Moderately well drained; runoff is medium; permeability is very slow. Soil Moisture: Dry.

HORIZON	DESCRIPTION
A1 RSL No. 66250	0 to 4 inches, yellowish brown (10YR 5/4) sandy loam, brown to dark brown (10YR 4/3) when moist; weak fine granular structure; loose, very friable, slightly sticky, nonplastic; plentiful fine and medium roots; many very fine interstitial and common fine tubular pores; strongly acid (pH 5.3); abrupt smooth boundary.
A2 RSL No. 66251	4 to 10 inches, light gray (10YR 7/2) fine sandy loam, brown (10YR 5/3) when moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, nonplastic; few fine to medium roots; common very fine and fine tubular pores; strongly acid (pH 5.3); abrupt smooth boundary.
B11 RSL No. 66252	10 to 17 inches, brown (7.5YR 5/4) sandy clay loam, brown to dark brown (7.5YR 4/4) when moist; moderate medium angular blocky structure; hard, friable, sticky, slightly plastic; few fine to medium roots; few very fine and fine tubular pores; common thin clay skins in pores; very strongly acid (pH 4.8); abrupt wavy boundary.
B12 RSL No. 66253	17 to 30 inches, brown (7.5YR 5/4) sandy clay loam, brown to dark brown (7.5YR 4/2) when moist; moderate medium angular blocky structure; hard, friable, sticky, slightly plastic; very few fine roots; few very fine and fine tubular pores; common thin clay skins in pores; very strongly acid (pH 4.5); gradual smooth lower boundary.
B13 RSL No. 66254	30 to 36 inches, brown to dark brown (7.5YR 4/4) heavy clay loam, brown to dark brown (7.5YR 4/2) when moist; moderate medium angular blocky structure; hard, friable, sticky, plastic; very few fine roots; few very fine and fine tubular pores; common thin clay skins in pores; very strongly acid (pH 4.5); abrupt smooth boundary.
B2t RSL No. 66255	36 to 45 inches, brown to dark brown (7.5YR 4/2) clay, dark brown (7.5YR 3/2) when moist; strong medium to coarse angular blocky structure; very hard, firm, sticky, plastic; very few fine roots; many fine interstitial and very few fine tubular pores; extremely acid (pH 4.2); abrupt wavy boundary.
B31sim RSL No. 66256	45 to 49 inches, grayish brown (10YR 5/2) ped exteriors and brown to dark brown (7.5YR 4/2) ped interiors both of which are of clay texture and dark gray (10YR 4/1) and brown to dark brown (7.5YR 4/2) when moist; moderate medium to coarse angular blocky structure; hard to extremely hard, firm to extremely firm, sticky, plastic; very few fine roots; very few fine tubular pores; many thin to moderately thick clay skins on ped faces and in pores; extremely acid (pH 4.2); abrupt irregular boundary.
B32sim RSL No. 66257	49 to 59 inches, grayish brown (10YR 5/2) ped exteriors and dark brown (7.5YR 3/2) ped interiors of clay texture, dark gray (10YR 4/1) and dark brown (7.5YR 3/2) respectively when moist; moderate coarse platy structure; strongly indurated ped interiors; very few fine roots; very few fine tubular pores; common thick clay skins on ped faces; clear smooth boundary.
IIB33sim RSL No. 66258	59 to 72 inches +, color pattern same as the B32sim; massive; weakly indurated; very common fine interstitial pores; common moderately thick clay skins on ped faces; approximately 30 percent cobbles.

1/ The Redding series is in a fine, kaolinitic, thermic family of Abruptic Durixeralfs. This pedon has an argillic horizon with less than 35 percent clay. It also has an exchangeable sodium percentage of more than 15 and a base saturation of less than 75 percent in the horizon, but no Natric Ultic subgroup has been provided for in the classification system.

U. S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Natric Haploxeralf, fine, mixed, thermic
SOIL San Miguel sandy loam variant SOIL Nos. S66Calif-37-5 LOCATION San Diego County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 66259 - 66260

Depth (in.)	Horizon	1B1b Total Sand (2–0 05) Pct. of < 2 mm	Silt (0 05–0.002)	Clay (< 0.002)	Size class and particle diameter (mm) 3A1 Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0 02	Int. III (0 02–0 002)	Int. II (0.2–0.02)	(2–0.1)			1/ Coarse fragments 1A2a > 2 Pct.	2 - 19 Pct. of < 76mm	19–76 Pct. of < 76mm	
35-45	B21t	25.8	26.1	48.1	0.9	4.6	7.7	9.0	3.6	10.8	15.3	18.0	22.2	0	48	3	2	1	2/
45-57	B22t	27.4	28.3	44.3	1.0	4.8	7.9	9.7	4.0	12.0	16.3	19.7	23.4	0	44	3	3	0	2/

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. Iron as Fe Pct.	6E1b Carbonate as $CaCO_3$ Pct.	Bulk density 4A1f 1/3 bar g/cc	4A1h Oven dry g/cc	g/cc	3B2 Cm	Water content Pct.	4B1c 1/3 bar Pct	4B2 15 bar Pct.	4D1 Extensibility COLEF in./in.	4D1 Extensibility COLE in./in.	pH 8C1a H_2O 1:1		
35-45	0.35					1.62	1.86		0.98		22.5	16.8	0.047	0.046	4.2		
45-57	0.21					1.54	1.79		0.98		24.5	16.8	0.052	0.051	4.1		

Depth (in.)	Extractable bases 5B1a 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity 5A1a NH_4OAc	5A3a Sum		6G1d KCl Ext. Al^{+++}						Base saturation 5C3 Sum	5C1 NH_4OAc
	meq/100 g															Pct.	Pct.
35-45	4.2	4.5	6.8	0.3	15.8	8.5	22.7	24.3		1.2						65	70
45-57	4.6	4.8	8.0	0.2	17.6	8.5	24.2	26.1		1.1						67	73

Depth (in.)	Clay mineralogy (<0.002 mm) 7A Mont.	Verm.	Mica	Kaolin	
	X-ray				
35-45	xx	x	-	xxx	
45-57	xxx	-	-	xx	

1/ From characterization sample (5Kg) (except as noted).
2/ 2-19 mm. from characterization sample, 19-76 mm. from field weight (>50 Kg).

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

SAN MIGUEL SANDY LOAM variant 1/
S66Calif-37-5

Location: San Diego County, California; Miramar Transect No. 2, station 21.1; 100 feet east and 50 feet north of the southwest corner of section 19, T. 15 S., R. 2 W. Date of sampling: June 14, 1966.
Description by: George Borst, Roy Bowman, David Estrada, and Gerald Kester. Samples collected by: Leo Klameth and Dennis Nettleton.
Classification: Natric Haploxeralf; fine, mixed, thermic family.
Vegetation: Sparse chamise and flattop buckwheat. Climate: Weather record for San Diego, near the sampling site, is mean winter air temperature 55° F., mean summer air temperature 68° F., mean annual precipitation 10 inches. Parent Material: Stream deposit over Pleistocene marine terrace.
Topography: Flat marine terrace of less than 1 percent slope. Elevation: About 425 to 450 feet.
Drainage: Moderately well drained; runoff is medium; permeability is very slow. Soil Moisture: Dry.

HORIZON	DESCRIPTION
A1	0 to 3 inches, grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) when moist; weak fine granular structure; slightly hard, very friable, slightly sticky, nonplastic; plentiful very fine to fine roots; common fine tubular and very fine interstitial pores; medium acid (pH 5.9); abrupt smooth boundary.
A21	3 to 14 inches, pale brown (10YR 6/3) loam, brown to dark brown (10YR 4/3) when moist; massive; hard, very friable, slightly sticky, slightly plastic; few fine to medium roots; common fine tubular and many fine vesicular pores; medium acid (pH 5.8); clear smooth boundary.
A22	14 to 24 inches, very pale brown (10YR 7/3) loam, brown (10YR 5/3) when moist; massive; hard, very friable, slightly sticky, slightly plastic; few fine to medium roots; common fine tubular and many fine vesicular pores; very strongly acid (pH 4.8); gradual smooth boundary.
B1	24 to 35 inches, pinkish gray (7.5YR 6/2) and pale brown (10YR 6/3) clay loam, dark grayish brown (10YR 4/2) when moist; massive; very hard, friable, slightly sticky, slightly plastic; few fine roots; few very fine tubular pores; common thin clay skins in pores; very strongly acid (pH 4.8); clear smooth boundary.
B21t RSL No. 66259	35 to 45 inches, dark brown to brown (7.5YR 4/2) clay, dark brown (7.5YR 3/2) when moist; weak medium prismatic breaking to coarse angular blocky structure; very hard, firm, sticky, plastic; few fine roots; few very fine tubular pores; common thin to thick clay skins on ped faces; very strongly acid (pH 4.5); gradual smooth boundary.
B22t RSL No. 66260	45 to 57 inches, grayish brown (10YR 5/2) clay, dark grayish brown (10YR 4/2) when moist; weak medium to coarse angular blocky structure; extremely hard, firm, sticky, plastic; very few fine roots; very few very fine tubular pores; very strongly acid (pH 4.5); gradual smooth boundary.
B23t	57 to 92 inches, gray (10YR 5/1) clay, dark gray (10YR 4/1) when moist; weak coarse angular blocky structure; extremely hard, firm, sticky, plastic; very few fine roots; very few very fine tubular pores; very strongly acid (pH 4.5); clear smooth boundary.
B3	92 to 98 inches +, grayish brown (10YR 5/2) clay loam to sandy clay, dark grayish brown (10YR 4/2) when moist; massive; very hard, friable, slightly sticky, slightly plastic; very strongly acid (pH 4.5).

1/ The San Miguel series is in a fine, montmorillonitic, thermic family of Typic Natrixeralfs. This pedon lacks a horizon with prismatic structure or blocky structure with tongues of an eluvial horizon with uncoated silt or sand grains extending more than 2.5 cm. into it. The horizon does have an exchangeable sodium percentage of more than 15 and a base saturation of less than 75 percent, but no Natric Ultic subgroup has been provided for in the system.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Psammentic Haploxeralf, coarse-loamy, mixed, thermic

SOIL Garey sandy loam SOIL Nos. S62Calif-42-3 LOCATION Santa Barbara County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 6286 - 6294

Depth (In.)	Horizon	1B1b Size class and particle diameter (mm) Total Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)			Coarse fragments 2A2 ≥ 2 Pct.	2 – 19 Pct. of < 76mm	19 – 76 Pct. of < 76mm
		Pct. of < 2 mm																
0–4	Ap1	51.2	42.1	6.7	0.0	5.3	24.3	12.2	9.4	27.6	14.5	40.4	41.8			0		
4–8	Ap2	48.9	43.2	7.9	0.0	5.5	23.7	11.9	7.8	28.0	15.2	39.0	41.1			0		
8–16	A13	47.5	42.5	10.0	0.1	4.6	23.2	11.8	7.8	26.4	16.1	37.5	39.7			0		
16–27	A3	47.7	42.6	9.7	0.1	5.0	22.8	11.9	7.9	26.7	15.9	37.9	39.8			0		
27–36	B21	53.0	39.1	7.9	0.0	5.4	27.3	13.7	6.6	24.0	15.1	34.3	46.4			0		
36–47	B22	52.0	40.3	7.7	0.0	6.1	23.4	16.7	5.8	28.0	12.3	38.2	46.2			0		
47–58	B31	68.8	25.0	6.2	0.0	7.8	38.2	18.5	4.3	14.7	10.3	23.6	64.5			0		
58–70	B32	75.4	19.9	4.7	0.0	8.3	40.3	22.4	4.4	13.0	6.9	26.7	71.0			0		
70–83+	C	84.4	12.3	3.3	0.1	9.2	48.5	23.5	3.1	7.2	5.1	16.1	81.3			0		

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct.	6C2a Ext. Iron as Fe Pct.	Bulk density 4A1f 1/3 bar clods g/cc	4A1h Oven-dry clods g/cc	g/cc		Water content Pct.	4B1c 1/3 bar clods Pct.	4B2 15 bar Pct.	4D1 Extensibility COLEF in./in.		pH 8C1a H_2O 1:1	8C1c 1 N KCl 1:1	(1:1)
0–4	0.43	0.048	9			0.6	1.42	1.44				10.6	3.2	0.003		5.9	4.3	
4–8	0.34					0.7	1.64	1.64				10.4	3.5	0.000		5.5	3.8	
8–16	0.25					0.8	1.49	1.50				10.0	4.2	0.003		5.6	3.9	
16–27	0.16					0.8	1.58	1.61				12.1	4.1	0.007		6.2	4.4	
27–36	0.08					0.7	1.64	1.66				10.1	3.5	0.003		6.5	4.7	
36–47	0.03					0.7	1.85	1.89				9.3	3.6	0.007		6.8	5.0	
47–58	0.01					0.6		1.85*					3.0			6.3	4.6	
58–70	0.01					0.4							2.3			7.0	5.0	
70–83+	0.00					0.3	1.61	1.61				3.5	1.5	0.007		7.3	5.1	

Depth (In.)	Extractable bases 6N2b Ca	6O2c Mg	6P2a Na	5B1a 6Q2a K	meq/100 g	6H2a Ext. Acidity	Cation Exch. Capacity 5A3a Sum		Base saturation 5C3 Sum Pct.	Pct.
0–4	2.1	0.9	0.1	0.2		2.9	6.2		59	
4–8	1.8	0.8	0.2	0.2		3.6	6.6		45	
8–16	2.6	1.1	0.2	0.1		3.3	7.3		55	
16–27	2.8	1.8	0.4	0.1		2.2	7.3		70	
27–36	2.4	2.2	0.4	0.1		1.3	6.4		80	
36–47	2.3	2.3	0.6	0.1		0.6	5.9		90	
47–58	1.5	1.7	0.4	Tr.		0.6	4.2		86	
58–70	1.3	1.2	0.4	Tr.		0.4	3.3		88	
70–83+	0.9	0.8	0.3	Tr.		0.2	2.2		91	

Depth (In.)

* Lamella only

GAREY SANDY LOAM
S62Calif-42-3

Location: Santa Barbara County, California. SW¼ Sec. 9, T.9N., R.33W.; 5 miles east of Orcutt on Clark Road; 10,600 feet east of Highway 101, 600 feet north, 40 feet west. Date of Sampling: March 14, 1962
Described by: L. C. Leifer. Collectors: R. E. Nelson, B. R. Brasher, G. E. Shipman, C. J. Hilliker, L. C. Leifer.
Classification: Psammentic Haploxeralf, coarse-loamy, mixed, thermic.
Vegetation: Abandoned alfalfa field; annual weeds and sparse stand of alfalfa. Climate: Precipitation 14-15 inches. Mean annual temperature 57°F., January 50°F., July 63°F. Parent Material: Aeolian sandy material. Topography: Rolling terrace-like, locally slightly convex 6 percent south slope. Elevation: 740 feet. Drainage: Well drained. Runoff is medium. A horizons have moderately rapid and B horizons moderately slow to slow permeability. Soil Moisture: Moist to 72 inches, dry below.
Remarks: Field determinations of pH by Hellige-Truog triplex indicator. Paired site sample numbers are Garey S62Calif-42-4-1 through 9.

HORIZON	DESCRIPTION
Ap1 RSL 6286	0 to 4 inches, brown (10YR 5/3) sandy loam, dark brown (10YR 4/3) when moist; weak fine subangular blocky and weak medium granular structure; slightly hard, very friable, nonsticky and slightly plastic; abundant very fine roots; many very fine interstitial pores; medium acid (pH 5.7); clear smooth boundary.
Ap2 RSL 6287	4 to 8 inches, brown (10YR 5/3) sandy loam, dark brown (7.5YR 4/3) when moist; slightly finer than above; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots with abundant very fine roots in joints; many very fine interstitial pores; very few fine and medium tubular pores; strongly acid (pH 5.4); clear wavy boundary.
A13 RSL 6288	8 to 16 inches, brown (10YR 5/3) sandy loam, dark brown (7.5YR 3/3) when moist; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; very few very fine roots with plentiful very fine roots in joints, very few woody roots 3 to 10 mm; many very fine interstitial and common fine and very few medium tubular pores; strongly acid (pH 5.4); gradual smooth boundary.
A3 RSL 6289	16 to 27 inches, light brown (7.5YR 6/3) sandy loam, dark brown (7.5YR 3/3) when moist; slightly more clay than above; massive; hard, friable, slightly sticky and slightly plastic; very few very fine roots, mostly in joints; many very fine interstitial and common fine and very few medium tubular pores, common thin clay films as bridges and in pores; medium acid (pH 6.0); gradual wavy boundary.
B21 RSL 6290	27 to 36 inches, light brown (7.5YR 6/3) heavy sandy loam, dark brown (7.5YR 3/3) when moist; massive; hard, firm, slightly sticky and slightly plastic; very few very fine roots; many very fine interstitial, common fine and very fine and very few medium tubular pores; common thin clay films as bridges in pores; indistinct dark reddish brown (5YR 3/3m) lamellae 1/2 inch thick, slightly brittle; medium acid (pH 6.0); gradual smooth boundary.
B22 RSL 6291	36 to 47 inches, light brown (7.5YR 6/4) sandy loam, reddish brown (5YR 4/4) when moist; massive; hard, soil mass friable, lamellae firm, slightly sticky and slightly plastic; very few very fine roots; many very fine interstitial and common very fine and very few medium tubular pores; common thin clay films as bridges and in pores; several indistinct discontinuous dark reddish brown (5YR 3/2 3/3m) lamellae that are weakly brittle; slightly acid (pH 6.2); clear wavy boundary.
B31 RSL 6292	47 to 58 inches, pinkish gray (7.5YR 7/2) loamy sand, dark brown (7.5YR 4/3) when moist; massive; slightly hard, very friable, nonsticky and nonplastic; lamellae are very hard, dry, firm when moist; very few very fine roots, many very fine interstitial pores with very few very fine tubular pores in lamellae only; distinct reddish brown (5YR 5/3d) dark reddish brown (5YR 3/3) when moist continuous lamellae about 1/2 inch thick; slightly acid (pH 6.2); clear wavy boundary.
B32 RSL 6293	58 to 70 inches, pinkish gray (7.5YR 7/3) loamy sand, brown (7.5YR 5/4) when moist; massive; slightly hard, very friable, nonsticky and nonplastic; no roots; many very fine interstitial pores; no clay films except thin weak bridges in bands; lamellae 1/4 to 1/2 inch thick, continuous and wavy, thinner in lower part of horizon, similar to those in horizon above; medium acid (pH 6.0); clear wavy boundary.
C RSL 6294	70 to 83 inches +, very pale brown (10YR 7/3) sand, brown (7.5YR 5/4) when moist; massive; soft, very friable, nonsticky and nonplastic; no roots; many very fine interstitial pores; weak lamellae 1/4 to 1/2 inch thick, 5 to 7 inches apart, continuous and wavy, reddish brown (5YR 4/3d) a few pendants of lamellae 1 to 1½ inches long; medium acid (pH 6.0), lamellae essentially same reaction as other soil of same horizon.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Psammentic Haploxeralf, coarse-loamy, mixed, thermic
SOIL Garey sandy loam SOIL Nos. S62Calif-42-4 LOCATION Santa Barbara County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 6295 - 62103

Depth (in.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)	Coarse fragments 2A2: > 2 Pct.	Coarse fragments 2A2: 2–19 Pct. of < 76mm	Coarse fragments 2A2: 19–76 Pct. of < 76mm
		Pct. of < 2 mm												Pct.		
0–8	Ap	52.8	40.8	6.4	0.0	6.3	25.7	13.5	7.3	29.1	11.7	39.8	45.5	0		
8–19	A12	51.9	39.7	8.4	0.0	5.9	26.0	12.8	7.2	26.6	13.1	37.2	44.7	0		
19–27	A3	51.4	40.7	7.9	0.0	5.8	26.4	13.0	6.2	28.2	12.5	37.9	45.2	0		
27–33	B21	54.9	37.6	7.5	0.0	5.5	27.7	13.8	7.9	24.8	12.8	36.0	47.0	0		
33–47	B22	60.3	33.3	6.4	0.1	6.0	32.2	16.4	5.6	22.5	10.8	32.3	54.7	0		
47–54	B31	69.4	25.4	5.2	0.1	6.9	38.5	18.9	5.0	16.2	9.2	25.5	64.4	0		
54–64	B32	75.6	21.1	3.3	0.1	7.3	42.8	21.0	4.4	14.0	7.1	23.0	71.2	0		
64–75	C1	79.8	16.5	3.7	0.1	7.1	45.6	23.6	3.4	10.8	5.7	19.4	76.4	0		
75–96+	C2	85.5	11.3	3.2	0.0	8.3	51.5	23.2	2.5	7.6	3.7	14.7	83.0	0		

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct.		Bulk density: 4A3a Field moist cores g/cc	Bulk density: 4A1h Oven-dry clods g/cc	Bulk density: g/cc		Water content: 4B1d 1/10 bar Pct.	Water content: 4B1d 1/3 bar Pct.	Water content: 4B2 15 bar Pct.			pH: 8C1a H_2O 1:1	pH: 8C1c 1 N KCL 1:1	(1:1)
0–8	0.54	0.046	12				1.60				14.7	9.2	2.8			5.8	4.3	
8–19	0.24						1.52				13.3	9.2	3.4			6.1	4.1	
19–27	0.17						1.46				13.2	9.1	3.3			6.7	4.8	
27–33	0.13						1.66				13.1	9.4	3.4			7.0	5.1	
33–47	0.02						1.87				12.1	9.0	3.0			7.3	5.5	
47–54	0.00						1.82				10.0	7.4	2.4			7.3	5.0	
54–64	0.00						1.82				9.6	6.2	1.8			7.1	5.0	
64–75	0.00						1.72				8.2	5.2	1.9			7.1	5.3	
75–96+	0.00						1.50	1.82*			5.9	3.7	1.9			7.2	5.2	

Depth (in.)	Extractable bases 6N2b Ca	602c Mg	6P2a Na	5B1a 6Q2a K		6H2a Ext. Acidity	Cation Exch. Capacity 5A3a Sum									Base saturation 5C3 Sum Pct.	Base saturation Pct.
	meq/100 g																
0–8	1.8	0.8	0.2	0.3		2.7	5.8									53	
8–19	2.9	1.1	0.2	0.1		2.2	6.5									66	
19–27	2.9	1.5	0.2	0.1		1.4	6.1									77	
27–33	2.3	1.9	0.4	0.1		1.0	5.7									82	
33–47	1.9	2.2	0.5	Tr.		0.4	5.0									92	
47–54	1.4	1.6	0.4	Tr.		0.3	3.7									92	
54–64	1.0	1.2	0.3	Tr.		0.2	2.7									93	
64–75	1.2	1.1	0.4	Tr.		0.2	2.9									93	
75–96+	1.0	1.0	0.4	Tr.		0.2	2.6									92	

Depth (in.)

* lamella

GAREY SANDY LOAM
S62Calif-42-4

Location: Santa Barbara County, California. SW¼ Sec. 10, T9N, R33W; 1400 feet north on Dominion Road from Clark Avenue, 2000 feet east and north along road to oil well and 100 feet northwest into field; 6 miles east of Orcutt. Date of Sampling: March 14, 1962.
Described by: L. C. Leifer. Collectors: R. E. Nelson, B. R. Brasher, G. E. Shipman, C. J. Hilliker, L. C. Leifer.
Classification: **Psammentic Haploxeralf, coarse-loamy, mixed, thermic.**
Vegetation: Not cultivated for several years, used for range; small annual weeds, nit grass (Festuca megalora) and annual lupine. Climate: Precipitation 14-15 inches. Mean annual temperature 57°F., January 50°F., July 60°F. Parent Material: Aeolian sandy material. Topography: Low rolling terrace-like, locally plane 5 percent east slope. Elevation 600 feet. Drainage: Well drained. Runoff is medium. A horizons have moderately rapid permeability and B horizons have moderately slow to slow. Soil Moisture: Moist to 85 inches, dry below. A3 more moist than A12; soil above firm lamellae of B31, B32 and C1 is particularly moist.
Remarks: Field determinations of pH by Hellige-Truog triplex indicator. Paired site sample numbers are Garey S62Calif-42-3-1 through 9.

HORIZON	DESCRIPTION
Ap RSL 6295	0 to 8 inches, brown (10YR 5/3) sandy loam, dark brown (7.5YR 3/2) when moist; few thin yellowish brown (10YR 5/4m) plates due to tillage; massive; hard, firm, nonsticky, slightly plastic; plentiful very fine roots tend to be concentrated on joints; many very fine interstitial, few very fine and fine tubular pores; strongly acid (pH 5.2); clear smooth boundary.
A12 RSL 6296	8 to 19 inches, brown (10YR 5/3) sandy loam, dark brown (7.5YR 3/2) when moist; massive; hard, friable, slightly sticky and slightly plastic; plentiful very fine roots; many very fine interstitial and many fine and few medium tubular pores; strongly acid (pH 5.4); gradual wavy boundary.
A3 RSL 6297	19 to 27 inches, brown (7.5YR 5/3) sandy loam, darker brown (7.5YR 4/4) when moist; massive; hard, very friable, slightly sticky and slightly plastic; plentiful very fine roots; many very fine interstitial,many fine and few medium tubular pores; very few thin clay films in bridges; medium acid (pH 5.9); gradual wavy boundary.
B21 RSL 6298	27 to 33 inches, light brown (7.5YR 6/3) sandy loam, slightly finer than above, reddish brown (5YR 4/3) when moist; a few coarse indistinct reddish brown (5YR 5/3d) mottles; massive; very hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine interstitial, common fine and very few medium tubular pores; few thin clay films as bridges; several indistinct blotches similar to A1 material; slightly acid (pH 6.1); clear smooth boundary.
B22 RSL 6299	33 to 47 inches, light brown (7.5YR 6/3) slightly heavy sandy loam, reddish brown (5YR 4/3) when moist; a few indistinct darker lamellae 1/2 inch thick discontinuous, dark reddish brown (5YR 3/3m); massive; very hard, firm, somewhat brittle, slightly sticky and slightly plastic; few very fine roots; many very fine interstitial pores, many very fine few fine and very few medium tubular pores; few thin clay films in bridges; slightly acid (pH 6.5); clear wavy boundary, lower boundary of succeeding horizons coincides with a lamella. Otherwise boundaries are gradual.
B31 RSL 62100	47 to 54 inches, light brown (7.5YR 6/3) light sandy loam, reddish brown (5YR 4/3) when moist; massive; hard, very friable, nonsticky and nonplastic; very few very fine roots; many very fine interstitial, common very fine and very few fine tubular pores; no clay films except in lamellae; a prominent lamella bottom of horizon 1 to 1½ inch thick has common very fine and few fine tubular pores in addition to interstitial pores; some tubular pores have continuous moderately thick clay films, all of the lamella has thin or very thin clay films in bridges; slightly acid (pH 6.3); clear wavy boundary.
B32 RSL 62101	54 to 64 inches, pinkish gray (7.5YR 7/2) loamy sand, reddish brown (5YR 5/3) when moist; massive; slightly hard, very friable, nonsticky and nonplastic; no roots; many very fine interstitial and few fine tubular pores; bottom of horizon has lamellae 1 to 3½ inch thick, few tubular pores in addition to interstitial,most prominent lamella in profile, firm brittle when moist; slightly acid (pH 6.3); clear wavy boundary.
C1 RSL 62102	64 to 75 inches, pinkish gray (7.5YR 7/3) slightly loamy sand, brown (7.5YR 5/4) when moist; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine interstitial pores; 3 wavy lamellae 1/4" to 1½" thick similar to lamellae above but slightly weaker; slightly acid (pH 6.5); clear wavy boundary.
C2 RSL 62103	75 to 96 inches +, pinkish gray (7.5YR 7/3) sand, brown (7.5YR 5/4) when moist; preceding colors are for soil mass, not lamellae; massive; weakly coherent, very friable, nonsticky and nonplastic; many very fine interstitial pores; 4 continuous lamellae similar to horizon above plus some very weak very thin discontinuous lamellae; slightly acid (pH 6.5).

CONSECUTIVE PEDON NUMBER C 68 76 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES JABU SHALLOW VARIANT SOIL NO. S68 CALI. 9-29 SAMPLE NO. 8 614-8 626 TAHOE BASIN AREA

SOIL FAMILY ULTIC HAPLOXERALF COARSE-LOAMY,MIXED,FRIGID RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION SAND 2-.05	SILT .05-.002	CLAY LT .002	SANDS VCS 2-1	CS 1-.5	MS .5-.25	FS .25-.10	VFS .1-.05	SILTS CSI .05-.02	FSI .02-.002	CLAYS CO. 2-.2U	FINE LT .2U	CARBONATE 3A1A.02	INT. II .2-OF WHOLE 20	COARSE FRAGMENTS PCT. I 75-SOIL	II 20-5	III 5-2
			PERCENT OF LESS THAN 2MM														--A		
8 614	3- 0	O1															--	--	--
8 615	0- 4	A11	72.4	18.1	9.5	9.1	17.7	13.3	23.0	9.3	7.3	10.8				28.8	15A	--	15Z N
8 616	4- 13	A12	74.9	16.2	8.9	9.5	17.7	14.2	23.7	9.8	6.3	9.9				28.9	17A	--	17Z N
8 617	13- 33	C 1	74.0	16.4	9.6	6.6	17.1	14.8	24.8	10.7	7.0	9.4				31.1	16A	3	13Z N
8 618	33- 56	C 2	74.8	15.5	9.7	11.9	16.2	13.3	23.6	9.8	6.1	9.4				28.0	12A	--	12Z N
8 619	56- 76	2B1 TXB	68.7	18.3	13.0	8.1	16.1	12.8	22.8	8.9	6.8	11.5				27.2	10A	--	10Z N
8 620	76-105	2B2 TXB	73.1	13.2	13.7	6.9	18.0	14.8	25.3	8.1	4.7	8.5				25.3	16A	--	16Z N
8 621	105-125	2B31TXB	75.4	11.1	13.5	7.3	18.2	15.3	25.9	8.7	4.4	6.7				26.0	19A	--	19Z N
8 622	125-140	2B32TXB	75.0	11.5	13.5	7.8	18.0	15.0	25.7	8.5	4.6	6.9				26.0	17A	--	17Z N
8 623	140-165	2B33TXB	74.1	13.0	12.9	6.4	17.8	16.3	26.0	7.6	5.1	7.9				25.2	16A	--	16Z N
8 624	165-195	2B34TB	76.0	11.1	12.9	8.3	17.1	15.2	26.3	9.1	4.1	7.0				26.2	20A	--	20Z N
8 625	195-210	2C B	80.4	9.3	10.3	14.5	25.0	14.9	19.2	6.8	3.7	5.6				19.5	26A	--	26Z TR
8 626	0- 13	A															19A	--	19Z N

SAMPLE NO.	DEPTH CM.	ORG.MATTER CARBON 6A1A -PERCENT-	NITROGEN 6B1A -PERCENT-	CARBONATE AS CACO3 LT 2 6E1B	2-20 6E1B	SESQUIOXIDES DI-CIT FE 6C2B -PERCENT-	DI-CIT AL 6G7A -PERCENT-	PYROP FE 6C5A -PERCENT-	PYROP AL 6G5A -PERCENT-	ATTERBERG LL 4F2 PCT.	LIMIT PL 4F1 NO.40	EST. 1/3 BAR 4A1F GRAMS PER CC 0.40	DRY BAR 4A1F	BULK DENSITY 1/3 BAR 4A1H	DRY	CM WATER CONTENT 1/10 BAR 4B1C -PERCENT-	1/3 BAR 4B1C	15 BAR 4B2	EXTNSBLTY LEF 4D1 -PERCENT-	LE 4D1
8 614	3- 0											0.40		1.00						
8 615	0- 4	6.56	0.355			1.1							0.70	0.70	0.96			14.0		
8 616	4- 13	1.94	0.097			1.3				NP	NP		1.10	1.10	0.92		11.7	6.3		
8 617	13- 33	0.66	0.042			1.2							1.20	1.21	0.92		11.5	5.5	0.3	0.3
8 618	33- 56	0.53				1.4				NP	NP		1.34	1.35	0.94		11.3	5.3	0.2	0.2
8 619	56- 76	0.21				1.2							1.61	1.64	0.94		15.2	4.2	0.6	0.6
8 620	76-105	0.14				1.1				NP	NP		1.58	1.61	0.90		13.2	6.2	0.6	0.6
8 621	105-125	0.11				1.1							2.14	2.22	0.84		10.3	5.8	1.2	1.0
8 622	125-140	0.13				1.1							1.52	1.54	0.89		12.4	6.3	0.4	0.4
8 623	140-165	0.13				1.1							1.52	1.54	0.90		13.4	5.9	0.4	0.4
8 624	165-195	0.15				1.0							1.54	1.54	0.87		12.3	6.3		
8 625	195-210	0.06				0.9				NP	NP		1.41	1.41	0.84		13.8	4.8		
8 626	0- 13	2.18	0.097									1.05			0.91			5.7		

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6O2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACI-DITY 6H2A	KCL EXT. AL 6G1E	--C E C-- SUM	NH4-OAC 5A3A	BASE SUM+ ACI-DITY	SATURATION SUM+ AL 5A6A	NH4-OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA-CL2 8C1E
		MEQ/100G									PERCENT					
8 614	3- 0															
8 615	0- 4	21.2	1.8	TR	0.5	23.5	14.8		38.3	38.1	61		62		5.9	5.5
8 616	4- 13	5.6	0.5	TR	0.2	6.3	8.4		14.7	12.7	43		50		6.2	5.5
8 617	13- 33	3.6	0.4	TR	0.2	4.2	6.3		10.5	8.3	40		51		6.3	5.6
8 618	33- 56	3.5	0.4	0.1	0.2	4.2	6.7		10.9	8.3	39		51		6.2	5.4
8 619	56- 76	4.4	0.7	0.1	0.2	5.4	3.9		9.3	7.9	58		68		6.2	5.6
8 620	76-105	4.5	0.7	0.1	0.2	5.5			5.5	7.4	100+		74		6.1	5.5
8 621	105-125	4.2	0.8	0.1	0.2	5.3	3.1		8.4	7.5	63		71		6.2	5.7
8 622	125-140	3.8	0.8	0.1	0.1	4.8	3.3		8.1	6.9	59		70		6.2	5.7
8 623	140-165	4.5	0.8	0.1	0.1	5.5	3.9		9.4	7.7	59		71		6.1	5.6
8 624	165-195	4.0	0.7	0.1	0.1	4.9	3.3		8.2	7.0	60		70		6.1	5.5
8 625	195-210	3.4	0.6	0.1	0.1	4.2			4.2	5.9	100+		71		6.1	5.6
8 626	0- 13	5.6	0.7	TR	0.3	6.6	9.0		15.6	12.7	42		52		6.1	5.5

SAMPLE NO	DEPTH CM.	CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I	7A2E II	7A2E III	7A2E IV	DTA 7A3 -PERCENT-	L.T. 0.0002 MM X RAY 7A3 I	7A2E II	7A2E III	MINERAL CODE	RELATIVE AMOUNT
8 614	3- 0										1 TRACE
8 615	0- 4									VR VERMICLT	2 SMALL
8 616	4- 13	VR 3		KK 3						KK KAOLINIT	3 MODERATE
8 617	13- 33										4 ABUNDANT
8 618	33- 56										5 DOMINANT
8 619	56- 76										6 INDETER.
8 620	76-105										
8 621	105-125	KK 2		VR 1							
8 622	125-140										
8 623	140-165										
8 624	165-195										
8 625	195-210	KK 2		VR 1							
8 626	0- 13										

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

JABU COARSE SANDY LOAM, SHALLOW VARIANT
S68Calif-9-29

Location: Tahoe Basin, El Dorado County, California, 1/2 mile northeast of the southwest corner, sec. 21, T. 12 N., R. 18 E., in swale 10 feet west of dirt road along moraine crest, 1.3 miles northeast of Meyers.
Date of Sampling: August 9, 1968. Description by: L. N. Langan. Collectors: J. H. Rogers, G. M. Kennedy, L. I. Larsen, D. Palmquist, B. R. Brasher, W. D. Nettleton.
Classification: Ultic Haploxeralf, coarse-loamy, mixed, frigid.*
Vegetation: Not cultivated; Jeffrey pine, white fir, mountain whitethorn, greenleaf manzanita. Climate: Precipitation is 30 to 35 inches. Mean annual temperature is 45° F., January 27° F., July 61° F. Parent Material: Mixed morainal material, dominantly granitic. Topography: Swale on crest of lateral moraine, pre-Tahoe? Two percent slope. Elevation: 6,500 feet. Drainage: Moderately well drained; runoff is slow; permeability is moderately rapid over slow. Soil Moisture: Dry.
Remarks: Field determination for pH by Hellige-Truog triplex indicator. Composite A taken from 10 satellite samples. C2-IIB1txb horizon contact contains a stoneline with cobbles and stones. *Fragixeralf group not provided for in current classification system. Fragipan properties not strongly and clearly expressed.

HORIZON	DESCRIPTION
O1 RSL 68614	1 to 0 inches (3-0 cm.), pine litter.
A11 RSL 68615	0 to 1½ inches (0-4 cm.), dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; moderate fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine and fine interstitial pores; 5 percent 3/8 inch gravel; strongly acid (pH 5.5); clear wavy boundary.
A12 RSL 68616	1½ to 5 inches (4-13 cm.), brown (10YR 5/3) light sandy loam, dark brown (7.5YR 3/2) moist; dark grayish brown (10YR 4/2) spots; moderate very fine and fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine, fine and medium roots; many very fine and fine interstitial pores; 5 percent 3/8 inch gravel; medium acid (pH 5.8); clear wavy boundary.
C1 RSL 68617	5 to 13 inches (13-33 cm.), pale brown (10YR 6/3) light sandy loam, brown (7.5YR 4/3) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, medium and coarse roots; many very fine and fine interstitial pores; 5 percent 3/8 inch gravel; medium acid (pH 6.0); clear wavy boundary.
C2 RSL 68618	13-22 inches (33-56 cm.), pale brown (10YR 6/3) loamy sand, brown (7.5YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine, medium and coarse, common fine roots; many very fine and fine interstitial pores; 5 percent 3/8 inch gravel; medium acid (pH 5.8); abrupt smooth boundary.
IIB1txb RSL 68619	22 to 30 inches (56-76 cm.), pale brown and light yellowish brown (10YR 6/3, 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; very hard, very friable, nonsticky and slightly plastic; common very fine, few fine and medium roots; few fine tubular and common very fine interstitial pores; common thin clay films in pores and bridges and many thin clay films coating sand grains; many 1/8 to 3/8 inch vertical and horizontal light gray (10YR 7/2) seams, brown (10YR 4/3) moist, containing common clean sand grains and many silt bridges; 10 percent gravel; strongly acid (pH 5.5); clear wavy boundary.
IIB2txb RSL 68620	30 to 41 inches (76-105 cm.), pale brown and light yellowish brown (10YR 6/3, 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; very hard, very friable, nonsticky and slightly plastic; common very fine, few fine and medium roots; few fine tubular and common very fine interstitial pores; few moderately thick, many thin clay films in bridges and many thin clay films coating sand grains; common 1/8 to 3/8 inch vertical and horizontal light gray (10YR 7/2) seams, brown (10YR 4/3) moist, containing common clean sand grains and many silt bridges; 10 percent gravel; strongly acid (pH 5.5); clear wavy boundary.
IIB31txb RSL 68621	41 to 49 inches (105-125 cm.), pale brown and light yellowish brown (10YR 6/3, 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; hard, very friable, nonsticky and slightly plastic; few very fine, fine, medium and coarse roots; many very fine, common fine interstitial pores; common thin clay films in bridges and many thin clay films coating sand grains; common 1/8 to 3/8 inch vertical and horizontal light gray (10YR 7/2) seams, brown (10YR 4/3) moist, containing many clean sand grains and thin silt bridges; 10 percent ½ inch minus gravel; strongly acid (pH 5.5); gradual wavy boundary.
IIB32txb RSL 68622	49 to 56 inches (125-140 cm.), pale brown and light yellowish brown (10YR 6/3, 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, nonsticky and slightly plastic; very few fine, medium and coarse roots; many very fine, few fine interstitial pores; common thin clay films in bridges and many thin clay films coating sand grains; common 1/8 to 3/8 inch vertical and horizontal light gray (10YR 7/2) seams, brown (10YR 4/3) moist, containing many clean sand grains and thin silt coatings; 10 percent ½ inch minus gravel; strongly acid (pH 5.5); gradual wavy boundary.
IIB33txb RSL 68623	56 to 64 inches (140-165 cm.), pale brown and light yellowish brown (10YR 6/3, 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; common fine distinct dark brown (7.5YR 3/3) moist mottles; massive; slightly hard, very friable, nonsticky and slightly plastic; very few fine, medium and coarse roots; many very fine, few fine interstitial pores; common thin clay films in bridges and many thin clay films coating sand grains; few ⅛ to 3/8 inch vertical and horizontal light gray (10YR 7/2) seams; brown (10YR 4/3) moist; 10 percent ½ inch minus gravel; strongly acid (pH 5.5); gradual wavy boundary.
IIB34txb RSL 68624	64 to 77 inches (165-195 cm.), very pale brown (10YR 7/4) light sandy loam, dark yellowish brown (10YR 4/4) moist; common fine distinct brownish yellow (10YR 6/6) mottles; massive; slightly hard, very friable, nonsticky and nonplastic; very few fine and medium roots; many very fine, common fine interstitial pores; few thin clay films in bridges and common thin clay film coatings; 10 percent ½ inch minus gravel; medium acid (pH 5.8); clear wavy boundary.
IICb RSL 68625	77 to 82 inches (195-210 cm.), white (10YR 8/2) loamy sand, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; very few fine and medium roots; many very fine and fine interstitial pores; few fine and medium dark brown and very dark brown (7.5YR 3/3, 2/2) moist, iron and manganese stains on gravel; 5 percent ½ inch minus gravel; medium acid (pH 6.0).

CONSECUTIVE PEDON NUMBER C 68 77 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES JABU SHALLOW VARIANT SOIL NO. S68 CALI. 9-30 SAMPLE NO. 8 627-8 642 TAHOE BASIN AREA

SOIL FAMILY ULTIC HAPLOXERALF COARSE-LOAMY,MIXED,FRIGID RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION 2- .05	SANDS .05-.002	SILTS .002 LT	CLAYS	VCS 2-1	CS 1- .5	MS .5-.25	FS .25-.10	VFS .1-.05	CSI .05-.02	FSI .02-.002	CO. 2-.2U	FINE LT .2U	CARBO NATE 3A1A.02	INT. II .2- WHOLE SOIL	COARSE FRAGMENTS- PCT. OF 20 I 75- --A	II 20-5 PCT. OF	III 5-2 LT 75
			PERCENT OF LESS THAN 2MM																	
8 627	3- 0	O1																--	--	--
8 628	0- 8	A11	74.7	19.1	6.2		14.6	20.8	12.5	18.3	8.5	7.2	11.9				25.3	16A	--	16Z N
8 629	8- 20	A12	71.3	18.9	9.8		9.5	18.5	13.1	20.0	10.2	8.9	10.0				29.8	16A	--	16Z N
8 630	20- 28	B11TX	70.7	19.1	10.2		8.7	18.0	13.2	20.2	10.6	8.6	10.5				30.1	11A	--	11Z N
8 631	28- 36	B12TX	72.9	17.2	9.9		16.3	19.2	12.1	16.8	8.5	7.6	9.6				24.9	18A	--	18Z N
8 632	36- 48	B13TX	69.3	19.8	10.9		11.2	18.3	12.3	18.8	8.7	8.7	11.1				27.5	11A	--	11Z N
8 633	48- 74	B14TX	62.3	20.6	17.1		7.0	12.8	11.0	20.3	11.2	9.3	11.3				31.8	9A	--	9Z N
8 634	74-110	B21TX	67.5	16.9	15.6		11.3	16.2	12.1	18.9	9.0	7.0	9.9				26.1	12A	--	12Z N
8 635	110-165	B22TX	75.4	11.8	12.8		13.9	19.1	13.1	20.4	8.9	6.1	5.7				25.6	25A	--	25Z N
8 636	165-190	B31TX	76.8	12.0	11.2		16.8	21.3	13.7	18.1	6.9	5.5	6.5				20.8	33A	--	33Z N
8 637	190-230	B32TX	76.1	15.5	8.4		16.1	20.2	13.1	18.0	8.7	7.1	8.4				24.5	18A	--	18Z N
8 638	230-2902C	1X	77.1	20.1	2.8		12.9	18.1	12.9	22.0	11.2	9.9	10.2				32.6	11A	--	11Z N
8 639	290-4452C	2X	81.5	14.0	4.5		16.7	22.2	13.5	20.5	8.6	6.8	7.2				25.5	16A	--	16Z N
8 640	445-4952C	3	79.8	14.5	5.7		19.1	20.8	9.9	20.0	10.0	7.4	7.1				28.3	8A	--	8Z N
8 641	495-5102C	4	80.6	14.5	4.9		15.4	21.7	13.8	21.5	8.2	7.0	7.5				25.5	12A	--	12Z N
8 642	0- 20	A1																13A	--	13Z N

SAMPLE NO.	DEPTH CM.	ORG.MATTER CAR- BON 6A1A	NITRO GEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B	2-20 6E1B	SESQUIOXIDES DI-CIT FE 6C2B	EXT PYROP AL 6G7A	EXT FE 6C5A	AL 6G5A	ATTERBERG LL 4F2	LIMIT PL 4F1	BULK DENSITY EST. 1/3 BAR 4A1F	1/3 BAR 4A1F	DRY 4A1H	CM 3B2	WATER CONTENT EXTNSBLTY 1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2	LEF 4D1	LE 4D1
		-PERCENT-		-PERCENT-		PERCENT				PCT.	NO.40	GRAMS PER CC				-PERCENT-			-PERCENT-	
8 627	3- 0													0.40	1.00					
8 628	0- 8	2.58	0.092			1.2						0.94	0.98	0.94		12.5	6.3	1.4	1.3	
8 629	8- 20	1.43	0.045			1.4				NP	NP	1.36	1.36	0.91		10.8	4.4			
8 630	20- 28	1.05				1.4						1.47	1.47	0.93		12.6	2.8			
8 631	28- 36	0.97				1.4				NP	NP	1.46	1.47	0.89		12.8	4.6	0.2	0.2	
8 632	36- 48	0.27				1.5						1.76	1.76	0.92		12.0	4.7			
8 633	48- 74	0.19				1.5						1.72	1.72	0.94		11.5	7.3			
8 634	74-110	0.18				1.2				22	18	1.86	1.91	0.91		13.2	6.8	0.9	0.8	
8 635	110-165	0.12				1.4						1.71	1.78	0.82		16.9	6.4	1.3	1.1	
8 636	165-190	0.09				1.5						1.78	1.82	0.76		13.7	3.6	0.7	0.6	
8 637	190-230					0.9						1.70	1.74	0.87		13.9	4.8	0.8	0.7	
8 638	230-290					0.5						1.74	1.75	0.93		12.9	1.5	0.2	0.2	
8 639	290-445					0.5						1.74	1.74	0.89		13.5	2.0			
8 640	445-495					1.0						1.78	1.78	0.94		12.0	3.7			
8 641	495-510					0.7				NP	NP	1.78		0.92			3.2			
8 642	0- 20	1.80	0.065									1.20		0.94			5.1			

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 584A 6N2E	MG 584A 6D2D	NA 584A 6P2A	K 584A 6Q2A	SUM	EXT. ACI- DITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 5A3A	BASE SATURATION NH4- OAC 5A6A	SUM+ ACI- DITY	SUM+ AL	NH4- OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA- CL2 8C1E
		MEQ/100G									PERCENT					
8 627	3- 0															
8 628	0- 8						10.8	0.8	10.8						5.2	4.6
8 629	8- 20						8.3	0.8	8.3						5.6	5.0
8 630	20- 28	2.4	0.2	TR	0.2	2.8	7.5		10.3	8.3	28		34		5.9	5.1
8 631	28- 36	2.0	0.3	0.1	0.2	2.6	8.3		10.9	8.6	24		30		5.8	5.1
8 632	36- 48	2.6	0.4	0.1	0.2	3.3	4.1		7.4	6.7	45		49		5.7	5.2
8 633	48- 74	5.2	1.1	0.1	0.1	6.5			6.5	8.2	100+		79		5.7	5.2
8 634	74-110	4.4	1.0	0.1	0.1	5.6			5.6	7.6	100+		74		5.7	5.2
8 635	110-165	6.7	1.5	0.1	TR	8.3	3.3		11.6	10.3	72		81		5.6	5.1
8 636	165-190	4.9	1.1	0.1	TR	6.1			6.1	7.9	100+		78		5.7	5.3
8 637	190-230	4.1	0.9	0.1	TR	5.1			5.1	5.9	100+		87		6.5	6.0
8 638	230-290	2.9	0.7	0.1	TR	3.7			3.7	4.0	100+		93		6.7	6.3
8 639	290-445	3.8	1.0	0.1	TR	4.9			4.9	5.3	100+		93		6.8	6.2
8 640	445-495	4.7	1.3	0.1	0.1	6.2			6.2	6.7	100+		93		6.7	6.1
8 641	495-510	4.1	1.1	0.1	TR	5.3			5.3	6.0	100+		89		6.7	6.2
8 642	0- 20														5.9	5.1

CLAY MINERALOGY

SAMPLE NO	DEPTH CM.	LESS THAN 0.002 MM X RAY I 7A2E	II 7A2E	III 7A2E	IV 7A2E	DTA -PERCENT- 7A3	7A3	L.T. 0.0002 MM MINERAL X RAY I 7A2E	II 7A2E	III 7A2E	CODE	RELATIVE AMOUNT
8 627	3- 0											1 TRACE
8 628	0- 8										VR VERMICLT	2 SMALL
8 629	8- 20	VR	3	KK	3						KK KAOLINIT	3 MODERATE
8 630	20- 28										MI MICA	4 ABUNDANT
8 631	28- 36	VR	3	KK	3						VM VM/MICA	5 DOMINANT
8 632	36- 48											6 INDETER.
8 633	48- 74											
8 634	74-110	MI	3	KK	3	VM	2					
8 635	110-165											
8 636	165-190											
8 637	190-230											
8 638	230-290	MI	3	KK	2							
8 639	290-445											
8 640	445-495											
8 641	495-510	MI	3	KK	2	VR	1					
8 642	0- 20											

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

JABU COARSE SANDY LOAM, SHALLOW VARIANT
S68Calif-9-30

Location: Tahoe Basin, El Dorado County, California; 2,700 feet east and 200 feet south of northwest corner sec. 28, T. 12 N., R. 18 E.; 100 feet south of dirt road extension of Oneidas Street, 1.3 miles northeast of Meyers, 10 feet east of sample site S67Calif-9-13. Date of Sampling: August 15, 1968.
Described by: L. N. Langan. Collectors: J. H. Rogers, G. M. Kennedy, L. C. Leifer, L. I. Larsen, D. Palmquist, B. R. Brasher, W. D. Nettleton.
Classification: Ultic Haploxeralf, coarse-loamy, mixed, frigid.*
Vegetation: Not cultivated. Jeffrey pine, lodgepole pine, squaw carpet. Climate: Precipitation is 35 inches. Mean annual temperature is 42° F., January 27° F., July 60° F. Parent Material: Mixed, dominantly granitic alluvium. Topography: Glacial terrace outwash, 1 percent northwest slope. Elevation: 6,420 feet. Drainage: Moderately well drained; runoff is slow; permeability is very slow. Soil Moisture: Moist below 75 inches.
Remarks: Field determinations for pH by Hellige-Truog triplex indicator. Composite A taken from 10 satellite samples. All bleached seams are soft and very friable. *Fragixeralfs group not provided for in current classification system. Fragipan properties not strongly and clearly expressed.

HORIZON	DESCRIPTION
01 RSL 68627	1-0 inches (3-0 cm.), pine needle litter.
A11 RSL 68628	0-3 inches (0-8 cm.), brown (7.5YR 5/4) coarse sandy loam, dark brown (7.5YR 3/2) moist; weak fine and medium platy structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; very few very fine interstitial and fine tubular pores; 8 percent ¼ inch minus gravel; medium acid (pH 5.7); abrupt wavy boundary.
A12 RSL 68629	3-8 inches (8-20 cm.), brown (7.5YR 5/4) coarse sandy loam, dark brown (7.5YR 3/2) moist; weak medium and coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine, few fine and medium roots; very few very fine interstitial, very few fine tubular pores; 5 percent 1 inch minus gravel; medium acid (pH 5.8); clear wavy boundary.
B11t RSL 68630	8-11 inches (20-28 cm.), reddish yellow (7.5YR 6/6) coarse sandy loam, reddish brown (5YR 4/4) moist; weak medium and coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; many fine, medium and coarse roots; very few medium interstitial, very few fine tubular pores; few thin clay films in bridges and pores; 10 percent 1 inch minus gravel; medium acid (pH 5.8); abrupt wavy boundary.
B12tx RSL 68631	11-14 inches (28-36 cm.), reddish yellow (7.5YR 6/6) coarse sandy loam, reddish brown (5YR 4/4) moist; 1/8 inch white (10YR 8/2) seams; massive; hard, very friable, nonsticky and nonplastic; many fine, medium and coarse roots; very few very fine interstitial and fine tubular pores; many strong brown (7.5YR 5/6) thin clay films in bridges and pores; 10 percent 1 inch minus gravel; medium acid (pH 5.6); abrupt wavy boundary.
B13tx RSL 68632	14-19 inches (36-48 cm.), light brown (7.5YR 6/3) coarse sandy loam, brown (7.5YR 4/4) moist; strong brown (7.5YR 5/6) spots, few very pale brown (10YR 7/3) seams, moist; massive; hard, friable, nonsticky and nonplastic; few very fine, fine and medium roots; many very fine and few fine interstitial pores; common very thin, few thin clay films in bridges; 10 percent gravel; medium acid (pH 5.6); clear wavy boundary.
B14tx RSL 68633	19-29 inches (48-74 cm.), light yellowish brown (10YR 6/4) sandy loam, strong brown (7.5 YR 4/6) moist; very pale brown (10YR 8/3) seams; massive; hard, friable, sticky and plastic; few very fine and fine roots; common very fine, few fine interstitial pores; many strong brown and reddish yellow (7.5YR 5/6, 6/6) thin and very few moderately thick clay films in bridges; few stones; 10 percent gravel; medium acid (pH 5.8; abrupt wavy boundary.
B21tx RSL 68634	29-44 inches (74-110 cm.), pale brown (10YR 6/3) coarse sandy loam, brown (10YR 4/3) moist; very pale brown (10YR 7/3) seams and few fine and medium reddish yellow (7.5YR 6/8) iron stains; massive; very hard, friable, sticky and plastic; few very fine and fine roots; common very fine, few fine interstitial pores; many thin, common moderately thick brown (7.5YR 4/4) clay films as bridges; 10 percent gravel; medium acid (pH 5.8); clear wavy boundary.
B22tx RSL 68635	44-64 inches (110-165 cm.), strong brown (7.5YR 5/6) crushed, gravelly coarse sandy loam, dark yellowish brown(10YR 4/4) moist; many 1/8 to 1/4 inch white (10YR 8/2) bleached and unoriented seams, few coarse prominent yellowish red and reddish brown (5YR 5/8, 4/4) iron stains moist; massive; very hard, friable, slightly sticky and plastic; few fine and medium roots; common very fine and fine interstitial pores; many thin and few moderately thick dark reddish brown (5YR 3/3) clay films as bridges; 20 percent gravel; medium acid (pH 5.8); diffuse smooth boundary.
B31tx RSL 68636	64-75 inches (165-190 cm.), reddish yellow (7.5YR 6/6) gravelly coarse sandy loam, brown (7.5YR 4/4) moist; many 1/8 to 1/4 inch white (10YR 8/2) bleached and unoriented seams and common medium prominent reddish yellow (5YR 6/6) mottles, few coarse and common fine strong brown (7.5YR 5/8) iron stains moist; massive; very hard, friable, slightly sticky and plastic; few fine and medium roots; common very fine and fine interstitial pores; common moderately thick dark reddish brown (5YR 3/4) moist clay bands with common moderately thick and few thin clay films in bridges and on colloids; 20 percent gravel; medium acid (pH 6.0); gradual irregular boundary.
B32tx RSL 68637	75-91 inches (190-230 cm.), brown (7.5YR 4/4) crushed, gravelly coarse sandy loam, yellowish brown (10YR 5/6) moist; common 1/8 inch white (10YR 8/2) seams and many medium distinct 7.5YR hue mottles, common moderately thick dark reddish brown (5YR 3/3) seams moist; massive; very hard, very friable, nonsticky and slightly plastic; few fine and medium roots; many very fine, few fine interstitial pores; many 7.5YR hue clay bands; 20 percent strongly weathered granitic gravel and cobbles; slightly acid (pH 6.2); gradual wavy boundary.
IIC1x RSL 68638	91-114 inches (230-290 cm.), very pale brown (10YR 8/3) loamy coarse sand, brown (10YR 5/3) moist; many 1/8 to 1/2 inch thick white (10YR 8/2) seams moist; massive; hard, very friable, nonsticky and nonplastic; no roots; many very fine, few fine interstitial pores; dark reddish brown (5YR 3/4) moist moderately thick clay bands and strong brown (7.5YR 5/6) moist thin clay bands; slightly acid (pH 6.3); abrupt wavy boundary.
IIC2x RSL 68639	114-176 inches (290-445 cm.), white (10YR 8/2) stratified coarse sand and loamy coarse sand, brown (10YR 4/3) moist; massive; slightly hard, very friable, and brittle; no roots; many very fine and few fine interstitial pores; few yellowish brown (10YR 5/6) 1/8 to 1/4 inch clay bands; 10 percent rounded gravel; slightly acid (pH 6.3); gradual wavy boundary.
IIC3 RSL 68640	176-194 inches (445-495 cm.), very pale brown (10YR 7/4) loamy sand, yellowish brown (10YR 5/4) moist; many fine and medium faint yellowish brown (10YR 5/8) moist iron stains; massive; slightly hard, very friable; brittle, nonsticky and nonplastic; no roots; many very fine, few fine interstitial pores; slightly acid (pH 6.3); clear smooth boundary.
IIC4 RSL 68641	194-200 inches (495-510 cm.), yellowish brown (10YR 5/6) coarse sand, yellowish brown (10YR 5/4) moist; many fine faint yellowish brown (10YR 5/8) iron stains moist; massive; coarse grading to fine brittle clods; soft, very friable, nonsticky and nonplastic; no roots; many very fine, few fine interstitial pores; slightly acid (pH 6.3).

CONSECUTIVE PEDON NUMBER C 68 79 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES JABU SOIL NO. S68 CALI. 9-34 SAMPLE NO. 8 652-8 663 TAHOE BASIN AREA

SOIL FAMILY ULTIC HAPLOXERALF COARSE-LOAMY,MIXED,FRIGID RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION 2-.05	SILT .05-.002	CLAY LT .002	SANDS VCS 2-1	CS 1-.05	MS .5-.25	FS .25-.10	VFS .1-.05	CSI .05-.02	FSI .02-.002	SILTS CO. 2-.2U	CLAYS FINE LT .2U	CARBONATE 3A1A	INT. II .2-.02	1A2A COARSE FRAGMENTS PCT. OF WHOLE I 75-20	II 20-5	III 5-2
			.05	.002	.002		.05	.25	.10	.05	.02	.002	.2U	.2U		.02			
			PERCENT OF LESS THAN 2MM														SOIL	PCT. OF LT 75	
8 652	0- 5	A1	77.7	14.5	7.8	17.5	19.8	12.4	19.5	8.5	6.9	7.6				25.7	13A	--	13Z	N
8 653	5- 15	A3	80.6	12.3	7.1	31.5	18.4	9.7	15.2	5.8	5.4	6.9				19.1	14A	--	14Z	N
8 654	15- 25	B1 T	77.4	13.4	9.2	15.9	22.0	12.4	18.7	8.4	6.3	7.1				24.5	15A	--	15Z	N
8 655	25- 51	B2 T	77.0	12.8	10.2	11.4	21.3	13.6	22.1	8.6	5.8	7.0				25.0	15A	--	15Z	N
8 656	51- 74	2B21TB	78.8	10.6	10.6	12.6	17.9	12.8	26.4	9.1	4.7	5.9				27.4	27A	8	19Z	N
8 657	74- 94	2B22TB	81.1	7.6	11.3	9.5	20.2	15.7	28.4	7.3	3.6	4.0				24.7	25A	15	10Z	N
8 658	94-115	2B23TB	81.3	8.3	10.4	12.8	23.1	14.9	24.2	6.3	4.1	4.2				21.3	45A	37	8Z	N
8 659	115-130	3B31TXB	83.8	10.6	5.6	11.2	23.7	14.2	24.6	10.1	6.3	4.3				29.1	7A	--	7Z	N
8 660	130-170	3B32TXB	72.2	21.8	6.0	10.4	17.3	10.6	22.1	11.8	10.4	11.4				33.6	10A	--	10Z	N
8 661	170-185	4C 1B	57.3	29.0	13.7	8.9	15.5	10.1	16.5	6.3	7.3	21.7				21.5	14A	--	14Z	TR
8 662	185-255	5C 2B	81.2	12.0	6.8	20.0	21.6	11.7	18.9	9.0	6.4	5.6				25.2	9A	--	9Z	N
8 663	0- 15	A															18A	--	18Z	N

SAMPLE NO.	DEPTH CM.	ORG.MATTER CARBON 6A1A	NITROGEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B	2-20 6E1B	SESQUIOXIDES DI-CIT FE 6C2B	EXT AL 6G7A	PYROP FE 6C5A	EXT AL 6G5A	ATTERBERG LL 4F2	PL 4F1	PI 4A1F	BULK DENSITY 1/3 BAR 4A1F	DRY 4A1H	CM 3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2	EXTNSBLTY LEF 4D1	LE 4D1
		PERCENT		PERCENT		PERCENT				PCT.		NO.40	GRAMS PER CC			PERCENT			PERCENT	
8 652	0- 5	2.73	0.115			1.5							0.90	0.95	0.95	20.2	6.2	1.8	1.7	
8 653	5- 15	1.02	0.052			1.5				NP	NP		1.36	1.36	0.92	13.0	5.0			
8 654	15- 25	0.71				1.8							1.31	1.32	0.92	11.4	5.5	0.3	0.2	
8 655	25- 51	0.47				1.9				NP	NP		1.39	1.39	0.91	9.0	5.6			
8 656	51- 74	0.30				2.9							1.57	1.57	0.82	14.3	6.2			
8 657	74- 94	0.22				3.5							1.45	1.46	0.84	17.4	6.5	0.2	0.2	
8 658	94-115	0.28				2.6				NP	NP		1.50	1.50	0.69	17.2	6.9			
8 659	115-130	0.18				1.6							1.64	1.64	0.95	9.5	4.0			
8 660	130-170	0.10				0.6							1.92	1.92	0.93	9.7	3.4			
8 661	170-185					1.3							1.60	1.62	0.91	19.3	7.9	0.4	0.4	
8 662	185-255					0.5				NP	NP	1.40			0.95		3.5			
8 663	0- 15	1.87	0.082									1.30			0.90		9.4			

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6Q2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACIDITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 5A3A	NH4-OAC 5A6A	BASE SUM+ ACI-DITY	SATURATION SUM+ AL	NH4-OAC 5C1	NAF 2 MIN 8C1D	PH H2O 1/1 8C1A	CA-CL2 8C1E
		MEQ/100G									PERCENT					
8 652	0- 5	6.1	0.4	TR	0.4	6.9	9.0		15.9	12.8	44		54		6.0	5.5
8 653	5- 15	3.4	0.3	TR	0.3	4.0	5.5		9.5	9.9	42		41		6.2	5.6
8 654	15- 25	2.1	0.3	TR	0.2	2.6	5.7		8.3	7.9	32		33		5.7	5.3
8 655	25- 51	2.0	0.3	0.1	0.1	2.5	4.9	0.5	7.4	7.1	34	83	35		5.4	4.7
8 656	51- 74	2.3	0.4	0.1	0.1	2.9	4.0	0.3	6.9	6.5	42	91	45		5.4	4.7
8 657	74- 94	1.9	0.3	0.1	0.1	2.4	4.9	0.2	7.3	5.0	33	92	48		5.5	4.9
8 658	94-115	2.2	0.4	0.1	0.1	2.8	5.9	0.3	8.7	5.9	32	90	47		5.4	4.8
8 659	115-130	2.0	0.3	0.1	0.1	2.5	2.8	0.2	5.3	5.1	47	93	49		5.4	4.7
8 660	130-170	2.8	0.4	0.1	0.1	3.4	1.4	0.2	4.8	4.5	71	94	76		5.6	4.8
8 661	170-185	9.2	1.7	0.2	0.1	11.2	2.3	0.4	13.5	14.8	83	97	76		5.4	4.8
8 662	185-255	2.5	0.5	0.1	0.1	3.2			3.2	3.8	100+		84		6.1	5.6
8 663	0- 15														6.1	5.4

CLAY MINERALOGY

SAMPLE NO	DEPTH CM.	LESS THAN 0.002 MM X RAY 7A2E I	7A2E II	7A2E III	DTA 7A2E IV	7A3 -PERCENT-	L.T. 0.0002 MM X RAY 7A3 I	7A2E II	7A2E III	MINERAL CODE	RELATIVE AMOUNT
8 652	0- 5										1 TRACE
8 653	5- 15	VR	3	KK	3					VR VERMICLT	2 SMALL
8 654	15- 25									KK KAOLINIT	3 MODERATE
8 655	25- 51	VR	3	KK	3					MI MICA	4 ABUNDANT
8 656	51- 74										5 DOMINANT
8 657	74- 94										6 INDETER.
8 658	94-115	KK	3	MI	1						
8 659	115-130										
8 660	130-170										
8 661	170-185										
8 662	185-255	MI	3	KK	3						
8 663	0- 15										

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

JABU COARSE SANDY LOAM
S68Calif-9-34

Location: Tahoe Basin, El Dorado County, California; 0.2 mile east of southwest corner sec. 23, T. 12 N., R. 18 E., 15 feet north of Fountain Place Road. Date of Sampling: August 14, 1968.
Description by: G. M. Kennedy. Collectors: J. H. Rogers, D. Palmquist, B. R. Brasher, W. D. Nettleton.
Classification: Ultic Haploxeralf, coarse-loamy, mixed, frigid.
Vegetation: Not cultivated; White fir, Jeffrey pine, squaw carpet, greenleaf manzanita.
Climate: Precipitation is 35 to 40 inches. Mean annual temperature is 41°F., January 26°F., July 60°F. Parent Material: Mixed alluvium. Topography: Glacial outwash over moraine, 10 percent north-facing slope. Elevation: 6940 feet. Drainage: Well drained; runoff is slow; permeability is slow. Soil Moisture: Dry to 72 inches.
Remarks: Field determinations for pH by Hellige-Truog triplex indicator. Composite A taken from 10 satellite samples.

HORIZON	DESCRIPTION
	(3-0 cm.)
01	1 to 0 inch, fir needles.
	(0-5 cm.)
A1 RSL 68652	0 to 2 inches, brown (7.5YR 5/4) coarse sandy loam, dark brown (7.5YR 3/2) moist; weak coarse platy structure; soft, very friable, nonsticky and nonplastic; many very fine, few fine roots; common very fine interstitial pores; 13 percent gravel; medium acid (pH 5.6); clear smooth boundary.
	(5-15 cm.)
A3 RSL 68653	2 to 6 inches, brown (7.5YR 5/4) coarse sandy loam, reddish brown (5YR 4/4) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine, common fine, medium and coarse roots; common very fine interstitial, few fine tubular pores; 14 percent gravel; medium acid (pH 6.0); clear smooth boundary.
	(15-25 cm.)
B1t RSL 68654	6 to 10 inches, brown (7.5YR 5/4) coarse sandy loam, reddish brown (5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine, fine, medium, and coarse roots; common very fine interstitial and few fine tubular pores; common thin clay films in bridges and coating sand grains; 14 percent gravel; medium acid (pH 5.8); clear smooth boundary.
	(25-51 cm.)
B2t RSL 68655	10 to 20 inches, strong brown (7.5YR 5/6) coarse sandy loam; dark reddish brown (5YR 3/4) moist; massive; hard, friable, nonsticky and nonplastic; many very fine, fine, medium and coarse roots; common very fine tubular and interstitial pores; many thin clay films in bridges and coating sand grains, clay films moderately thick in places; 14 percent gravel; strongly acid (pH 5.5); abrupt wavy boundary.
	(51-74 cm.)
IIB21tb RSL 68656	20 to 29 inches, strong brown (7.5YR 5/6) gravelly coarse sandy loam, yellowish red (5YR 4/6) moist; brown (7.5YR 5/4) coatings; massive; hard, firm, slightly sticky and slightly plastic; few very fine, fine, medium and coarse roots; common very fine tubular and interstitial, few fine tubular pores; many thin, few moderately thick clay films in bridges and coating sand grains; few cobbles resting on upper boundary of horizon; 27 percent gravel; strongly acid (pH 5.5); gradual smooth boundary.
	(74-94 cm.)
IIB22tb RSL 68657	29 to 37 inches, strong brown (7.5YR 5/6, 5/8) gravelly coarse sandy loam, yellowish red (5YR 5/6) moist; brown (7.5YR 5/4) coatings; massive; hard, firm, slightly sticky, slightly plastic; very few fine, medium and coarse roots; common very fine interstitial and tubular, few fine tubular pores; continuous thin, few moderately thick clay films in bridges and coating sand grains; 26 percent gravel; strongly acid (pH 5.5); gradual wavy boundary.
	(94-115 cm.)
IIB23tb RSL 68658	37 to 45 inches, strong brown (7.5YR 5/6, 5/8) gravelly coarse sandy loam, yellowish red (5YR 4/8) moist; massive; hard, firm, slightly sticky and slightly plastic; very few fine, medium and coarse roots; common very fine interstitial pores; continuous moderately thick yellowish red (5YR 4/6) clay films in bridges and coating sand grains; 44 percent gravel; strongly acid (pH 5.5); abrupt wavy boundary.
	(115-130 cm.)
IIIB31txb RSL 68659	45 to 52 inches, variegated reddish yellow and strong brown (7.5YR 6/6, 5/6) loamy coarse sand, strong brown (7.5YR 5/6, 5/8) moist; light gray (10YR 7/2) bleached areas, reddish yellow (7.5YR 6/6) moist; massive; hard, firm, nonsticky and nonplastic; no roots; common very fine interstitial pores; common thin clay films line pores; 7 percent gravel; strongly acid (pH 5.5); clear wavy boundary.
	(130-170 cm.)
IIIB32txb RSL 68660	52 to 66 inches, light gray (2.5Y 7/2) loamy coarse sand, olive gray (5Y 5/2) moist; dark grayish brown (2.5Y 4/2) bands; massive; extremely hard, extremely firm, nonsticky and nonplastic; no roots; few very fine interstitial pores; 10 percent gravel; strongly acid (pH 5.5); clear wavy boundary.
	(170-185 cm.)
IVC1b RSL 68661	66 to 72 inches, white (N 8/) silty clay, light gray (N 7/) moist; black coatings dry and moist; strong medium platy structure; slightly hard, firm, nonsticky and plastic; whole horizon has horizontal bands of clay and silt with black coatings between the plates; 6 percent gravel; strongly acid (pH 5.5).
	(185-255 cm.)
VC2b RSL 68662	72 to 100 inches, light gray (2.5Y 7/2) compacted till, grayish brown (2.5Y 5/2) moist; horizon was augered; 10 to 20 percent gravel.

SOIL SURVEY LABORATORY — Riverside, California

SOIL TYPE Ahwahnee sandy loam (taxadjunct) **LOCATION** El Dorado County, California

SOIL FAMILY: Ultic Haploxeralf, coarse-loamy, mixed, mesic.

SOIL NOS. S61Calif-9-6 **LAB. NOS.** 61114 - 61120

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0- 3	A_{p1}	5.7	17.2	12.9	23.0	7.3	23.9	10.0	27.7	15.9	0	sl
3-15	A_{p2}	3.8	15.7	11.7	24.3	9.3	23.8	11.4	31.5	15.3	0	sl
15-26	B_1	4.5	16.4	11.1	22.2	8.6	23.3	13.9	29.4	14.9	1	sl
26-38	B_{21t}	3.3	15.1	10.9	22.7	7.7	22.9	17.4	28.3	15.1	0	sl
38-47	B_{22t}	5.0	14.8	10.8	21.8	7.5	22.6	17.5	25.7	16.5	1	sl
47-59	B_{3t}	5.2	17.2	10.9	21.5	6.7	23.0	15.5	24.9	16.2	0	sl
59- 70	C_1	5.0	16.7	13.2	24.9	7.3	22.8	10.1	27.3	16.0	0	sl

pH 8C1a H_2O 1:1	pH 8C1c KCl (1N) 1:1	Organic Matter Organic Carbon % 6A1a	Nitrogen % 6B1a	C/N	Free Fe_2O_3 % 6C1a	4A3a Bulk Den. gm/cc	Soil Water 15 ATMOS. % 4B2
5.9	5.2	3.43	0.241	14.2	0.8		7.9
6.1	4.8	0.79	0.056	14.1	0.9	1.53	5.5
6.3	4.7	0.27	0.022	12.3	1.1	1.53	6.2
6.4	4.6	0.14	0.013		1.3	1.83	7.7
6.5	4.5	0.10			1.3	1.91	8.7
6.6	4.4	0.07			0.9	1.91	8.5
6.6	4.0	0.06			0.3		7.0

5A2a CATION EXCHANGE CAPACITY (+ Na)	EXTRACTABLE CATIONS 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	5B1a 6Q2a K	BASE SAT. % 5C3	5A3a Sum of Cations soil	Calc. Sum of Cations clay	Calc. Sum of Cations clay + fine silt
	milliequivalents per 100g. soil →						← milliequivalents per 100g. →		
16.3	7.3	1.4	6.5	0.2	0.6	59	16.0	160	47
8.8	4.0	0.7	4.1	0.2	0.5	57	9.5	83	27
9.8	3.6	1.0	3.1	0.2	0.2	62	8.1	58	22
8.1	4.1	1.7	3.4	0.2	0.2	65	9.6	55	24
9.6	4.7	2.6	3.3	0.3	0.1	70	11.0	63	27
11.4	5.4	2.9	3.2	0.2	0.1	75	11.8	76	31
12.9	6.7	3.3	2.4	0.3	0.1	81	12.8	127	39

AHWAHNEE SANDY LOAM (taxadjunct) 1/
S61Calif-9-6

Collectors: Grant Kennedy, Reuben Nelson, John Rogers, Paul Nazar, David Estrada, Lothair Grant, Lynn Brittan
Date of Sampling: April 28, 1961 Description by: Grant Kennedy.
Location: El Dorado County, 1.5 miles southwest of Fairplay, California, NW cor. SE1/4NW1/4 sec. 5, T. 8 N., R. 12 E., El Dorado County, California.
Elevation: 2,390 feet
Relief: Rolling uplands with a 12 percent slope to the south.
Drainage: Well drained; medium runoff; rapid over moderate permeability
Parent Material: Granodiorite
Climate: Mean annual rainfall 37 inches. Mean annual temperature 57° F.
Vegetation: Cleared and formerly cultivated field, now heavily grazed by sheep. Present cover filaree, annual forbs, bur clover, wild oats, soft chess, ripgut brome, scattered ponderosa pine, live oak and black oak.
Classification: **Ultic Haploxeralf, coarse-loamy, mixed, mesic.**
Remarks: The profile has considerable mica which is most noticeable in the B horizon. The C1 is intermittent, in places being interrupted by an irregular R which extends into the B3t horizon.

HORIZON		DESCRIPTION
Ap1	0- 3"	Dark brown (10YR 4/3) sandy loam, dark brown (10YR 3/3) when moist; massive; slightly hard when dry, friable when moist, nonsticky and nonplastic when wet; abundant very fine roots; many very fine and fine tubular and interstitial pores; medium acid, pH 6.0; clear smooth boundary.
Ap2	3-15"	Dark brown (10YR 4/3) sandy loam, dark brown (10YR 3/3) when moist; massive; slightly hard when dry, very friable when moist, nonsticky and nonplastic when wet; abundant very fine and fine roots; many very fine tubular and interstitial, common fine tubular, few medium tubular pores; medium acid, pH 6.0; clear wavy boundary.
B1	15-26"	Yellowish brown (10YR 5/4) sandy loam near sandy clay loam, brown (7.5YR 4/4) when moist; massive; hard when dry, friable when moist, slightly sticky and slightly plastic when wet; plentiful very fine and fine roots; many very fine tubular and interstitial, common fine and medium tubular pores; few thin clay films in pores and bridges; medium acid, pH 6.0; clear smooth boundary.
B21t	26-38"	Yellowish brown (10YR 5/4) sandy clay loam near sandy loam, brown (7.5YR 4/4) when moist; massive; extremely hard when dry, friable when moist, slightly sticky and plastic when wet; few very fine and fine roots; many very fine tubular, common fine, few medium pores; many thin clay films in pores and bridges; medium acid, pH 6.0; gradual smooth boundary.
B22t	38-47"	Yellowish brown (10YR 5/4) sandy clay loam, brown (7.5YR 4/4) when moist; massive; extremely hard when dry, firm when moist, sticky and plastic when wet; few very fine and fine roots; common very fine tubular and interstitial, common fine tubular pores; many thin clay films in pores, medium acid, pH 5.8; gradual smooth boundary.
B3t	47-59"	Light yellowish brown (10YR 6/4) sandy clay loam, brown (7.5YR 5/4) when moist; massive; very hard when dry, firm when moist, sticky and plastic when wet; very few very fine and fine roots; common very fine and few fine tubular pores; common thin clay films in pores and bridges; medium acid, pH 5.0; clear irregular boundary.
C1	59-70"+	Very pale brown (10YR 7/4) sandy clay loam near loam, yellowish brown (10YR 5/4) when moist; massive; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; very few very fine and fine roots; common very fine interstitial, few very fine and fine tubular pores; medium acid, pH 6.0.

1/ The Ahwahnee series is in a coarse-loamy, mixed, thermic family of Mollic Haploxeralfs. This pedon has an argillic horizon with a base saturation of less than 75 percent in some parts and is in a mesic family.

CONSECUTIVE PEDON NUMBER C 68 78 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES JABU SHALLOW VARIANT SOIL NO. S68 CALI. 9-33 SAMPLE NO. 8 643-8 651 TAHOE BASIN AREA

SOIL FAMILY ULTIC HAPLOXERALF FINE-LOAMY,MIXED,FRIGID RIVERSIDE SOIL SURVEY LABORATORY

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION SAND 2- .05	SILT .05- .002	CLAY LT .002	SANDS VCS 2-1	CS 1- .05	MS .5- .25	FS .25- .10	VFS .1- .05	SILTS CSI .05- .02	FSI .02- .002	CLAYS CO. 2U	FINE LT 2U	CARBO NATE 3A1A	INT. II .2-.02	COARSE FRAGMENTS PCT. OF WHOLE SOIL	I 75- 20 PCT. OF --A	II 20-5 --Z	III 5-2 LT 75
			PERCENT OF LESS THAN 2MM																	
8 643	3- 0	01																--	--	
8 644	0- 15	A1	71.1	18.4	10.5	17.4	17.4	10.0	17.1	9.2	8.3	10.1				26.1	38A	--	38Z	N
8 645	15- 41	A3	68.3	19.6	12.1	10.6	15.9	10.3	19.9	11.6	9.7	9.9				32.1	12A	--	12Z	N
8 646	41- 69	2B1 TXB	61.9	16.0	22.1	14.5	15.5	9.0	14.6	8.3	6.2	9.8				22.5	13A	--	13Z	N
8 647	69-105	2B21TXB	56.7	15.7	27.6	8.5	13.5	9.5	16.3	8.9	6.4	9.3				24.2	11A	--	11Z	N
8 648	105-175	2B22TXB	71.0	18.6	10.4	14.4	17.4	12.1	18.8	8.3	7.7	10.9				25.4	13A	--	13Z	N
8 649	175-205	2B3 TB	74.5	13.6	11.9	20.1	19.4	10.9	16.4	7.7	5.2	8.4				21.7	17A	--	17Z	N
8 650	205-220	2C 8	84.7	10.2	5.1	23.5	31.0	11.7	13.5	5.0	4.9	5.3				16.1	24A	--	24Z	N
8 651	0- 41	A															19A	--	19Z	N

SAMPLE NO.	DEPTH CM.	ORG. MATTER CARBON 6A1A -PERCENT-	NITROGEN 6B1A -PERCENT-	CARBONATE AS CACO3 LT 2 6E1B	2-20 6E1B -PERCENT-	SESQUIOXIDES DI-CIT EXT FE 6C2B	AL 6G7A	PYROP EXT FE 6C5A	AL 6G5A -PERCENT-	ATTERBERG LIMIT LL 4F2 PCT.	PL 4F1 NO.	EST. 1/3 BAR 4A1F	BULK DENSITY 1/3 BAR 4A1F	DRY 4A1H	CM 3B2 GRAMS PER CC	WATER CONTENT 1/10 BAR 4B1C -PERCENT-	1/3 BAR 4B1C	15 BAR 4B2	EXTNSBLTY LEF 4D1 -PERCENT-	LE 4D1
8 643	3- 0											0.40			1.00					
8 644	0- 15	2.83	0.119			3.3				NP	NP		1.22	1.24	0.78		13.4	6.7	0.5	0.4
8 645	15- 41	1.48	0.067			3.7							1.31	1.31	0.94		14.7	6.6		
8 646	41- 69	0.50				7.5				32	19		1.44	1.47	0.92		23.9	10.5	0.7	0.6
8 647	69-105	0.18				7.3				39	25		1.54	1.60	0.93		19.2	12.4	1.3	1.2
8 648	105-175	0.09				5.1							1.64	1.65	0.91		16.3	5.8	0.2	0.2
8 649	175-205	0.08				5.7							1.62	1.64	0.89		19.1	5.7	0.4	0.4
8 650	205-220					2.6				NP	NP		1.68	1.68	0.83		8.4	3.5		
8 651	0- 41	2.51	0.104									1.28			0.90			7.0		

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6Q2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACI- DITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 5A3A	NH4- OAC 5A6A	BASE SATURATION SUM ACI- DITY	SUM AL	NH4- OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA-CL2 8C1E
		MEQ/100G									PERCENT					
8 643	3- 0															
8 644	0- 15	5.2	0.6	TR	0.3	6.1	11.9		18.0	14.3	34		43		5.8	5.2
8 645	15- 41	4.7	0.5	TR	0.2	5.4	9.8		15.2	10.7	36		51		6.0	5.3
8 646	41- 69	3.3	0.9	0.1	0.1	4.4	7.2		11.6	8.5	38		52		5.8	5.4
8 647	69-105	4.5	1.4	0.1	0.1	6.1	5.3		11.4	9.1	54		67		5.9	5.6
8 648	105-175	3.0	0.8	0.1	TR	3.9			3.9	5.2	100+		76		5.9	5.6
8 649	175-205	3.0	0.8	0.1	TR	3.9			3.9	5.3	100+		74		5.9	5.5
8 650	205-220	2.3	0.6	0.1	TR	3.0			3.0	3.6	100+		85		6.0	5.5
8 651	0- 41														5.8	5.3

SAMPLE NO	DEPTH CM.	CLAY MINERALOGY LESS THAN 0.002 MM X RAY DTA 7A2E I	7A2E II	7A2E III	7A2E IV	7A3 -PERCENT-	7A3	L.T. 0.0002 MM MINERAL X RAY 7A2E I	7A2E II	7A2E III	CODE	RELATIVE AMOUNT
8 643	3- 0											1 TRACE
8 644	0- 15	VR	3	KK	3						VR VERMICLT	2 SMALL
8 645	15- 41										KK KAOLINIT	3 MODERATE
8 646	41- 69	KK	3	VR	1						MI MICA	4 ABUNDANT
8 647	69-105	MI	3	KK	3							5 DOMINANT
8 648	105-175											6 INDETER.
8 649	175-205											
8 650	205-220	MI	3	KK	3	VR	1					
8 651	0- 41											

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.
N=NOT DETERMINED.

JABU COARSE SANDY LOAM, SHALLOW VARIANT 1/
S68Calif-9-33

Location: Tahoe Basin, El Dorado County, California, 0.6 miles south and 0.4 miles east of the northwest corner of sec. 22, T. 12 N., R. 18 E., 200 feet south of Fountain Place Road. Date of Sampling: August 14, 1968.
Description by: G. M. Kennedy and P. G. Nazar. Collectors: J. H. Rogers, G. L. Anderson, B. R. Brasher, W. D. Nettleton.
Classification: Ultic Haploxeralf, fine-loamy, mixed, frigid.
Vegetation: Not cultivated; Jeffrey pine, big sagebrush, perennial and annual grasses. Climate: Precipitation is 35 inches. Mean annual temperature is 43°F., January 27°F., July 61°F. Parent Material: Mixed alluvium. Topography: Glacial outwash terrace, 5 percent north-northwest facing slope. Elevation: 6400 feet. Drainage: Well drained; runoff is slow; permeability is very slow. Soil Moisture: Dry.
Remarks: Field determination for pH by Hellige-Truog triplex indicator. Composite A taken from 10 satellite samples.

HORIZON	DESCRIPTION
	(3-0 cm)
01 RSL 68643	1 to 0 inches, loose mat of pine needles.
	(0-15 cm.)
A1 RSL 68644	0 to 6 inches, reddish brown (5YR 4/4) sandy loam, dark reddish brown (5YR 3/4) moist; weak medium platy structure parting to moderate fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine, common medium roots; common very fine tubular and interstitial pores; 3 percent gravel; medium acid (pH 6.0); clear smooth boundary.
	(15-41 cm.)
A3 RSL 68645	6 to 16 inches, yellowish red (5YR 5/6) heavy sandy loam, yellowish red (5YR 4/6) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine, fine, medium and coarse horizontal roots; common very fine interstitial and few very fine tubular pores; few thin clay films in pores and on ped faces; 5 percent gravel and 15 percent 5 inch minus cobbles; slightly acid (pH 6.2); abrupt wavy boundary.
	(41-69 cm.)
IIB1txb RSL 68646	16 to 27 inches, strong brown (7.5YR 5/6) sandy clay loam, strong brown (7.5YR 4/6) moist; massive; hard, firm, brittle, sticky and plastic; common fine, medium and coarse roots; common very fine tubular and interstitial and few fine tubular pores; continuous thin clay films in bridges and coating sand grains; 10 percent gravel and 10 percent cobbles; slightly acid (pH 6.2); gradual wavy boundary.
	(69-105 cm.)
IIB21txb RSL 68647	27 to 42 inches, strong brown (7.5YR 5/6) clay loam, strong brown (7.5YR 4/6) moist; massive; very hard, very firm, brittle, sticky and plastic; few medium and coarse roots; few very fine tubular and interstitial pores; continuous thick clay films in bridges and coating sand grains; 5 percent gravel and 15 percent cobbles; slightly acid (pH 6.2); gradual smooth boundary.
	(105-175 cm.)
IIB22txb RSL 68648	42 to 68 inches, strong brown and brown (7.5YR 5/6, 4/4) gravelly sandy clay loam, strong brown (7.5YR 4/6) moist; massive; very hard, very firm, brittle, slightly sticky and slightly plastic; very few fine and medium, few coarse roots; common very fine tubular pores; continuous thin clay films in bridges and coating sand grains; 20 percent gravel and 25 percent cobbles; slightly acid (pH 6.2); clear wavy boundary.
	(175-205 cm.)
IIB3tb RSL 68649	68 to 80 inches, variegated strong brown (7.5YR 5/8, 5/6) gravelly sandy clay loam, strong brown (7.5YR 5/6) moist; massive; very hard, firm, brittle, slightly sticky and slightly plastic; no roots; common very fine tubular pores; continuous thin clay films in bridges and coating sand grains; 20 percent gravel and 20 percent cobbles; slightly acid (pH 6.2); clear wavy boundary.
	(205-220 cm.)
IICb RSL 68650	80 to 86 inches, variegated strong brown and brown (7.5YR 5/6, 4/4) coarse sand, brown (7.5YR 4/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; no roots; common very fine interstitial pores; common thin clay films coating sand grains; 30 percent gravel; medium acid (pH 6.0).

1/ The Jabu series is in a coarse-loamy, mixed, frigid family of Ultic Haploxeralfs. This pedon is in a fine-loamy, mixed, frigid family of the same subgroup.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Boomer stony loam **LOCATION** San Diego County, California

SOIL FAMILY: Ultic Haploxeralf, fine-loamy, mixed, mesic.

SOIL NOS. S60Calif-37-9 **LAB. NOS.** 60446 - 60451

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)							3A1		2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0- 3	A11	2.6	5.5	4.1	13.0	11.8	41.0	22.0	36.8	24.6	10	1
3- 8	A12	2.1	5.5	4.3	13.0	11.9	40.3	22.9	36.0	24.7	15	1
8-16	B1	1.2	4.4	3.8	14.9	13.2	39.4	23.1	38.4	23.7	3	1
16-31	B21	2.1	5.4	3.7	13.4	11.3	35.5	28.6	34.9	21.0	4	cl
31-46	B22	2.2	7.0	4.9	13.7	10.4	29.5	32.3	31.3	17.5	7	cl
46-57+	B3	3.2	13.0	8.8	20.7	10.7	22.7	20.9	33.4	12.4	6	scl-fsl

	pH		ORGANIC MATTER						MOISTURE TENSIONS		
8C1a H_2O 1:1	8C1c KCl 1:1		6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	Free Fe_2O_3 6C1b %	1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
6.7	5.6		3.81	0.241	15.8				3.8			15.9
6.5	5.4		3.01	0.187	16.1				3.8			10.1
5.7	4.5		1.33	0.092	14.5				4.1			14.3
6.0	4.6		0.54	0.049	11.0				4.2			17.4
5.9	4.7		0.47	0.040	11.8				3.9			22.4
6.0	4.8		0.37	0.033					3.3			16.5

5A2a	EXTRACTABLE CATIONS					5B1a						
CATION EXCHANGE CAPACITY ←(Na)	6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K	BASE SAT. % 5C3	Sum of Cations me./100 g. soil 5A3a	g_{a_K}				MOISTURE AT SATURATION %
	milliequivalents per 100g. soil ⟶						milliequivalents per liter ⟶					
34.9	20.8	5.6	10.1	0.2	1.4	73	38.1					
32.0	17.4	4.9	10.3	0.2	0.9	69	33.7					
27.6	13.1	4.4	11.2	0.2	0.4	62	29.3					
24.2	11.8	5.4	8.9	0.2	0.3	67	26.6					
26.3	11.2	5.7	9.0	0.4	0.1	66	26.4					
21.3	8.5	3.8	8.9	0.6	0.1	59	21.9					

1/ Percent of total soil

BOOMER STONY LOAM
S60Calif-37-9

Description: George Borst
Date of Sampling: November 18, 1960
Collectors: Reuben Nelson, James Lockard, Cliff Henry, and George Borst
Location: Approximately 75 feet east of Engineer's Road, approximately 0.3 mile northwest of its junction with Old Mill Truck Trail in SE1/4 sec. 30, T. 13 S., R. 3 E. (projected) of Rancho Cuyamaca, San Diego County, California.
Elevation: 4,800 feet
Relief: Steep, 33 percent
Use: Woodland
Vegetation: Cedar, oak, and pure forest
Drainage: Well drained
Parent Material: Deeply weathered basic intrusive rocks
Climate: This soil occurs under an average annual rainfall of about 38", a mean annual temperature of 53°, a mean January temperature of 39°, and a mean July temperature of 70°.
Remarks: This soil is relatively stony or rocky throughout, especially in the lower part of the B horizon. This profile is typical of Cohasset as to size and degree of development of the solum although it is less acid than is typical for the series. It was sampled as Aiken stony loam.
Reaction: pH was determined in the field with a Truog (Hellige) soil reaction kit
Classification: **Ultic Haploxeralf, fine-loamy, mixed, mesic.**

HORIZON		DESCRIPTION
O1 & O2	1- 0"	Partially decomposed and undecomposed leaves and litter, neutral (pH 7.0).
A11	0- 3"	Dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) when moist; moderate fine crumb structure; soft, very friable, slightly sticky and plastic; abundant very fine random roots; many fine interstitial pores; slightly acid (pH 6.5); abrupt smooth boundary.
A12	3- 8"	Dark brown (10YR 4/3) loam, dark brown (10YR 4/3) when moist; moderate medium granular structure; slightly hard, friable, slightly sticky and plastic; plentiful fine random roots; many fine interstitial pores; slightly acid (pH 6.5); clear wavy boundary. Tongues of this horizon extend into the underlying material, almost to the B2 horizon. These may possibly be filled animal burrows.
B1	8-16"	Dark brown (7.5YR 4/4) clay loam, dark reddish brown (5YR 3/4) when moist; moderate coarse angular blocky structure; slightly hard, firm, slightly sticky and plastic; few medium random roots; very many fine random tubular pores; few thin clay films on ped faces; medium acid (pH 6.0); clear wavy boundary.
B21	16-31"	Strong brown (7.5YR 5/6) stony clay, dark reddish brown (5YR 3/4) when moist; strong medium angular blocky structure; hard, firm, sticky and very plastic; few medium random roots; many fine random tubular pores; common moderately thick clay films on ped faces; medium acid (pH 6.0); clear wavy boundary.
B22	31-46"	Yellowish red (5YR 4/8) very stony clay, yellowish red (5YR 4/8) when moist; moderate medium angular blocky structure; hard, firm, sticky and very plastic; few medium random roots; many fine random tubular pores; many thick clay films on ped faces; medium acid (pH 6.0); diffuse, broken boundary.
B3	46-57"+	Reddish yellow (7.5YR 6/8) very stony clay loam, yellowish red (5YR 4/8) when moist; moderate medium angular blocky structure; hard, firm, sticky and very plastic; few fine random roots; many fine random tubular pores; common moderately thick clay films on ped faces; medium acid (pH 6.0).

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Elkhorn fine sandy loam (taxadjunct) **LOCATION** San Mateo Co., Calif.

SOIL FAMILY: Ultic Haploxeralf, fine-loamy, mixed, mesic

SOIL NOS. S55Ca1,41-5 **LAB. NOS.** 55125-55130

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0- 6	A_{1p}	0.3	5.2	19.7	36.8	7.8	21.5	8.7	34.8	9.0	0	fsl
6-14	A_{12}	0.7	6.3	20.2	33.9	7.3	21.6	10.0	33.3	8.4	0	fsl
14-26	A_2	0.3	5.9	22.1	37.1	7.7	22.1	4.8	34.1	9.3	0	fsl
26-40	B_{21}	0.2	5.2	18.8	29.9	6.2	17.9	21.8	26.9	7.8	0	scl
40-50	B_{22}	0.2	4.8	18.3	30.1	6.5	19.4	20.7	28.9	8.1	1	scl
50-60	C1	0.4	5.1	18.0	29.4	6.0	19.8	21.3	27.9	8.6	0	scl

8C1b SATURATED PASTE 1:1	pH 8C1a 1:5	8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	8A1a Elec. Conduc. EC·10³ MILLIMHOS PER CM @25°C.	Free Fe_2O_3 Pct. 6C1b	4A3a Bulk Density g/cc	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
5.3		5.9	1.07	.092	11.6		0.5	0.8			9.5	4.0
5.4		5.9	0.97	.086	11.3		0.5	0.8	1.52		10.5	4.0
5.5		5.9	0.14				0.6	0.6			8.1	2.0
6.0		6.4	0.15				0.5	2.7	1.64			9.5
6.1		6.5	0.13				0.4	2.0				9.0
6.2		6.6	0.11				0.4	2.0	1.62			9.2

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg	6J1a 6I1a CO_3+HCO_3 1/	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
7.9	3.0	0.8	5.4	0.3	0.3	45	1.5	0.5	2.2	0.6	0.9	22.7
7.9	3.6	0.9	5.2	0.2	0.2	49	1.7	0.1	3.0	0.5	0.7	21.7
3.3	1.6	0.7	1.8	0.1	Tr	57	1.8	0.1	3.4	0.2	1.3	17.4
11.3	2.9	4.2	3.5	0.4	0.1	68	2.5	<0.1	1.6	0.2	1.4	41.3
11.4	2.3	3.8	3.6	0.4	0.1	65	2.5	<0.1	1.3	0.2	1.3	40.8
11.4	4.9	4.7	3.4	0.6	0.1	75	2.5	Tr	0.7	0.2	1.2	44.3

1/ only HCO_3^- found

ELKHORN FINE SANDY LOAM (taxadjunct) 1/
S55Calif-41-5

Location: San Mateo County, California. Two miles southwest of Pescadero, 1/2 mile north of junction of Highway No. 1 and Old Coast Highway on east side of Old Coast Highway. See Sheet 40, Soil Survey of San Mateo Area, California, May, 1961.
Date of Sampling: February 25, 1955.
Description by: W. M. Johnson. Collectors: Reuben E. Nelson, Ralph E. Nelson, Richard Wagner, Melvin Mello, and W. M. Johnson.
Classification: Ultic Haploxeralf, fine-loamy, mixed, mesic.
Vegetation: Cultivated, used for production of Brussels sprouts. Original vegetation assumed to be grass and shrubs. Climate: Rainfall about 20 inches annually. June, July, and August are very dry. Fogginess is high in many parts of the year, particularly during summer and fall. Average January temperature is about 48° F., average July temperature about 60° F. On-shore winds carrying salt spray are common. Parent Material: Sandy coastal plains sediments. Relief: Undulating to rolling marine terrace. On second terrace above ocean level. Slope about 5 percent, plane, toward the west. Elevation: About 65 feet. Drainage: Runoff medium, Permeability is moderate. Affected by laterally flowing underground water. At time of collection of sample, water flowed into the pit at a depth of 56 inches, and rose to within 50 inches of the surface overnight.
Remarks: Profile moist in A and B horizons, wet below.

HORIZON		DESCRIPTION
A_{1p}	0 - 6"	Gray (10YR 5/1.5, dry; 3/2, moist) light fine sandy loam. Weak medium and fine granular. Slightly hard, very friable, nonplastic, nonsticky. Roots very numerous. Peds slightly porous. pH 4.8. Abrupt, wavy lower boundary.
A_{12}	6 - 14"	Light fine sandy loam of about the same color as the A_{1p}. Very weak medium and fine subangular blocky; nearly massive. Slightly hard, very friable, nonplastic, nonsticky. Roots very numerous. Peds are slightly porous. pH 5.0. Abrupt wavy lower boundary.
A_2	14 - 26"	Light gray (1Y 7/2.5, dry; 5/3, moist) light fine sandy loam. Massive. Slightly hard, very friable, nonplastic, nonsticky. Roots are common. Peds are moderately porous. There are lumps of B_2 in this horizon, and "tongues" of A_2 penetrate to a depth of about 4 feet in this profile. pH 5.8. Abrupt, irregular lower boundary.
B_{21}	26 - 40"	Brownish yellow (10YR 6/6, dry; 5/5, moist) sandy clay loam with common fine mottles of black and dark brown (dry). Moderate very coarse prismatic, breaking to weak coarse and medium subangular blocky. Moderate continuous clay skins. Very hard, friable, plastic, sticky. Few roots. Peds are nonporous. pH 6.0. Clear, irregular lower boundary.
B_{22}	40 - 50"	Brownish yellow (10YR 6/6, dry; 5/6, moist) light sandy clay loam with common fine mottles of black, very pale brown and dark brown (dry). Weak coarse and medium subangular blocky. Very hard, friable, plastic, sticky. Moderate, nearly continuous clay skins. Very few roots. Peds are nonporous. pH 6.2. Gradual, wavy lower boundary.
C1	50 - 60"	Finely mottled very pale brown and brownish yellow (10YR 7/3 and 6/6, dry; 5/3 and 4/6, moist) light sandy clay loam with a few small black spots. Massive. Hard, friable, plastic, sticky. No roots observed. Slightly porous. A few thin patches of clay skins along tubular pores and cracks. pH 6.4.

1/ The Elkhorn series is in a fine-loamy, mixed, mesic family of Pachic Argixerolls. This pedon has an epipedon with a base saturation (by sum of cations) of less than 50.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Elkhorn sandy loam (taxadjunct) **LOCATION** San Mateo County, California

SOIL FAMILY: Ultic Haploxeralf, fine-loamy, mixed, mesic.

SOIL NOS. S55Cal. 41-6 **LAB. NOS.** 55131-55137

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 2/	
0-13	A_{1p}	2.3	21.7	28.4	20.4	4.3	15.9	7.0	20.1	7.6	1	sl
13-17	A_{12}	2.6	19.3	26.7	20.3	4.5	17.5	9.1	21.1	8.3	2	sl
17-24	A_{21}	2.5	19.4	27.5	20.2	4.5	16.6	9.3	21.0	7.5	1	sl
24-27	A_{22}	2.5	20.7	26.6	19.0	4.0	15.9	11.3	19.6	7.2	1	sl
27-40	B_2	1.3	16.3	26.0	18.7	3.9	13.4	20.4	18.1	5.8	1	scl
40-55	B_3	3.2	17.2	31.6	21.9	3.3	10.1	12.7	15.7	4.9	1	sl
55-60	C_g or C_{ug}	19.1	16.2	10.6	11.6	4.2	16.3	22.0	18.9	7.6	14	scl

pH			ORGANIC MATTER			EST% SALT (BUREAU CUP)	8A1a Elec. Conduc. EC x 10^3 MILLIMHOS PER CM @25°C.	Free Fe_2O_3 6C1b %	4A3a Bulk Density g/cc	MOISTURE TENSIONS		
8C1b SATURATED PASTE 1:1	8C1a 1:5	8C1a 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N					4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
5.1		5.6	1.13	.087	13.0		0.6	0.8			8.4	3.5
5.4		6.0	0.72	.069	10.4		0.6	1.0	1.57		9.7	3.9
5.5		6.0	0.58				0.7	1.1			9.7	3.8
5.6		6.0	0.39				0.6	1.3			10.4	4.7
5.9		6.0	0.25				0.6	1.8	1.75			8.6
6.0		6.2	0.10				0.8	1.7				6.2
5.2		5.9	0.07				0.4	1.7	1.84			10.0

5A2a CATION EXCHANGE CAPACITY	EXTRACTABLE CATIONS 5B					BASE SAT. %	SATURATION EXTRACT SOLUBLE 8A1					8A MOISTURE AT SATURATION
	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	5C3	6P1a Na	6Q1a K	6N1a 6O1a	6J1a 6I1a $CO_3^{=}$+ HCO_3^{-} 1/	6K1a Cl	
(+ Na)	milliequivalents per 100g. soil →						← milliequivalents per liter →					%
7.8	3.1	0.7	5.5	0.2	0.3	44	2.1	0.6	4.7	1.3	0.9	20.1
8.5	2.5	0.7	5.8	0.3	0.2	39	2.2	0.3	2.8	0.4	1.8	19.9
7.5	3.2	0.7	5.3	0.3	0.2	45	2.6	0.4	3.5	0.4	1.9	19.5
7.7	2.3	0.6	4.6	0.2	0.2	42	2.1	0.2	3.6	0.3	1.9	20.9
9.8	2.1	3.1	4.3	0.4	0.1	57	2.7	0.2	4.6	0.2	1.9	28.0
7.5	1.3	2.8	3.8	0.4	0.1	55	4.1	0.1	3.5	0.2	2.5	24.3
16.4	2.4	6.8	4.0	0.8	0.2	72	3.2	0.1	0.8	0.1	1.6	48.9

1/ only HCO_3^- found

2/ Percent of whole soil

ELKHORN SANDY LOAM (taxadjunct) 1/
855Calif-41-6

Location: San Mateo County, California. 115 yards east of California Highway No. 1, measured from a point 4/10 mile north of Pigeon Point Lighthouse. In a cultivated field about 10 feet north of a field road. Date of Sampling: February 25, 1955. Description by: W. M. Johnson. Collectors: Reuben Nelson, Ralph Nelson, Richard Wagner, Melvin Mello, and W. M. Johnson.
Classification: Ultic Haploxeralf, fine-loamy, mixed, mesic.
Vegetation: Cultivated, irrigated. Land Use: Used for Brussels sprouts. Climate: Rainfall about 20 inches annually. June, July, and August are very dry. Fogginess is high in many parts of the year, particularly during summer and fall. Average January temperature is about 48° F., average July about 60° F. On-shore winds carrying salt spray are common. Parent Material: Sandy coastal plains sediments. Relief and Slope: Eroded low marine terrace. Gently undulating. About 3 percent, plane, toward the northwest. Elevation: About 55 feet. Drainage: Runoff, medium; permeability, medium. Affected by laterally moving ground water. Water seeped into hole at depth of 43 inches. Soil Moisture: Profile moist to depth of 40 inches, wet below.

HORIZON		DESCRIPTION
A_{1p}	0 - 13"	Dark grayish brown (10YR 4.5/1.5; 3/1.5, moist) light sandy loam. Cloddy due to tillage. Very weak coarse and medium granular. Slightly hard, friable, nonplastic, nonsticky. Porous. pH 5.0. Abrupt, smooth lower boundary.
A_{12}	13 - 17"	Dark grayish brown (10YR 4.5/1.5; 2.5/1.5, moist) light sandy loam. Weak medium and fine granular. Slightly hard, friable, nonplastic, nonsticky. Porous. pH 5.3. Clear, wavy lower boundary.
A21	17 - 24"	Mottled dark grayish brown and brown (10YR 4.5/1.5 and 4/3, dry; 10YR 3/1.5 and 3/3, moist) light sandy loam. Weak medium subangular blocky. Slightly hard, friable, nonplastic, nonsticky. Porous. pH 5.5. Clear, wavy lower boundary.
A22	24 - 27"	Mottled gray and brown (10YR 5/1 and 5/3, dry; 3/1 and 3/3, moist) with a few darker brown spots. Sandy loam, with slightly more clay than the horizon above. Moderate medium subangular blocky. Hard, friable, slightly plastic, nonsticky. Porous. Few small patches of thin clay skins on vertical surfaces. pH 5.6. "Interfingered" with horizon below.
B_2	27 - 40"	Yellowish brown (10YR 5/6, dry; 4/6, moist) with common medium and fine mottles of black, very dark brown, and dark brown (dry). Light sandy clay loam. Moderate medium subangular blocky. Very hard, friable, plastic, sticky. Thin, nearly continuous clay skins. Few pores. pH 6.0. Indistinct lower boundary.
B_3	40 - 55"	Yellowish brown (10YR 5/6, dry; 4/6, moist) with many medium and coarse mottles of black. Sandy loam. Very weak coarse and medium subangular blocky. Hard, friable, slightly plastic, nonsticky. Moderate number of fine pores. There are thin, patchy clay skins. pH 6.2. Clear, wavy lower boundary.
C_g or C_{ug}	55 - 60"+	Mottled light gray and yellowish brown (2.5Y 7/1 and 10YR 5/6, dry; 2.5Y 6/2 and 10YR 4/6, moist) with many black spots and streaks. Sandy clay loam. Massive. Very hard, friable, plastic, sticky. Contains more coarse fragments than horizons above. There are a few patches of thin clay skins on vertical surfaces. pH 5.3.

1/ The Elkhorn series is in a fine-loamy, mixed, mesic family of Pachic Argixerolls. This pedon has an epipedon with a base saturation of less than 50 percent (by sum of cations).

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Holland sandy loam **LOCATION** El Dorado County, California

SOIL FAMILY: Ultic Haploxeralf, fine-loamy, mixed, mesic

SOIL NOS. S61Calif-9-5 **LAB. NOS.** 61106 - 61113

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	3A1 2A2 > 2	TEXTURAL CLASS
0- 2	A_{11}	7.6	19.6	9.2	18.4	7.6	26.4	11.2	28.2	16.3	0	cosl
2-10	A_{12}	7.0	18.5	8.5	20.0	8.2	25.4	12.4	28.5	16.6	0	cosl-sl
10-21	B_1	4.5	19.5	8.2	19.3	8.0	25.1	15.4	27.5	16.6	0	sl
21-30	B_{21t}	6.3	17.7	6.8	16.6	6.8	24.1	21.7	24.4	16.0	0	scl
30-36	B_{22t}	5.1	17.6	7.5	17.1	6.5	21.7	24.5	22.5	15.4	0	scl
36-45	$B_{3}t$	6.2	18.7	8.8	18.6	7.2	20.4	20.1	23.8	15.0	0	scl-cosl
45-54	C_1	8.8	21.3	10.6	20.7	7.3	17.7	13.6	24.4	12.5	0	cosl
54+	R											

pH 8C1a H_2O 1:1	8C1c KCl (1 N) 1:1	Organic Matter Organic Carbon % 6A1a	Nitrogen % 6B1a	C/N	6C1a Free Fe_2O_3 %	4A3a Bulk Den. gm/cc	4B2 Silt Water 15 ATMOS. %
6.0	5.0	2.77	0.203	13.6	0.7		7.0
5.9	4.6	1.08	0.085	12.7	0.9	1.57	5.8
6.0	4.5	0.36	0.033	10.9	1.1	1.54	6.8
6.1	4.6	0.18	0.019		1.5	1.80	9.9
6.3	4.7	0.10			1.5	1.36	10.5
6.5	4.7	0.07			1.0	1.89	10.6
6.6	4.7	0.06			0.5		7.8

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K	BASE SAT. % 5C3	5A3a Sum of Cations soil	Calc. Sum of Cations clay	Calc. Sum of Cations clay + fine silt
	milliequivalents per 100g. soil						milliequivalents per 100g.		
14.6	5.8	1.1	6.0	0.2	0.8	57	13.9	124	37
9.7	3.5	0.8	5.4	0.2	0.7	49	10.6	85	28
9.1	3.1	1.0	3.9	0.2	0.4	55	8.6	56	21
11.5	4.5	1.8	3.8	0.2	0.3	64	10.6	49	23
11.3	4.7	2.4	3.3	0.2	0.2	69	10.8	44	23
11.9	4.8	2.6	2.5	0.2	0.1	76	10.2	51	25
9.1	4.7	2.3	2.0	0.2	0.1	79	9.3	68	30

HOLLAND SANDY LOAM
S61Calif-9-5

Collectors: Grant Kennedy, Reuben Nelson, John Rogers, Paul Nazar, David Estrada, Lothair Grant, Lynn Brittan
Date of Sampling: April 28, 1961 **Description by: Grant Kennedy.**
Location: 600 feet north of Slug Gulch Road, 1-1/4 mile northeast of Fairplay, NE1/4SW1/4 sec. 27, T. 9 N, R. 12 E., El Dorado County, California.
Elevation: 2,550 feet
Relief: Rolling uplands with a 10 percent slope to the south, on a slightly convex slope
Drainage: Well drained; medium runoff, moderately rapid over moderate permeability
Parent Material: Granodiorite
Climate: Mean annual precipitation 38 inches, mean annual temperature 57°
Vegetation: Cleared field possibly cultivated many years ago. Present cover soft chess, ripgut brome, filaree, annual forbs, scattered live oak, black oak, and ponderosa pine
Classification: **Ultic Haploxeralf, fine-loamy, mixed, mesic.**
Remarks: The C1 is intermittent with an irregular R that extends into the B3t. Occasional rock outcrops occur in the area. Horizons 2 and 4 (A11 and B21t) were sampled for the Bureau of Public Roads and California Division of Highways.

HORIZON		DESCRIPTION
A11	0- 2"	Brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) when moist; moderate fine granular; slightly hard when dry, very friable when moist, nonsticky and nonplastic when wet; abundant very fine roots; many very fine tubular and interstitial, few fine tubular pores; strongly acid, pH 5.5; clear smooth boundary.
A12	2-10"	Brown (10YR 5/3) sandy loam, dark yellowish brown (10YR 3/4) when moist; massive; slightly hard when dry, very friable when moist, slightly sticky, slightly plastic when wet; abundant very fine, few fine and medium roots; many very fine tubular and interstitial, few fine tubular pores; strongly acid, pH 5.5; clear smooth boundary.
B1	10-21"	Brown (10YR 5/3) sandy loam, dark brown (7.5YR 3/4) when moist; massive; hard when dry, very friable when moist, slightly sticky and slightly plastic; plentiful very fine, few fine and medium roots; many very fine tubular and interstitial, common fine tubular few medium tubular pores; common thin clay films in pores and bridges, strongly acid. pH 5.5; clear slightly wavy boundary.
B21t	21-30"	Strong brown (7.5YR 5/6) clay loam (near loam), dark brown (7.5YR 3/4) when moist; massive; extremely hard when dry, friable, when moist, sticky and slightly plastic when wet; few very fine roots; common very fine and fine tubular pores; many thin clay films in pores and bridges; strongly acid, pH 5.8; gradual smooth boundary.
B22t	30-36"	Brown (7.5YR 5/4) clay loam near loam, dark brown (7.5YR 4/4) when moist; massive; extremely hard when dry, firm when moist, sticky and slightly plastic when wet; very few very fine roots; common very fine, few fine tubular pores; many thin clay films in pores and bridges; strongly acid; pH 5.8; gradual smooth boundary.
B3t	36-45"	Yellowish brown (10YR 5/4) sandy clay loam near loam, dark yellowish brown (10YR 4/4) when moist; massive; hard when dry, firm when moist, slightly sticky and slightly plastic when wet; very few very fine roots; few very fine and fine tubular pores; common thin clay films in pores and bridges; strongly acid, pH 5.8; clear wavy boundary.
C1	45-54"	Pale brown (10YR 6/3) sandy clay loam, near loam, brown (10YR 4/3) when moist; massive; hard when dry, friable when moist, slightly sticky and slightly plastic when wet; no roots observed; few thin clay films in pores; strongly acid, pH 5.8; abrupt irregular boundary.
R	54"+	Slightly weathered granodiorite.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Holland loam (taxadjunct) **LOCATION** San Diego County, California

SOIL FAMILY: Ultic Haploxeralf, fine-loamy, mixed, mesic.

SOIL NOS. S61Calif-37-2 **LAB. NOS.** 6110 - 6116

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)							3A1		2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0- 3	A11	1.7	5.7	5.3	33.0	21.7	23.9	8.7	58.5	11.7	18	fsl
3-10	A12	1.8	5.2	4.4	32.3	23.1	24.4	8.8	60.9	12.1	16	fsl
10-20	A3	1.4	4.6	4.2	29.1	25.6	25.3	9.8	61.2	12.6	15	fsl-vfsl
20-29	B21	1.2	2.8	2.6	20.0	27.7	24.8	20.9	57.0	11.9	5	cl-vfsl
29-35	B22	0.3	1.1	1.0	14.0	32.0	31.3	20.3	61.1	14.6	0	1
35-50	B3	0.2	0.9	1.1	19.1	35.7	31.6	11.4	69.2	15.4	0	vfsl
50-64+	C1	3.2	4.4	3.1	21.4	35.5	23.6	8.8	67.5	9.6	3	vfsl

pH			ORGANIC MATTER				ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C.		Free Fe_2O_3	MOISTURE TENSIONS		
8C1a H_2O 1:1	8C1c KCl 1:1		6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)		$CaCO_3$ equivalent %	6C1b %	1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
5.7	4.9		4.21	0.187	22.5				1.6			6.7
5.8	4.8		1.14	0.057	20.0				1.8			4.9
5.7	4.5		0.30	0.024					1.7			5.2
5.7	4.6		0.26	0.022					2.1			10.0
5.5	4.6		0.30	0.018					1.9			12.7
5.6	4.4		0.18						2.6			10.7
5.7	4.2		0.13						2.2			7.4

5A2a CATION EXCHANGE CAPACITY (-(Na)	EXTRACTABLE CATIONS 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K	BASE SAT. % 5C3	Sum of Cations me./100g. soil 5A3a	K	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						milliequivalents per liter →		
19.8	9.0	1.3	10.3	0.2	0.4	51	21.2		
12.0	4.8	0.9	5.3	0.2	0.3	55	11.7		
7.9	3.5	1.1	3.0	0.1	0.3	62	8.0		
11.4	5.4	1.6	4.1	0.2	0.5	65	11.8		
15.2	7.1	1.7	4.5	0.2	0.5	68	14.0		
17.1	10.6	1.8	4.7	0.4	0.2	73	17.7		
16.4	10.4	1.8	3.9	0.3	<0.1	77	16.7		

All sands have considerable mica.

1/ Percent of total soil

HOLLAND LOAM (taxadjunct) 1/
S61Calif-37-2

Description: George Borst
Date of Sampling: January 18, 1961
Collectors: Reuben Nelson, Cliff Henry, and George Borst
Location: About 700 feet east of Boulder Peak Road, 1,425 feet south-southeast of its junction with Eagle Way, in Pine Hills, in the SW1/4 sec. 13, T. 13 S., R. 3 E., San Diego County, California.
Elevation: 4,100 feet
Relief: Strongly sloping, 16 percent
Use: Woodland range
Vegetation: Open forest of pine and oak, with occasional manzanita
Drainage: Well drained, moderately slow subsoil permeability
Parent Material: Deeply weathered micaceous schist
Climate: This soil occurs under an average annual rainfall of about 36", a mean annual temperature of 53°, a mean January temperature of 39°, and a mean July temperature of 70°.
Remarks: The A horizon of this soil is relatively thick, and erosion relatively slight, as compared with most soils in this series in San Diego County.
Reaction: pH was determined in the field with a Truog (Hellige) soil reaction kit.
Classification: **Ultic Haploxeralf, fine-loamy, mixed, mesic.**

HORIZON		DESCRIPTION
A11	0- 3"	Dark brown (10YR 4/3) loam, dark brown (10YR 3/3) when moist; weak fine granular structure; soft, very friable, nonsticky and slightly plastic; abundant very fine random roots; common very fine random tubular pores; highly micaceous; medium acid (pH 6.0); abrupt smooth boundary.
A12	3-10"	Yellowish brown (10YR 5/4) stony fine sandy loam, dark yellowish brown (10YR 4/4) when moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; plentiful fine random roots; common fine random pores; highly micaceous; medium acid (pH 6.0); clear smooth boundary.
A3	10-20"	Yellowish brown (10YR 5/4) stony fine sandy loam, dark yellowish brown (10YR 4/4) when moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; plentiful medium random roots; many medium random tubular pores; highly micaceous; medium acid (pH 6.0); abrupt wavy boundary.
B21	20-29"	Brown (7.5YR 5/4) clay loam, dark brown (7.5YR 4/4) when moist; strong coarse angular blocky structure; hard, firm, slightly sticky and plastic; few medium to coarse random roots; many medium to coarse random tubular pores; many moderately thick clay films on ped faces; highly micaceous; medium acid (pH 5.8); clear wavy boundary.
B22	29-35"	Brown (7.5YR 5/4) clay loam, dark brown (7.5YR 4/4) when moist; strong coarse angular blocky structure; hard, firm, sticky and very plastic; few medium to coarse random roots; many medium random tubular pores; many thick clay films on ped faces; highly micaceous; medium acid (pH 6.0); clear irregular boundary.
B3	35-50"	Brownish yellow (10YR 6/6) fine sandy loam, yellowish brown (10YR 5/4) when moist; massive; hard, firm, slightly sticky and plastic; few medium random roots; common medium random tubular pores; common thin clay films on ped faces; highly micaceous; medium acid (pH 6.0); gradual irregular boundary.
C1	50-64"+	Light gray (2.5Y 7/2) deeply weathered highly micaceous schist of very fine sandy loam texture, dark yellowish brown (10YR 4/4) on cleavage planes, light brownish gray (2.5Y 6/2) when moist; few medium random roots; medium acid (pH 6.0).

1/ **The Holland series is in a fine-loamy, mixed, mesic family of Ultic Haploxeralfs. This pedon has a solum slightly thinner than permitted for the series (greater than 50 inches).**

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Josephine loam variant **LOCATION** Amador Co., California

SOIL FAMILY: Ultic Haploxeralf, fine-loamy, mixed, mesic

SOIL NOS. 59Calif-3-4 **LAB. NOS.** 59286 - 59293

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
1-0	$A_{00}A_0$	Not sampled										
0-2½	A_{11}	4.8	4.4	2.6	14.0	22.7	40.4	11.1	59.3	14.5	14	1
2½-7	A_{12}	2.9	3.6	2.3	12.6	23.7	38.9	16.0	59.3	12.9	14	1
7-13	A_3	2.6	3.2	2.4	12.7	24.2	38.6	16.3	58.9	13.8	12	1
13-27	B_1	2.2	3.0	2.0	10.2	19.8	35.2	27.6	49.1	13.7	9	c1-1
27-44	B_2	1.2	1.6	0.9	4.5	14.8	36.4	40.6	40.6	14.1	14	c-c1
44-62	B_3	1.1	2.2	1.4	7.4	17.9	37.5	32.5	46.8	14.4	9	c1
62-72	C_1	1.0	2.9	2.2	9.4	19.8	41.8	22.9	51.1	17.7	3	1
72-84+	D_r	1.0	2.2	2.0	9.6	26.1	46.5	12.6	60.9	19.0	0	1

pH 8C1a H_2O 1:1	pH 8C1c KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6C1b "Free" Fe_2O_3 %	ELECTRICAL CONDUCTIVITY EC x 10^3 MILLIMHOS PER CM @25°C	$CaCO_3$ equivalent %	Bulk Density 4A3a g/cc.	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
5.8	4.8	3.20	0.111	28.8	3.2						7.6
6.1	5.0	1.34	0.041	31.0	3.8			1.34			7.2
5.9	4.9	0.87	0.036	24.1	4.1			1.34			7.8
5.9	5.0	0.20	0.017		4.9			1.42			11.0
5.9	5.4	0.10			6.3			1.53			16.1
5.7	5.1	0.11			5.2			1.58			13.4
5.5	4.8	0.11			6.0			1.65			10.8
5.4	5.0	0.04			5.4			1.41			7.5

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K	BASE SAT. % 5C3	Clay mineralogy (<0.002 mm.) Mont.	Verm.	Mixed layer Mica-Verm.	Mica	% Kaolin DTA 7A3	% Gibb. DTA 7A3
	milliequivalents per 100g. soil →						← X-ray 7A2 →					
15.6	5.2	1.6	8.7	<0.1	0.5	46						
10.0	3.2	0.8	5.5	<0.1	0.4	44	-	xx	x	x	36	tr
8.7	2.6	0.9	5.3	0.1	0.4	43						
7.6	2.2	1.2	5.7	<0.1	0.4	40						
8.6	2.9	1.6	4.2	<0.1	0.4	54	-	x	-	x	40	tr
8.1	2.6	1.4	4.7	<0.1	0.3	48						
7.7	2.3	1.2	4.0	0.1	0.2	49	-	xx	-	-	40	10
5.8	2.6	1.0	3.1	<0.1	0.3	56						

1/ Percent of the whole soil

\- = looked for but not found
tr = detected, very small amounts
x = detected, small amounts
xx = moderate amounts
xxx = large amounts
xxxx = predominant amounts

JOSEPHINE LOAM variant 1/
859Calif-3-4

Collectors: Grant Kennedy, Reuben Nelson, Bob Sketchley, John Rogers.
Date of Sampling: June 17, 1959. Description by: Grant Kennedy.
Location: Amador County, California, Bennett property, 1/4 mile E. of the center of Section 21, T6N, R12E, about 4 miles E of Jackson.
Elevation: 2,180 feet.
Relief: Gently sloping uplands on a plain north-facing slope of 7 percent below a ridge.
Drainage: Well drained; slow runoff; moderately slow permeability in the B_2.
Parent Material: Fine grained schist of the Calaveras formation.
Biological Activity: Worms and burrowing rodents active in these soils.
Climate: Mean annual rainfall 40".
Vegetation: Ponderosa pine, black oak, manzanita, poison oak.
Remarks: A medial developed Reddish-Brown Lateritic soil. Bureau of Public Roads samples were obtained for the A_{12}, B_2, and C_1 horizons.
Classification: Ultic Haploxeralf, fine-loamy, mixed, mesic.

HORIZON		DESCRIPTION
A_{00} & A_0 Not sampled	1-0"	Fresh and partly decomposed litter of leaves and pine needles.
A_{11}	0-2½"	Brown (7.5YR 5/4) loam, dark reddish brown (5YR 3/3) when moist; massive in place crushing to moderate very fine granular; slightly hard when dry, friable when moist, non-sticky and nonplastic when wet; abundant very fine and fine roots; many very fine and fine pores, few medium; few shot less than 5 mm. in diameter (magnetic); medium acid, pH 5.8; abrupt, smooth lower boundary.
A_{12}	2½-7"	Reddish brown (5YR 5/4) loam, dark reddish brown (5YR 3/4) when moist; massive in place crushing to moderate medium and and fine granular structure; hard when dry, friable when moist, nonsticky and nonplastic when wet; abundant very fine and fine roots, few medium and coarse; many very fine and fine pores, few medium; few shot; slightly acid, pH 6.1; gradual, smooth lower boundary.
A_3	7-13"	Reddish brown (5YR 5/4) loam, dark reddish brown (5YR 3/4) when moist; essentially massive in place breaking to sub-angular blocks when disturbed; hard when dry, friable when moist, slightly sticky and nonplastic; roots and pores as above except common medium pores; thin, discontinuous clay films in pores; occasional shot; medium acid, pH 5.9; gradual, smooth lower boundary.
B_1	13-27"	Reddish brown (5YR 5/4) light clay loam, dark reddish brown (5YR 3/4) when moist; massive; hard when dry, firm when moist, slightly sticky and slightly plastic when wet; abundant very fine and fine, occasional medium and coarse roots; many very fine and fine, common medium pores; thin, continuous clay films in pores; occasional shot; medium acid, pH 5.9; gradual, smooth lower boundary.
B_2	27-44"	Yellowish red (5YR 5/6) light clay, yellowish red (5YR 4/6) when moist; massive; hard when dry, very firm when moist, sticky and plastic when wet; few very fine and fine roots; common very fine, fine, and few medium pores; moderately thick, continuous clay films in pores and bridges; medium acid, pH 5.9; gradual, wavy lower boundary.
B_3	44-62"	Yellowish red (5YR 5/6) with some coatings of red (2.5YR 5/6) clay loam, yellowish red (5YR 4/6) when moist; massive; hard when dry, very firm when moist, slightly sticky and plastic when wet; roots, pores, and clay films as above but clay films are not as conspicuous; medium acid, pH 5.7; gradual, wavy lower boundary.
C_1	62-72"	Strong brown (7.5YR 5/6) loam with yellowish red (5YR 5/6) streaks, strong brown (7.5YR 4/6) when moist with red (2.5YR 4/8) streaks; massive; slightly hard when dry, firm when moist, slightly sticky and slightly plastic when wet; occasional root; few very fine and fine pores; thin, continuous clay films in some pores; strongly acid, pH 5.5; clear, somewhat irregular lower boundary.
D_r	72-84"+	Dark bluish gray somewhat weathered fine-grained schist with reddish brown and yellowish brown staining on fracture planes; strongly acid, pH 5.4

1/ The Josephine series is in a fine-loamy, mixed, mesic family of Typic Haploxerults. This pedon has an argillic horizon with a base saturation of more than 35 percent.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Josephine loam (taxadjunct) **LOCATION** Amador County, California

SOIL FAMILY: Ultic Haploxeralf, fine-loamy, mixed, mesic.

SOIL NOS. S60Calif-3-29 **LAB. NOS.** 60134 - 60142

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0- 1	A11	2.0	5.2	2.9	8.7	9.7	57.6	13.9	37.5	35.6	14	sil
1- 5	A12	1.8	5.8	2.9	8.9	10.8	54.4	15.4	36.5	34.7	17	sil
5-12	B1	5.6	6.6	3.8	8.3	10.0	46.1	19.6	30.0	31.4	23	l
12-25	B21	6.1	7.9	4.4	7.8	10.1	44.0	19.7	31.5	27.1	7	l
25-38	B22t	6.0	7.6	4.2	6.3	11.0	42.5	22.4	30.0	26.6	13	l
38-50	B23t	4.7	8.0	4.4	9.1	9.4	42.8	21.6	32.5	25.5	18	l
50-63	B24t	6.1	9.7	4.7	8.9	8.5	38.3	23.8	29.4	23.0	20	l
63-69	B25t	7.4	10.4	4.6	8.4	9.1	32.3	27.8	28.5	18.1	26	cl-l
69+	B3	Rock										

8C1a pH H_2O 1:1	8C1c pH KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	6C1b Free Fe_2O_3 Pct.	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
6.2	5.2	4.97	0.217	22.9				4.3			12.2
6.3	5.2	1.74	0.078	22.3				5.1			9.1
6.0	4.9	1.19	0.057	20.9				6.4			10.3
6.1	5.0	0.57	0.036	15.8				6.7			10.5
5.9	4.8	0.38	0.024					6.6			11.2
5.9	4.8	0.36	0.023					6.9			14.9
5.9	4.8	0.31						7.9			11.9
5.8	5.1	0.25									13.1

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 6N2b Ca	6G2c Mg	6H2a H	6P2a Na	6Q2a K	BASE SAT. % 5C3	5A3a Sum of Cations eq/100g. soil	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →							
27.7	11.1	5.4	13.1	<0.1	0.8	57	30.5	
16.1	5.5	3.3	7.2	0.1	0.6	57	16.7	
13.9	3.2	2.4	7.0	<0.1	0.5	47	13.2	
11.0	3.0	2.0	5.7	0.1	0.4	49	11.2	
10.8	2.5	2.1	4.8	0.1	0.3	51	9.8	
10.5	2.6	2.2	5.1	0.1	0.3	50	10.3	
11.8	3.4	2.8	5.2	0.1	0.3	56	11.8	
11.4	3.3	3.2	4.4	0.1	0.2	61	11.2	

1/ Percent of whole soil

JOSEPHINE LOAM (taxadjunct) 1/
S60Calif-3-29

Location: Amador County, California. 0.15 mile east of W1/4 corner of sec. 24, T. 7 N., R. 11 E., 100 feet north of Shake Ridge Road; 1/4 mile northwest of Golden Bare Health Ranch turnoff.
Date of Sampling: May 6, 1960.
Description by: Grant Kennedy. Collectors: Grant Kennedy, Reuben Nelson, Robert Sketchley, Clifford Henry, Paul Nazar, and Jack McClelland.
Classification: Ultic Haploxeralf, fine-loamy, mixed, mesic.
Vegetation: Ponderosa pine, sugar pine, black oak, poison oak, mountain misery; herbs. Climate: Mean annual precipitation 32 inches; average temperatures (Tiger Creek Station): January - 40° F., July - 70° F.; mean annual - 55°F. Parent Material: Schists of the Calaveras formation with vertical cleavage. Relief: Steep uplands on a north-facing slope of 35 percent. Elevation: 2,090 feet. Drainage: Well drained; moderate runoff; moderate permeability.
Remarks: This soil is a moderately developed Red-Yellow Podzolic soil located in an area where there are no rock outcrops locally but some occur on the same slope. The lower A and upper B are darker than desirable for Red-Yellow Podzolic soils. The site is between two pines, about five feet from one and ten feet from the other. This sample is somewhat deeper than the other Josephine profile in this area (S60Calif-3-24) and redder but is typical of much of the deeper Josephine. It is too friable and lacks the development of the Sites. Gravel content about 10 percent to 50 inches, then increases somewhat with depth. The soil was moist when described.

DESCRIPTION

O1	1-0 inches, undecomposed and partially decomposed litter.
A11 RSL No. 60134	0-1 inches, dark gray (7.5YR 4/1) loam, very dark brown (7.5YR 2/2) when moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; plentiful very fine roots; many very fine interstitial and tubular pores; slightly acid (pH 6.2); abrupt smooth boundary.
A12 RSL No. 60135	1-5 inches, brown (7.5YR 5/3) loam, dark brown (7.5YR 3/3) when moist; massive; slightly hard, friable, slightly sticky and slightly plastic; abundant very fine, few fine and medium roots; many very fine interstitial and tubular, few fine and medium tubular pores; slightly acid (pH 6.2); clear smooth boundary.
B1 RSL No. 60136	5-12 inches, brown (7.5YR 5/4) loam, dark reddish brown (5YR 3/3) when moist; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; abundant roots of all sizes; pores as above; few thin discontinuous clay films in some pores; medium acid (pH 6.0; gradual smooth boundary.
B21 RSL No. 60137	12-25 inches, brown (7.5YR 5/4) light silty clay loam, dark reddish brown (5YR 3/4) when moist; weak fine and medium subangular blocky structure; slightly hard, friable, sticky and plastic; abundant roots of all sizes; many very fine interstitial and tubular, few fine and medium tubular pores; thin discontinuous clay films in pores; medium acid (pH 5.8); gradual smooth boundary.
B22t RSL No. 60138	25-38 inches, brown (7.5YR 5/4) light silty clay loam, dark reddish brown (5YR 3/4) when moist; weak fine and medium subangular blocky structure; slightly hard, friable, sticky and plastic; few roots of all sizes; many very fine interstitial and tubular, few fine and medium tubular pores; thin discontinuous clay films in pores; medium acid (pH 5.9); gradual smooth boundary.
B23t RSL No. 60139	38-50 inches, brown (7.5YR 5/4) light silty clay loam, dark reddish brown (5YR 3/4) when moist; weak fine and medium subangular blocky structure; slightly hard, friable, sticky and plastic; very few very fine to medium roots; many very fine interstitial and tubular, few fine and medium tubular pores; thin discontinuous clay films in pores; medium acid (pH 6.0); diffuse, smooth boundary.
B24t RSL No. 60140	50-63 inches, brown (7.5YR 5/4) light silty clay loam, dark reddish brown (5YR 3/4) when moist; weak fine and medium subangular blocky structure; slightly hard, friable, sticky and plastic; very few very fine to medium roots; many very fine interstitial and tubular, few fine and medium tubular pores; thin discontinuous clay films in pores; medium acid (pH 6.0); diffuse smooth boundary.
B25t RSL No. 60141	63-69 inches, brown (7.5YR 5/4) light silty clay loam, dark reddish brown (5YR 3/4) when moist; massive; slightly hard, friable, sticky and plastic; no roots; common very fine tubular, many very fine interstitial pores; thin nearly continuous clay films in pores; medium acid (pH 5.7); abrupt slightly irregular boundary.
B3 RSL No. 60142	69 inches +, gray (N 5/ and 6/) decomposing schist with strong brown (7.5YR 5/6) stains on fracture planes, very dark gray and gray (N 3/ and 4/) with reddish brown (5YR 4/4) stains when moist.

1/ The Josephine series is in a fine-loamy, mixed, mesic family of Typic Haploxerults. This pedon has an argillic horizon with greater than 35 percent base saturation.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Ultic Haploxeralf, fine-loamy, mixed, mesic
SOIL Josephine loam (taxadjunct) SOIL Nos. S66Calif-47-1 LOCATION Siskiyou County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 66334 - 66342

Depth (In)	Horizon	1B1b Total Sand (2-0.05)	Total Silt (0.05-0.002)	Total Clay (< 0.002)	Sand: Very coarse (2-1)	Sand: Coarse (1-0.5)	Sand: Medium (0.5-0.25)	Sand: Fine (0.25-0.1)	Sand: Very fine (0.1-0.05)	Silt: 0.05-0.02	Silt: Int. III (0.02-0.002)	Silt: Int. II (0.2-0.02)	Sand: (2-0.1)	3A1a Non-carbonate clay	1/ Coarse fragments 1A2a > 2	2 - 19	19 - 76
		Pct. of < 2 mm												Pct.	Pct.	Pct. of < 76mm	
0-2	A11	48.5	39.5	12.0	8.1	8.6	4.4	11.8	15.6	16.9	22.6	40.7	32.9	12	13	12	1
2-4	A12	47.5	38.6	13.9	4.9	8.4	4.7	12.9	16.6	16.1	22.5	41.8	30.9	14	8	8	-
4-11	A3	45.2	38.6	16.2	3.9	7.0	4.8	12.7	16.8	16.4	22.2	42.2	28.4	16	6	6	-
11-21	B1t	43.3	37.7	19.0	3.7	7.0	4.3	12.0	16.3	15.6	22.1	40.3	27.0	19	6	5	1
21-33	B21t	42.5	37.7	19.8	3.4	6.2	4.0	11.5	17.4	17.2	20.5	42.6	25.1	20	5	5	-
33-42	B22t	43.7	38.0	18.3	3.9	6.2	3.9	12.6	17.1	17.6	20.4	43.6	26.6	18	5	5	-
42-50	B3t	42.8	36.9	20.3	3.2	6.2	3.9	12.0	17.5	16.8	20.1	42.8	25.3	20	3	3	-
50-68+	C	35.4	35.9	28.7	2.4	3.9	2.5	10.7	15.9	15.6	20.3	39.4	19.5	29	4	4	-
0-4	A1 2/														11	10	1

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven dry	Bulk density: g/cc	3B2 C'	Water content: Pct	Water content: 4B1c 1/3 bar	Water content: 4B2 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH: 8C1a H_2O 1:1	
	Pct.	Pct.		Pct.	Pct.	g/cc	g/cc	g/cc		Pct	Pct.	Pct.	in./in.	in./in.		
0-2	3.36	0.124	27	2.7		1.27	1.29		0.93		23.1	9.9	0.006	0.005	6.0	
2-4	1.92	0.087	22	2.9		1.21	1.24		0.96		18.3	9.6	0.006	0.006	5.8	
4-11	0.68	0.060	11	3.1		1.42	1.45		0.97		17.4	9.4	0.006	0.006	5.8	
11-21	0.39			3.0		1.52	1.57		0.96		16.7	9.6	0.010	0.010	5.8	
21-33	0.32			2.9		1.56	1.61		0.97		16.5	10.6	0.011	0.010	5.7	
33-42	0.31			2.9		1.52	1.58		0.97		17.0	10.6	0.013	0.013	5.8	
42-50	0.21			3.4		1.55	1.61		0.98		17.4	11.2	0.012	0.012	6.0	
50-68+	0.18			3.4		1.57	1.77		0.98		22.7	16.9	0.041	0.040	6.5	
0-4	3.19	0.117	27	2.9								10.5			6.1	

Depth (In.)	Extractable bases 5B1a 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6R2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	Cation Exch. Capacity: 5A3a Sum	6G1d KCl Ext. Al^{+++}	Base saturation: 5C1 NH_4OAc	5C3 Sum
	meq/100 g									Pct.	Pct.
0-2	10.4	2.0	0.2	1.3	13.9	15.1	22.7	29.0		61	48
2-4	7.3	1.7	0.2	1.1	10.3	14.7	20.7	25.0		50	41
4-11	6.3	2.1	0.1	0.7	9.2	8.3	15.4	17.5		60	53
11-21	6.5	3.1	0.1	0.7	10.4	7.3	14.7	17.7		71	59
21-33	6.7	4.1	0.1	0.6	11.5	6.9	15.8	18.4		73	62
33-42	7.8	5.1	0.1	0.5	13.5	6.5	17.4	20.0		78	68
42-50	9.2	5.9	0.2	0.6	15.9	6.1	19.7	22.0		81	72
50-68+	17.1	11.3	0.2	0.2	28.8	5.0	32.9	33.8		88	85
0-4	11.4	2.1	0.5	0.2	14.2	13.7	22.7	27.9		63	51

Depth (In.)	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Illite	Kaolin
	X-ray			
0-2			xx	x
2-4				
4-11				
11-21				
21-33				
33-42		xx	xx	x
42-50				
50-68	xxxx	x		x

1/ From characterization sample (5 kg).

2/ Composite of 20 subsamples taken in a 15x12' grid adjacent to the master pedon.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

JOSEPHINE CLAY LOAM (taxadjunct) 1/
S66Calif-47-1

Location: Siskiyou County, California. A pit located below Trestle Road, and west of Hilt, California. From Hilt travel the road along the W. Fork of Cottonwood Creek. Turn right (N.) on to Trestle Rd. Site is located 1250 feet north and 750 feet west of the Southeast corner of Sec. 20, T48N, R7W. Date of Sampling: May 17, 1966.
Description by: J. J. Newlun. Collectors: K. W. Flach and J. J. Newlun.
Classification: Ultic Haploxeralf, fine-loamy, mixed, mesic.
Vegetation: Near pure stand of Douglas Fir with some ponderosa pine, sugar pine, and incense cedar. Hazel brush and serviceberry plus a small amount of perennial grass and forbs make up about 3 percent of the vegetative cover. The canopy cover is about 85 percent. The area has been both logged and burned in the past. Climate: The average annual precipitation is approximately 30 inches with much of it in the form of snow. The average January temperature is 32°F., the average July temperature 70°F., and the mean annual temperature 50°F. Parent Material: Residium from the sedimentary rock of the Chico Formation. This soil has developed from the sandstone in this formation. The sandstone has formed from mixed rock sources that were dominantly basic. Topography: The site is located on 26 percent slope, east aspect in mountainous upland. Elevation: 3520 feet. Drainage: Well drained, moderately slow permeability and medium runoff. Soil Moisture: Soil was near field capacity at time of description. Moisture was the same throughout the profile.
Remarks: Reactions were determined by the Truog soil reaction test. The profiles S66Calif-47-4 and S66Calif-47-5 are paired profiles. S66Calif-47-2, S66Calif-47-3 are similar soils. This profile has an ochric epipedon and an argillic horizon. The soil varies primarily in depth and colors. It is dominantly deep (36-60") with an average depth of about 40 inches.

HORIZON	DESCRIPTION
O1 & O2	1½ to 0 inches, new partially decomposed organic debris from coniferous trees. Abrupt smooth boundary.
A11 RSL 66334	0 to 2 inches, dark brown (10YR 4/3) light clay loam, very dark brown (10YR 2/2) moist; moderate medium to fine platy breaking to moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many medium, fine and very fine roots; many random interstitial pores; strongly acid (pH 5.5); abrupt smooth boundary.
A12 RSL 66335	2 to 4 inches, dark brown (10YR 4/3) light clay loam, very dark brown (10YR 2/2) moist; moderate medium platy breaking to moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; many medium and fine and common very fine roots; common random interstitial and few tubular pores; strongly acid (pH 5.5); abrupt smooth boundary.
A3 RSL 66336	4 to 11 inches, reddish brown (5YR 5/4) heavy sandy clay loam, dark reddish brown (5YR 3/4) moist (ped faces and crushed); moderate medium subangular blocky structure; hard, friable, sticky and plastic; many coarse, medium and fine with few very fine roots; many fine tubular pores; few thin clay films on ped faces; strongly acid (pH 5.5); gradual wavy boundary.
B1t RSL 63337	11 to 21 inches, same as A3 except slightly darker (not a full chip) and has common thin clay films on ped faces and a clear wavy boundary.
B21t RSL 66338	21 to 33 inches, reddish brown (5YR 5/4) heavy silty clay loam, dark reddish brown (5YR 3/4) moist and rubbed and dark reddish brown (5YR 3/4), reddish brown (5YR 4/4) moist ped faces, (5YR 3/4) dominates; very weak medium prismatic structure breaking to moderate medium subangular blocky; very hard, friable, very sticky and very plastic; many coarse, medium and fine roots; common fine tubular pores; common thin clay films on ped faces and in pores; strongly acid (pH 5.2); gradual wavy boundary.
B22t RSL 66339	33 to 42 inches, reddish brown (5YR 5/4) heavy silty clay loam, dark reddish brown (5YR 3/4) moist and rubbed, dark reddish brown (5YR 3/4) and reddish brown (5YR 4/4) moist ped faces (5YR 3/4) dominates; very weak medium prismatic breaking to moderate medium subangular blocky structure; very hard, friable, very sticky and very plastic; many coarse, medium and fine roots; common fine tubular pores; common thin clay films on ped faces and in pores; strongly acid (pH 5.2); clear smooth boundary.
B3t RSL 66340	42 to 50 inches, reddish brown (5YR 5/4) silty clay loam, reddish brown (5YR 4/4) moist (ped faces and rubbed); weak medium prismatic breaking to moderate medium subangular blocky structure; very hard, friable, sticky and plastic; many medium and few fine roots; many medium and fine tubular pores; common moderately thick clay films on ped faces, many moderately thick clay films in pores; strongly acid (pH 5.2); abrupt smooth boundary.
C RSL 66341	50 to 68 inches, reddish yellow (5YR 6/6) heavy silty clay loam, moist ped face colors are brown (10YR 5/3) and strong brown (7.5YR 5/6), the rubbed moist color strong brown (7.5YR 5/6); weak medium subangular blocky to massive, retaining some rock structure; extremely hard, firm, sticky and very plastic; few medium and fine roots; many fine tubular pores; many moderately thick clay films on ped faces and in pores; slightly acid (pH 6.5); 5 to 10% coarse fragments (not included in sample). Many coarse distinct purplish black stains in seams and on rock fragment faces. Purplish black concretions up to ⅛" in diameter and also reddish (5YR 5/6) concretions. The concretions are irregular in shape and often occur in pockets or groups.

1/ The Josephine series is in a fine-loamy, mixed, mesic family of Typic Haploxerults. This pedon has greater than 35 percent base saturation in the lower argillic horizon.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Ultic Haploxeralf, fine-loamy, mixed, mesic
SOIL Josephine loam (taxadjunct) SOIL Nos. S66Calif-47-2 LOCATION Siskiyou County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 66343 - 66349

Depth (In.)	Horizon	1B1b Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05)	Total: Silt (0.05–0.002)	Total: Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int III (0.02–0.002)	Int II (0.2–0.02)	(2–0.1)			1/ Coarse fragments 1A2a: > 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76mm	
0-2	A11															5	5	-
2-9	A12															5	5	-
9-17	B21t															3	3	-
17-27	B22t															3	3	-
27-35	B3t															6	5	1
35-55+	C															45	28	17
0-4	A1 2/															4	4	-

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$		Bulk density: 4A1f 1/3 bar	4A1h Oven dry			Water content: 4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH: 8C1a H_2O 1:1		
	Pct	Pct		Pct.	Pct.		g/cc	g/cc	g/cc		Pct	Pct	Pct	in./in.	in./in.			
0-2	1.59	0.075	21									7.8			6.1		
2-9	0.78	0.055	14									8.8			5.9		
9-17	0.43	0.042	10									9.3			5.7		
17-27	0.26											10.6			5.7		
27-35	0.12											7.4			5.7		
35-55+	0.20											7.5			5.8		
0-4	1.29	0.060	21									8.2			6.2		

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	5A3a Sum		6G1d KCl Ext. Al^{+++}						Base saturation: 5C1 NH_4OAc	5C3 Sum
	meq/100 g															Pct.	Pct.
0-2	8.5	1.9	0.1	0.8	11.3	7.8	15.3	19.1								74	59
2-9	7.5	1.9	0.1	0.9	10.4	6.2	13.9	16.6								75	63
9-17	6.7	2.6	0.1	0.4	9.8	6.1	13.8	15.9								71	62
17-27	8.2	3.7	0.1	0.4	12.4	5.0	15.9	17.4								78	71
27-35	7.1	3.3	0.1	0.3	10.8	3.9	13.4	14.7								81	73
35-55+	10.2	4.8	0.2	0.3	15.5	3.6	18.3	19.1								85	81
0-4	8.8	2.0	0.2	0.2	11.2	6.3	15.7	17.5								71	64

Depth (In.)	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Mica	Kaolin
	X-ray			

1/ From characterization sample (5 kg).

2/ Composite of 20 subsamples taken in a 15x12' grid adjacent to the master pedon.

JOSEPHINE LOAM (taxadjunct) 1/
S66Calif-47-2

Location: Siskiyou County, California. Below Trestle Road, and west of Hilt, California. From Hilt travel west on the road along the West Fork of Cottonwood Creek, then turn right on to Trestle Road. Site is located 1375 feet north and 300 feet west of the SE corner of Sec. 20, T48N, R7W. Date of Sampling: May 16, 1966.
Description by: J. J. Newlun. Collectors: K. W. Flach, S. B. Johnson and J. J. Newlun.
Classification: Ultic Haploxeralf, fine-loamy, mixed, mesic.
Vegetation: In order of dominance--Ponderosa pine, black oak, Incense cedar, Douglas fir, and a few forbs and grasses. Tree canopy of about 40 to 50 percent is dominantly pine (70 percent). The area has been both logged and burned, probably more than once. Trees are vigorous and show good growth. Climate: Average annual precipitation is approximately 30 inches with much of it in the form of snow. The average January temperature is 32°F., the average July temperature 70°F., and the mean annual temperature 50°F. Parent Material: Residium from the sedimentary rock of the Chico Formation. This soil has developed from the sandstone in this formation. The sandstone is fairly fine grained and weathers to heavy sandy clay loam or silty clay loam in most cases. The sandstone has formed in mixed rock sediments that are dominantly basic. Topography: This site is located on mountainous upland. It is single convex with a west aspect, a 26 percent gradient and is midslope. Microrelief is negligible. Elevation: 3520 feet plus or minus 40 feet. Drainage: Well drained, moderately slow permeability, medium runoff. Soil Moisture: Moist throughout. The A horizons about 70 percent of field capacity; the B and C horizons at field capacity.
Remarks: Reactions determined by Truog soil reaction test. The soils have ochric epipedons and argillic horizons.

HORIZON	DESCRIPTION
O1 & O2	1 to 0 inch, fresh,and partially decomposed organic debris. Abrupt smooth boundary.
A11 RSL 66343	0 to 2 inches, brown (7.5YR 5/4) loam, dark brown (7.5YR 3/2) moist; weak medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; common fine tubular pores; medium acid (pH 5.8); abrupt smooth boundary.
A12 RSL 66344	2 to 9 inches, light brown (7.5YR 6/4) light clay loam, dark brown (7.5YR 3/2) moist and rubbed, with dark reddish brown (5YR 3/3) ped faces, moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and slightly plastic; many medium and fine roots; common fine tubular pores; common thin clay films in pores; strongly acid (pH 5.5); clear smooth boundary.
B21t RSL 66345	9 to 17 inches, reddish yellow (5YR 6/6) light silty clay loam, dark brown (7.5YR 3/4) moist and rubbed with 80 percent of ped faces brown (7.5YR 4/4) and 20 percent dark brown (7.5YR 3/2); moderate medium subangular blocky structure; hard, friable, sticky and plastic; many fine, medium and coarse roots; few fine tubular pores; few thin clay films on ped faces, many thin clay films in pores; strongly acid (pH 5.3); clear wavy boundary.
B22t RSL 66346	17 to 27 inches, reddish yellow (5YR 6/6) silty clay loam, reddish brown (5YR 4/4) moist, rubbed and ped faces; moderate medium subangular blocky structure; very hard, slightly firm, sticky and plastic; many fine, medium and coarse roots; many fine tubular pores; many thin and few moderately thick clay films on ped faces, and many moderately thick clay films in pores; very strongly acid (pH 5.0); clear wavy boundary.
B23t RSL 66347	27 to 35 inches, light brown (7.5YR 6/4) heavy sandy clay loam, dark brown (7.5YR 4/4) moist and rubbed with clay films reddish brown (5YR 4/4) moist; weak medium prismatic breaking to weak medium subangular blocky structure; very hard, friable, sticky and plastic; common fine and medium roots; common fine tubular pores; common moderately thick and thin clay films on ped faces and common moderately thick clay films in pores; strongly acid (pH 5.5); 5 percent purplish black stains and weak irregular concretions; 5 percent coarse fragments; (not included in sample); clear wavy boundary.
C1 RSL 66348	35 to 55 inches, strong brown (7.5YR 4/6) heavy sandy clay loam, same moist and rubbed; moist fracture planes have strong brown (7.5YR 5/6) 40 percent, dark brown (7.5YR 3/2) 20 percent, dark brown (7.5YR 4/4) clay films on 40 percent. Structure is mainly rock structure; very hard to extremely hard, friable, sticky and plastic; many medium and common fine roots; few fine tubular pores; common moderately thick and few thin clay films on fracture planes; medium acid (pH 6.0); common distinct purplish black stains; gradual wavy boundary.
C2	55 to 61 inches, strong brown (7.5YR 5/6) heavy sandy clay loam, dark brown (7.5YR 4/4) moist and rubbed, strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6) moist ped face colors; many distinct purplish black stains and/or irregular concretions; rock structure; extremely hard, very firm to friable, sticky and plastic; few medium roots; few fine tubular pores; many moderately thick clay films on ped faces, medium acid (pH 6.0).

1/ The Josephine series is in a fine-loamy, mixed, mesic family of Typic Haploxerults. This pedon has greater than 35 percent base saturation in the argillic horizon.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Ultic Haploxeralf, fine-loamy, mixed, mesic
SOIL Josephine loam (taxad.junct) SOIL Nos. S66Calif-47-3 LOCATION Siskiyou County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 66350 - 66351

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt (0.05–0.02)	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)			1/ Coarse fragments 1A2a ≥ 2 Pct.	2 – 19 Pct. of < 76mm	19 – 76 Pct. of < 76mm
		Pct. of < 2 mm																
0-4																14	14	-
17-26																7	7	-

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. Iron as Fe Pct.	6E1b Carbonate as $CaCO_3$ Pct.		Bulk density: 4A1f 1/3 bar g/cc	Bulk density: 4A1h Oven dry g/cc			Water content: Pct.	Water content: 4B1c 1/3 bar Pct.	Water content: 4B2 15 bar Pct	4D1 Extensibility COLE f in./in.	4D1 Extensibility COLE in./in.	pH: 8C1a H_2O 1:1		
0-4	1.80	0.074	24										6.1			6.6		
17-26	0.22												7.3			5.7		

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	Cation Exch. Capacity: 5A3a Sum		6G1d KCl Ext. Al^{+++}					Base saturation: 5C1 NH_4OAc Pct.	5C3 Sum Pct.
	meq/100 g															
0-4	6.7	1.0	0.1	0.6	8.4	4.3	13.0	12.7							65	66
17-26	4.6	1.2	0.1	0.9	6.8	4.5	9.6	11.3							71	60

Depth (In.)	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Mica	Kao-Hn.
	X-ray			

1/ From characterization sample (5 kg).

JOSEPHINE LOAM (taxadjunct) 1/
S66Calif-47-3

Location: Siskiyou County, California. A pit located below Trestle Road west of Hilt, California. From Hilt travel west along road adjacent to the West Fork Cottonwood Creek and turn right (north) on to Trestle Road. The site is located 2400 feet east and 1125 feet south of NW corner Sec. 28, T48N, R7W. Date of Sampling: May 17, 1966.
Description by: J. J. Newlun. Collectors: K. W. Flach, S. B. Johnson, J. J. Newlun.
Classification: Ultic Haploxeralf, fine-loamy, mixed, mesic.
Vegetation: In order of dominance: Douglas fir, black oak, ponderosa pine, sugar pine, Oregon grape, snowberry, vetch and a few grasses and other forbs. Tree canopy is about 75 percent. The area has been logged and burned in the past. The trees are small and growth is slow. Climate: The average annual precipitation is approximately 30 inches with much of it in the form of snow. The average January temperature is 32°F., the average July temperature is 70°F., and the mean annual temperature is 50°F. Parent Material: Residium from sedimentary rocks of the Chico Formation. This soil has developed in the sandstone in this formation. The sandstone is fairly fine grained and weathers to heavy sandy clay loams in most cases. The sandstone has formed from mixed rock sediments but is dominantly basic. Topography: The site is located on mountainous upland with a single convex slope, a southeast aspect, a 23 percent gradient and is about midslope. Microrelief is negligible. Elevation: 3300 feet plus or minus 40 feet. Drainage: Well drained, moderately slow permeability, medium runoff. Soil Moisture: Soil was about 50 percent of field capacity throughout the profile at the time it was described.
Remarks: Only two horizons were sampled of this profile--the A11 (0-4") and B2t (17-26"). This profile represents a variation in the Josephine soils. It has less strongly developed horizons than the modal series in this County. The soil is also less deep to the C horizon which has only rock structure. The soil has a paralithic contact at 39 inches. The soil has a lower site index for timber than other profiles sampled because of the aspect and rooting depth limitation.

HORIZON	DESCRIPTION
O1 & O2	1 to 0 inches, fresh and partially decomposed organic debris; abrupt smooth boundary.
A11 RSL 66350	0 to 4 inches, pale brown (10YR 6/3) loam, dark brown (10YR 3/3) moist; moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine, very fine and medium roots; medium acid (pH 5.8); 5 percent gravels; clear smooth boundary.
A3	4 to 10 inches, pale brown (10YR 6/3) loam, dark brown (7.5YR 4/4) moist both rubbed and ped faces; weak medium subangular blocky breaking to moderate fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; many fine very fine and medium roots; many very fine tubular pores; medium acid (pH 6.0); clear smooth boundary.
B1	10 to 17 inches, light brown (7.5YR 6/4) light sandy clay loam, dark brown (7.5YR 4/4) moist, rubbed and ped faces; very weak medium prismatic breaking to weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; many fine and medium roots; many fine tubular pores; common thin clay films in pores; medium acid (pH 5.7); clear wavy boundary.
B2t RSL 66351	17 to 26 inches, reddish yellow (5YR 6/6) sandy clay loam, reddish brown (5YR 4/4) moist and rubbed, moist ped faces yellowish red (5YR 4/6); weak medium prismatic breaking to moderate medium subangular blocky structure; very hard, friable, sticky and plastic; many medium and common fine roots; common thin clay films on ped faces and in pores; medium acid (pH 5.7); abrupt somewhat irregular boundary.
C1	26 to 39 inches, yellow (10YR 7/6) sandy clay loam; rock structure; extremely hard, firm, sticky and plastic; many fine, medium and coarse roots; few fine tubular pores; common moderately thick clay films on structural faces and in pores; medium acid (pH 5.8); abrupt smooth boundary. Sandy loam material in seams.
C2	39 to 48 inches, yellow (10YR 7/6) dry, sandy clay loam, rock structure; extremely hard, firm, sticky and plastic; few fine roots in seams; medium acid (pH 5.8).

1/ **The Josephine series is in a fine-loamy, mixed, mesic family of Typic Haploxerults. This pedon has greater than 35 percent base saturation in the argillic horizon.**

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Ultic Haploxeralf, fine-loamy, mixed, mesic

SOIL Josephine loam (taxadjunct) SOIL Nos. S66Calif-47-4 LOCATION Siskiyou County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 66352 - 66361

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Size class and particle diameter (mm) 3A1 Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Non-carbonate clay	1/ Coarse fragments 1A2a: ≥ 2	2 – 19	19 – 76
		Pct. of < 2 mm												Pct.	Pct.	Pct. of < 76mm	
0-2	A11	60.0	33.3	6.7	2.5	9.1	11.0	22.7	14.7	17.0	16.3	43.9	45.3	7	4	4	-
2-6	A12	61.2	31.0	7.8	2.5	9.0	11.3	22.3	16.1	14.8	16.2	43.1	45.1	8	4	4	-
6-10	A3	59.7	31.2	9.1	2.7	9.0	11.1	22.0	14.9	15.4	15.8	42.4	44.8	9	3	3	-
10-25	B1t	55.7	28.1	16.2	3.1	8.2	10.3	20.0	14.1	13.2	14.9	38.9	41.6	16	2	2	-
25-36	B21t	51.5	26.9	21.6	1.9	6.6	9.0	19.2	14.8	13.7	13.2	39.7	36.7	22	1	1	-
36-50	B22t	50.8	28.8	20.4	1.3	7.3	9.3	19.5	13.4	16.2	12.6	41.0	37.4	20	-	-	-
50-68	B23t	53.2	29.9	16.9	2.1	7.8	9.3	19.5	14.5	17.2	12.7	43.1	38.7	17	1	1	-
68-91	B3t	59.0	27.7	13.3	1.9	7.2	9.9	23.5	16.5	15.4	12.3	45.4	42.5	13	1	1	-
91-94+	C	72.2	22.1	5.7	1.3	13.5	16.0	26.9	14.5	11.2	10.9	40.2	57.7	6	-	-	-
0-6	A1 2/														4	4	-

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$		Bulk density 4A1f 1/3 bar	4A1h Oven dry		3B2 C'		Water content 4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH 8C1a H_2O 1:1		
	Pct.	Pct.		Pct.	Pct.		g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.	in./in.			
0-2	1.69	0.072	23				1.46	1.47		0.98		14.1	6.0	0.001	0.001	5.8		
2-6	0.68	0.043	16				1.52	1.52		0.98		12.9	5.3	0.001	0.001	5.7		
6-10	0.49	0.038	13				1.50	1.51		0.98		11.9	5.5	0.001	0.001	5.5		
10-25	0.20						1.60	1.62		0.99		12.5	8.2	0.003	0.003	5.6		
25-36	0.14						1.65	1.74		0.99		17.2	10.6	0.018	0.018	5.4		
36-50	0.12						1.66	1.77		1.00		17.7	10.6	0.021	0.021	5.4		
50-68	0.06						1.62	1.73		0.99		18.0	9.7	0.022	0.022	5.6		
68-91	0.12						1.59	1.66		0.99		14.7	8.6	0.014	0.014	5.8		
91-94+	0.29						1.82	1.87		1.00		13.6	5.9	0.010	0.010	5.9		
0-6	1.43	0.055	26										5.4			5.8		

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	5A3a Sum		6G1d KCl Ext. Al^{+++}						Base saturation: 5C1 NH_4OAc	5C3 Sum
	meq/100 g															Pct	Pct.
0-2	2.4	0.6	0.1	0.6	3.7	17.2	11.8	20.9		0.1						31	18
2-6	4.3	1.0	0.1	0.8	6.2	4.7	9.6	10.9		0.2						64	57
6-10	3.6	1.0	0.1	0.6	5.3	4.5	8.7	9.8		0.2						61	46
10-25	6.3	2.3	0.1	0.4	9.1	3.7	12.5	12.8		0.3						73	71
25-36	9.2	3.4	0.1	0.6	13.3	5.3	17.5	18.6		0.4						76	72
36-50	11.8	4.1	0.1	0.6	16.6	5.0	20.6	21.6		0.3						81	77
50-68	11.7	4.0	0.2	0.4	16.3	4.8	23.6	21.1		0.4						69	77
68-91	14.1	4.2	0.2	0.2	18.7	3.8	22.4	22.5		0.3						83	83
91-94+	9.0	2.2	0.3	0.1	11.6	2.8	13.1	14.4		0.2						89	81
0-6	4.2	1.2	0.2	0.1	5.7	5.9	11.0	11.6		0.1						52	49

Depth (In.)	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Illite	Kaolin	
	X-ray				
0-2			xx	t	
2-6					
6-10					
10-25					
25-36					
36-50		xxx		xx	
50-68					
68-91					
91-94+		xx		x	
0-6					

1/ From characterization sample (5 kg).

2/ Composite of 20 subsamples taken in a 15x12' grid adjacent to the master pedon.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

JOSEPHINE LOAM (taxadjunct) 1/
S66Calif-47-4

Location: Siskiyou County, California. Pit located above Trestle Rd. near its junction with the road following the West Fork of Cottonwood Creek, 1750 feet east and 1200 feet south of the NW corner of Sec. 34, T48N, R7W. Date of Sampling: May 18, 1966.
Description by: J. J. Newlun. Collectors: K. W. Flach, S. B. Johnson, L. Mann.
Classification: Ultic Haploxeralf, fine-loamy, mixed, mesic.
Vegetation: In order of dominance: Ponderosa pine, sugar pine, black oak, white oak, Douglas fir, Incense cedar and various grasses and forbs. Very little understory vegetation. This is a fully stocked stand of trees which show good growth rate. Canopy is approximately 65 percent. The area has been logged and burned in the past. Climate: Average annual precipitation approximately 22 inches with much of it in the form of snow. Average January temperature 33°F., average July temperature 71°F., and mean annual temperature 51°F.
Parent Material: Residium from sedimentary rock of Chico Formation. This soil has developed from the sandstone of this formation. The sandstone is fairly fine textured and weathers to heavy sandy clay loam or silty clay loam in most cases. Sandstone has formed from mixed rock sources that were dominantly basic. Topography: The site is located on the upland foothills of the Klamath Mountains. Slope is single convex with a gradient of 16 percent and a north aspect. No significant microrelief is present. Elevation: 3040 feet plus or minus 40 feet. Drainage: Well drained, moderately slow permeability, medium runoff. Soil Moisture: About 75 percent of field capacity in A horizons and approximately 100 percent in B and C horizons.
Remarks: Site is representative of the soils developed at near minimum precipitation for this series. It was originally thought to be a member of the Parrish series but was correlated Josephine at the field level. Soil reaction determined by Truog soil reaction test. Profile has an ochric epipedon and an argillic horizon. Soil varies primarily in depth and colors. They are dominantly deep (36-60") with an average depth of about 40 inches. There may be a few quartzite gravels and cobbles throughout the profile.

HORIZON	DESCRIPTION
O1 & O2	1 to 0 inches, new and partially decomposed organic debris; abrupt smooth boundary.
A11 RSL 66352	0 to 2 inches, brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist and rubbed, moist ped faces are dark brown (10YR 3/3); weak fine granular structure; slightly hard, friable, slightly sticky and nonplastic; many fine and very fine and common medium roots; many random interstitial and common fine tubular pores; strongly acid (pH 5.5); abrupt smooth boundary.
A12 RSL 66353	2 to 6 inches, light brown (7.5YR 6/4) loam, dark brown (10YR 3/3) moist and rubbed, moist ped faces are dark brown (7.5YR 3/4); massive, appears to have traffic compaction; slightly hard, friable, slightly sticky and nonplastic; many fine and medium roots; common very fine and few fine tubular pores; strongly acid (pH 5.3); abrupt smooth boundary.
A3 RSL 66354	6 to 10 inches, light brown (7.5YR 6/4) loam, dark brown (10YR 3/3) moist and rubbed, ped faces moist are dark brown (7.5YR 3/4); weak medium subangular blocky to massive; slightly hard, friable, slightly sticky and slightly plastic; common fine and medium roots; many random interstitial and few fine tubular pores; few thin clay films in pores; strongly acid (pH 5.3); clear smooth boundary.
B1t RSL 66355	10 to 25 inches, light yellowish brown (10YR 6/4) heavy sandy clay loam or silty clay loam, dark brown (7.5YR 4/4) moist and rubbed, moist ped faces are dark yellowish brown (10YR 4/4); very weak medium prismatic breaking to weak medium subangular blocky structure; hard, friable, sticky and plastic; common fine, medium and coarse roots; many very fine and fine tubular pores; common thick and moderately thick clay films in pores; few thin clay films on ped faces; strongly acid (pH 5.3); clear smooth boundary.
B21t RSL 66356	25 to 36 inches, reddish yellow (7.5YR 6/6) heavy silty clay loam, dark yellowish brown (10YR 4/4) moist and rubbed with (10YR 4/4) and yellowish brown (10YR 5/4) moist ped faces; weak medium prismatic breaking to moderate medium subangular blocky structure; very hard, slightly firm, sticky and very plastic; many medium and coarse and common fine roots; common fine tubular pores; common thick and many moderately thick clay films on ped faces and in pores; strongly acid (pH 5.5); gradual wavy boundary.
B22t RSL 66357	36 to 50 inches, yellowish brown (10YR 5/6) silty clay loam, dark yellowish brown (10YR 4/4) moist, rubbed and ped faces; moderate medium subangular blocky structure; very hard, slightly firm, sticky and plastic; many medium and common fine roots; many fine tubular pores; many moderately thick clay films in pores and on ped faces and common thick films in pores; strongly acid (pH 5.5); gradual wavy boundary.
B23t RSL 66358	50 to 68 inches, same colors, structure, consistence, roots, and clay films as B22t. Texture is a light silty clay loam, medium acid (pH 5.8); and boundary clear and wavy. Few fine but distinct purplish black stains.
B3 RSL 66359	68 to 91 inches, yellowish brown (10YR 5/4) light loam, dark yellowish brown (10YR 4/4) moist rubbed and on ped faces; rock structure to massive; very hard, slightly firm, slightly sticky and nonplastic; few fine and common medium roots; many fine tubular and interstitial pores; very few thin clay films causing some bridging of sand grains; medium acid (pH 6.0); abrupt smooth boundary. Few distinct purplish black stains.
C RSL 66360	91 to 94 inches, essentially well weathered sandstone that is only slightly firm moist and very hard dry; common medium roots; few thin clay films on structural faces; medium acid (pH 5.8).

1/ The Josephine series is in a fine-loamy, mixed, mesic family of Typic Haploxerults. This pedon has a base saturation greater than 35 percent in the argillic horizon.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Ultic Haploxeralf, fine-loamy, mixed, mesic
SOIL Josephine loam (taxad.junct) SOIL Nos. S66Calif-47-5 LOCATION Siskiyou County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 66362 - 66370

Depth (In)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt (0.05–0.02)	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)			1/ Coarse fragments 1A2a ≥ 2 Pct.	2 – 19 Pct. of < 76mm	19 – 76 Pct. of < 76mm
		Pct. of < 2 mm																
0-2	A11															5	5	-
2-6	A12															4	4	-
6-18	A3															3	3	-
18-35	B1t															2	2	-
35-52	B21t															1	1	-
52-67	B22t															1	1	-
67-84	B31t															-	-	-
84-91+	B32t															1	1	-
0-6	A1 2/															7	7	-

Depth (In.)	6A1a Organic carbon Pct	6B1a Nitrogen Pct.	C/N	6C2a Ext. Iron as Fe Pct.	6E1b Carbonate as $CaCO_3$ Pct.		Bulk density: 4A1f 1/3 bar g/cc	4A1h Oven dry g/cc			Water content: Pct.	4B1c 1/3 bar Pct.	4B2 15 bar Pct.	4D1 Extensibility COLEF in./in.	4D1 Extensibility COLE in./in.	pH: 8C1a H_2O 1:1		
0-2	2.10	0.071	30										7.4			6.1		
2-6	2.43	0.065	37										7.3			6.0		
6-18	0.49	0.032	15										7.1			5.9		
18-35	0.27												8.0			5.7		
35-52	0.18												8.3			5.8		
52-67	0.12												8.2			5.8		
67-84	0.13												8.0			5.9		
84-91+	0.11												9.0			5.8		
0-6	2.19	0.083	26										7.3			6.2		

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	5A3a Sum		6G1d KCl Ext. Al^{+++}						Base saturation: 5C1 NH_4OAc Pct	5C3 Sum Pct.
	meq/100 g																
0-2	7.3	1.3	0.1	0.8	9.5	7.2	13.4	16.7								71	57
2-6	6.9	1.3	0.1	0.8	9.1	7.0	12.8	16.1								71	57
6-18	4.2	1.3	0.1	0.6	6.2	4.7	8.7	10.9								71	57
18-35	4.2	1.7	0.1	0.4	6.4	3.7	9.1	10.1								70	63
35-52	5.0	2.0	0.1	0.3	7.4	3.7	10.1	11.1								73	67
52-67	4.6	2.0	0.1	0.3	7.0	3.6	9.3	10.6								75	66
67-84	4.5	2.0	0.1	0.3	6.9	3.4	9.4	10.3								73	67
84-91+	5.7	2.5	0.2	0.2	8.6	3.4	10.7	12.0								80	72
0-6	8.5	1.3	0.1	0.7	10.6	7.8	13.9	18.4								76	58

Depth (In.)	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Mica	Kaolin
	X-ray			

1/ From characterization sample (5 kg).

2/ Composite of 20 subsamples taken in a 15x12' grid adjacent to the master pedon.

JOSEPHINE LOAM (taxadjunct) 1/
S66Calif-47-5

Location: Siskiyou County, California, below Trestle Road, west of Hilt, California. From Hilt, travel the road along the west fork of Cottonwood Creek to Trestle Road, then turn right onto it. Site is 2000 feet east and 1700 feet south of the NW corner, Sec. 27, T48N, R7W. Date of Sampling: May 18, 1966.
Description by: J. J. Newlun. Collectors: K. W. Flach, S. B. Johnson, and L. Mann.
Classification: Ultic Haploxeralf, fine-loamy, mixed, mesic.
Vegetation: In order of dominance: Ponderosa pine, Douglas fir, black oak and a few forbs and grasses. The tree canopy is about 80 percent. Very little understory vegetation. Trees show good growth rate and size. Site area has been burned and logged in the past.
Climate: Average annual precipitation is approximately 22 inches with much of it in the form of snow. Average January temperature is 33°F., average July temperature 71°F., and mean annual temperature 51°F. Parent Material: Residium from sedimentary rock of the Chico Formation. Soil has developed from the sandstone in this formation. The sandstone is fairly fine textured and weathers to heavy sandy clay loams or silty clay loams. The sandstone has formed in sediments from mixed rock sediments that were dominantly basic. Topography: The site is located on a mountain foothill. The slope is single convex, 23 percent gradient, and aspect is 25° east of north. Elevation: 3040 feet plus or minus 40 feet. Drainage: Well drained, moderately slow permeability and medium runoff. Soil Moisture: Soil moisture was about 50 percent of field capacity throughout the profile.
Remarks: Soil reactions determined by Truog soil reaction test. Profile has an ochric epipedon and an argillic horizon. The soils are dominantly deep (36-60") with an average depth of about 40 inches. There are few quartzite gravels throughout the profile.

HORIZON	DESCRIPTION
O1 & O2	1 to 0 inch, new and partially decomposed organic debris. Abrupt smooth boundary.
A11 RSL 66362	0 to 2 inches, brown (7.5YR 5/4) loam, dark brown (7.5YR 3/2) moist; weak medium platy structure; slightly hard, very friable, slightly sticky and nonplastic; many fine and very fine roots; many very fine and fine tubular pores; medium acid (pH 5.8); abrupt smooth boundary.
A12 RSL 66363	2 to 6 inches, light reddish brown (5YR 6/4) heavy loam, dark reddish brown (2.5YR 3/4) moist and rubbed, with dark reddish brown (5YR 3/4) moist ped faces; massive; slightly hard, friable, slightly sticky and slightly plastic; common fine and medium roots; many very fine and common fine tubular pores; medium acid (pH 5.8); abrupt smooth boundary.
A3 RSL 66364	6 to 18 inches, light reddish brown (5YR 6/4) heavy clay loam, dark reddish brown (5YR 3/3) moist and rubbed, with moist reddish brown (5YR 4/4) ped faces; moderate medium subangular blocky structure; hard, friable, sticky and plastic; many medium and common fine roots; common fine and very fine tubular pores; few thin clay films in pores and on ped faces; medium acid (pH 6.0); clear smooth boundary.
B1t RSL 66365	18 to 35 inches, reddish brown (5YR 5/4) heavy sandy clay loam, reddish brown (5YR 4/4) moist and rubbed with 60 percent yellowish red (5YR 4/6) and 30 percent dark reddish brown (5YR 3/4) on moist ped faces; weak medium prismatic structure breaking to moderate medium subangular blocky; hard, friable, sticky and very plastic; many medium and common fine roots; many fine tubular pores; few thin clay films in pores and on ped faces; strongly acid (pH 5.5); gradual wavy boundary. Clay films in this horizon occur mainly in pockets of peds.
B21t RSL 66366	35 to 52 inches, same colors as B1t, sandy clay loam; weak medium prismatic structure breaking to moderate medium subangular blocky; very hard, slightly firm, sticky and very plastic; many medium and coarse and common fine roots; many very fine, fine and medium tubular pores; few moderately thick clay films in pores; strongly acid (pH 5.5); clear irregular boundary. A few purplish black stains and concretions are present throughout the horizon.
B22t RSL 66367	52 to 67 inches, same colors as B1t, sandy clay loam; weak medium prismatic structure breaking to moderate medium subangular blocky; very hard, slightly firm, sticky and plastic; few fine roots; many fine, very fine and medium tubular pores; few thin clay films in pores; strongly acid (pH 5.5); gradual wavy boundary. Some purplish black stains and shot-like to irregular shaped concretions throughout horizon.
B31 RSL 66368	67 to 84 inches, same colors as B1t, heavy sandy loam; massive; very hard, slightly firm; common fine and medium roots; many very fine interstitial and common fine tubular pores; few thin and moderately thick clay films in pores; strongly acid (pH 5.5); abrupt wavy boundary.
B32 RSL 66369	84 to 91 inches, light reddish brown (5YR 6/4) heavy sandy loam, dark brown (7.5YR 4/4) moist and rubbed with yellowish red (5YR 4/6) moist ped faces; massive; very hard, slightly firm, sticky and plastic; common medium roots; common fine tubular and many very fine interstitial pores; few thin and moderately thick clay films in pores; strongly acid (pH 5.5); this horizon retains structure and fabric of the original rock.

1/ **The Josephine series is in a fine-loamy, mixed, mesic family of Typic Haploxerults. This pedon has a base saturation greater than 35 percent in the argillic horizon.**

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Mariposa gravelly silt loam (taxadjunct) **LOCATION** Amador County, California

SOIL FAMILY: Ultic Haploxeralf, fine-loamy, mixed, mesic

SOIL NOS. S60Calif-3-26 **LAB. NOS.** 60114 - 60119

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0- 1	A11	7.5*	11.5*	4.1	8.1	5.6	54.1	9.1	29.0	35.5	34	sil
1- 5	A12	5.8*	10.3*	3.7	7.3	5.6	55.3	12.0	27.5	37.7	30	sil
5-10	B1t	4.1*	10.1*	3.9	7.1	5.4	54.8	14.6	25.2	39.1	25	sil
10-16	B21t	4.9*	8.9*	3.3	6.1	4.8	54.9	17.1	23.7	39.6	40	sil
16-22	B22t	2.1	3.8	1.8	1.6	3.8	65.7	21.2	13.4	56.4	6	sil
22-36+	R	Rock										

8C1a pH H_2O 1:1	8C1c pH KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	4A3a Bulk Density g/cc	$CaCO_3$ equivalent %	6C1b "Free" Fe_2O_3 %	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
5.8	4.8	6.87	0.284	24.2				2.9			11.0
5.7	4.5	1.81	0.104	17.4		1.4		3.5			7.8
5.6	4.4	1.51	0.099	15.3		1.33		3.4			8.4
5.5	4.3	1.02	0.089	11.4		1.4		3.6			9.0
5.1	3.9	0.23						4.2			10.3

5A2a CATION EXCHANGE CAPACITY (+(Na)	EXTRACTABLE CATIONS 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K	5B1a BASE SAT. % SC3	5A3a Sum of Cations meq/100g. soil	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →							
32.0	12.6	2.8	17.6	0.2	1.0	49	34.2	
15.4	4.7	1.2	8.9	0.1	0.6	43	15.5	
14.4	3.8	1.6	9.0	0.1	0.5	40	15.0	
13.8	3.3	2.3	7.8	0.1	0.4	44	13.9	
12.5	1.1	3.2	7.4	0.1	0.1	38	11.9	

Many iron and manganese concretions in these fractions.

1/ Percent of the whole soil

MARIPOSA GRAVELLY SILT LOAM (taxadjunct) 1/
S60Calif-3-26

Location: 0.2 mile NW of the S1/4 corner of sec. 36, T. 8 N., R. 12 E., 300 feet W of Markley Mine Road Junction with the Fiddletown-Silver Lake Road, 150 feet S of the Fiddletown-Silver Lake Road, Amador County, California.
Date of Sampling: May 6, 1960
Collectors: Grant Kennedy, Reuben Nelson, Robert Sketchley, Clifford Henry, Paul Nazar, Jack McClelland Description by: Grant Kennedy.
Vegetation: Manzanita locally with black oak, mountain misery, and ponderosa pine
Climate: Mean annual precipitation - 38 inches; average temperatures (Tiger Creek Station): January - 40° F.; July - 70° F.; mean annual 55° F.
Parent Material: Calaveras schists and slates with vertical cleavage
Relief: Sloping uplands near a ridge crest, on a south-facing slope of 10 percent
Elevation: 2,960 feet
Drainage: Well drained; moderate runoff; moderate permeability
Remarks: This is a weakly developed Red-Yellow Podzolic soil. Many krotovena are evident. A few rock outcrops occur nearby. Roots are mainly horizontal. About 20 percent gravel was present to 16 inches. The soil was moist when described.
Classification: Ultic Haploxeralf, fine-loamy, mixed, mesic.

HORIZON		DESCRIPTION
01 & 02 NOT sampled	1- 0"	Mainly loose leaf litter, the lower part being partly decomposed.
A11 RSL No. 60114	0- 1"	Yellowish brown (9YR 5/4) gravelly loam, dark brown (7.5YR 3/4) when moist although upper 1/4" is very dark gray (N 3/) moist; massive; soft; friable, slightly sticky and slightly plastic; abundant very fine roots; many very fine interstitial and tubular pores; strongly acid (pH 5.5); abrupt smooth boundary.
A12 RSL No. 60115	1- 5"	Yellowish brown (9YR 5.5/4) gravelly silt loam near loam, dark brown (7.5YR 3/4) when moist; weak fine subangular blocky structure; soft, friable, slightly sticky and slightly plastic; abundant very fine, few fine and medium roots; many very fine interstitial and tubular, few fine and occasional medium pores; strongly acid (pH 5.5); clear smooth boundary.
B1t RSL No. 60116	5-10"	Light yellowish brown (9YR 6/4) gravelly silt loam near loam, dark brown (7.5YR 3/4) when moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; roots and pores as above; few thin discontinuous clay films in pores; strongly acid (pH 5.2); clear smooth boundary.
B21t RSL No. 60117	10-16"	Similar to above except gravelly clay loam; sticky and plastic; thin continuous clay films in pores; very strongly acid (pH 5.0); abrupt irregular boundary.
B22t RSL No. 60118	16-22"	Light yellowish brown (10YR 6/4) silty clay loam between stones and rock (80 percent), brown (7.5YR 4/4) when moist; massive; slightly hard, firm, sticky and plastic; occasional root; common very fine tubular pores; thin continuous clay films in pores; very strongly acid (pH 4.8); abrupt irregular boundary.
R RSL No. 60119	22-36"+	Dark gray (N 4/) hard, nearly vertical, platy metamorphosed rock which is extremely hard and has yellowish red (5YR 5/6) coatings on fracture planes, very dark gray and reddish brown (N 3/ and 5YR 4/4) when moist; very strongly acid (pH 5.0) - ground rock.

NOTE: The A11 is a mixture of decomposing organic matter with the upper A1 and is black on top grading into the A12. The R in this pit is as shallow as 8" and as deep as 36" and protrudes irregularly, particularly into the B22t horizon.

1/ Mariposa is in a fine-loamy, mixed, mesic family of Ruptic-Lithic-Xerochreptic Haploxerults. This pedon has a continuous argillic horizon with a base saturation of greater than 35 percent throughout and no lithic contact within 20 inches.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Musick sandy loam **LOCATION** Amador County, California

SOIL FAMILY: Ultic Haploxeralf, fine-loamy, mixed, mesic

SOIL NOS. 59Calif-3-13 **LAB. NOS.** 59325 - 59331

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
2-0	A_{oo} & A_o	Not sampled										
0-9	A_1	4.7	15.0	11.1	18.3	9.6	26.8	14.5	32.0	14.8	3	sl
9-20	A_3	3.5	14.0	9.9	17.2	10.3	27.6	17.5	32.2	15.3	0	fsl
20-27	B_1	4.2	14.3	8.2	14.5	7.8	23.9	27.1	26.0	13.7	0	scl
27-39	B_{21}	3.5	13.5	8.0	15.7	7.6	16.0	35.7	24.9	7.6	0	sc-scl
39-58	B_{22}	5.4	15.3	9.0	18.6	9.0	19.8	22.9	29.9	9.7	0	scl
58-78	B_{23}	5.6	10.9	5.9	13.1	8.2	24.3	32.0	27.2	13.2	0	cl
78-100+	B_3	11.8	18.6	8.9	19.2	10.4	21.3	9.8	33.4	9.4	0	cosl

pH		ORGANIC MATTER			6C1b	ELECTRICAL CONDUCTIVITY		Bulk	MOISTURE TENSIONS		
8C1a H_2O 1:1	8C1c KCl 1:1	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	"Free" Fe_2O_3 %	EC×10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	Density 4A3a g/cc	1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
5.8	4.6	3.92	0.152	25.8	2.2			1.09			10.0
5.9	4.7	0.50	0.032	15.6	2.9			1.22			8.9
5.8	4.9	0.27	0.019	14.2	4.3			1.36			12.9
6.0	5.5	0.12			5.7			1.43			16.2
5.8	5.2	0.08			4.3			1.54			12.7
5.6	5.1	0.13			5.4			1.30			17.0
5.4	4.2	0.04			3.5			1.31			8.7

5A2a	EXTRACTABLE CATIONS				5B1a	BASE SAT. % 5C3	Clay mineralogy (<0.002 mm.)					
CATION EXCHANGE CAPACITY ← Na →	6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K		Mont. ←	Verm. X-ray	Mixed layer Mica-Verm. 7A2	Mica →	% Kaolin DTA 7A3	% Gibb. DTA 7A3
	milliequivalents per 100g. soil →											
23.4	5.8	1.8	14.8	0.2	0.8	37	-	xx	x	-	26	5
11.1	2.7	1.1	5.6	0.1	0.8	46						
11.7	3.0	1.3	5.6	0.2	0.9	49						
11.7	3.3	1.3	4.5	0.1	0.8	55						
10.4	1.9	1.0	4.2	0.1	0.8	48	-	-	x	-	40	5
12.0	2.0	1.4	5.6	0.2	0.8	44						
8.6	0.7	0.6	3.8	<0.1	0.3	30	-	-	x	-	30	tr

1/ Percent of the whole soil

- = looked for but not found
tr = detected, very small amounts
x = detected, small amounts
xx = moderate amounts
xxx = large amounts
xxxx = predominant amounts

MUSICK SANDY LOAM
S59Calif-3-13

Collectors: Grant Kennedy, Reuben Nelson, Bob Sketchley.
Date of Sampling: June 18, 1959. Description by: Grant Kennedy.
Location: Amador County, Calif., 1/2 mile south of the junction of Highway 88, and Westpoint Road in the NE1/4 of the NW1/4 of Section 1, T6N, R12E. (Stout Realty lot 6, subdivision next to the McFadden fence.)
Elevation: 2,680 feet.
Relief: Sloping uplands on a convex slope of 12 percent facing north.
Drainage: Well drained; slow runoff; moderate permeability.
Parent Material: Granodiorite.
Climate: Mean annual rainfall - 34 inches.
Vegetation: Ponderosa pine, black and live oak, blue wild rye.
Remarks: This is a medial developed Reddish-Brown Lateritic soil which in some areas includes small areas with a weakly developed A_2 horizon (Red-Yellow Podzolic?). The profile is micaceous throughout, particularly below the B_1. Samples were obtained for the Bureau of Public Roads of the following horizons: 9-20", 39-58", 78-100", the A_3, B_{22}, and B_3 horizons respectively.
Classification: Ultic Haploxeralf, fine-loamy, mixed, mesic.

HORIZON		DESCRIPTION
$A_{oo}A_o$ Not sampled	2-0"	Fresh litter of pine needles and leaves, becoming partially decomposed in the lower portion.
A_1	0-9"	Brown (7.5YR 4/4) sandy loam, dark brown (7.5YR 3/4) when moist; moderate fine and very fine granular structure; soft although slightly hard in upper 4 inches when dry, friable when moist; abundant very fine, fine, few medium and coarse roots; many very fine, fine, medium, and coarse pores; few very fine and fine shot (essentially nonmagnetic); medium acid, pH 5.8; clear, smooth lower boundary.
A_3	9-20"	Yellowish red (5YR 5/6) fine sandy loam, reddish brown (5YR 4/4) when moist; massive; slightly hard when dry, friable when moist, slightly plastic and nonsticky when wet; roots and pores as above; thin discontinuous clay films in pores; few very fine shot; medium acid, pH 5.9; gradual, smooth lower boundary.
B_1	20-27"	Yellowish red (5YR 5/6) sandy clay loam, yellowish red (5YR 3/6) when moist; similar to above except clay films are thin and continuous in pores; gradual, smooth lower boundary.
B_{21}	27-39"	Yellowish red (5YR 5/8) sandy clay near sandy clay loam, dark red (2.5YR 3/8) when moist; massive; hard when dry, firm when moist, slightly plastic, slightly sticky when wet; plentiful very fine, fine and medium, few coarse roots; many very fine, fine and medium, few coarse pores; moderately thick continuous clay films in pores and bridges; moderately thick in some pores; medium acid, pH 6.0; gradual, smooth lower boundary
B_{22}	39-58"	Yellowish red (5YR 4/8) sandy clay loam, dark red (2.5YR 3/6) when moist; similar to above horizon except fewer roots and pores are present, clay films are thinner, and the pH is 5.8; gradual, smooth lower boundary.
B_{23}	58-78"	Light red (2.5YR 6/8) clay loam, red (2.5YR 4/8) when moist; massive; slightly hard when dry, firm when moist, slightly plastic and slightly sticky when wet; few very fine, fine, and medium roots; many very fine and fine, few medium and coarse pores; thin continuous clay films in pores and bridges, moderately thick in some pores; medium acid, pH 5.6; gradual, smooth lower boundary.
B_3	78-100"+	Reddish yellow (5YR 7/8) coarse sandy loam, red (2.5 R 5/8) when moist; massive; soft when dry, firm when moist, slightly plastic and nonsticky when wet; few very fine to medium roots and pores; thin, continuous clay films in most pores; strongly acid, pH 5.4.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Musick loam **LOCATION** Amador County, California

SOIL FAMILY: Ultic Haploxeralf, fine-loamy, mixed, mesic

SOIL NOS. 59Calif-3-14 **LAB. NOS.** 59332 - 59339

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0-14	A_p	2.3	7.5	7.2	19.5	13.6	32.5	17.4	40.9	17.3	0	l
14-23	B_1	2.0	6.3	5.9	16.9	12.9	32.2	23.8	36.4	19.4	1	l
23-29	B_{21}	0.4	2.5	4.0	12.3	9.5	31.7	39.6	28.3	21.2	0	cl-c
29-47	B_{22}	1.4	7.3	5.1	11.9	8.7	31.0	34.6	27.1	20.3	0	cl
47-60	B_{31}	6.7	16.7	7.9	17.2	10.9	22.4	18.2	32.4	11.6	0	sl
60-74	B_{32}	5.8	20.2	9.5	17.5	10.6	21.7	14.7	32.1	10.7	0	cosl
74-97	C_1	3.2	16.4	8.2	17.1	10.8	25.8	18.5	32.5	14.8	0	fsl
97+	D_r	Weathered granodiorite										

pH 8C1a H_2O 1:1	pH 8C1c KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6C1b "Free" Fe_2O_3 %	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	Bulk Density 4A3a g/cc	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
6.0	4.8	3.69	0.143	25.8	4.2			1.00			12.2
5.7	4.5	0.82	0.043	19.1	5.2			1.31			13.2
5.5	4.9	0.45	0.026	17.3	8.3			1.31			19.4
5.5	5.0	0.22	0.014		7.3			1.40			17.8
5.6	4.4	0.08			2.5			1.47			10.2
5.5	4.3	0.03			1.7						10.4
5.4	4.0	0.08			3.5			1.47			12.8

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	5B1a 6Q2a K	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE Na	K	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →		
21.9	6.5	1.5	13.4	0.1	0.7	40			
12.1	2.9	1.4	6.8	<0.1	0.6	42			
11.7	2.5	1.7	5.2	<0.1	0.8	49			
10.6	2.3	2.1	4.3	<0.1	0.7	54			
6.7	1.1	1.1	2.6	<0.1	0.5	51			
7.0	1.0	1.0	2.9	0.1	0.7	49			
9.9	1.0	1.1	5.1	0.2	0.6	36			

1/ Percent of the whole soil

MUSICK LOAM
S59Calif-3-14

Collectors: Grant Kennedy, Reuben Nelson, Bob Sketchley.
Date of Sampling: June 18, 1959. Description by: Grant Kennedy.
Location: Amador Co., California in the SE1/4 of the SE1/4 of Section 19, T7N, R13E, 1/4 mile NE of Pioneer, follow black top across from the Post Office for 1/4 mile, then turn left on Schafer Road for 1/4 mile.
Elevation: 2,960 feet.
Relief: Steep uplands just below a ridgetop on a convex slope of 20 percent facing NNE.
Drainage: Well drained; slow runoff; moderate permeability.
Parent Material: Granodiorite.
Climate: Mean annual rainfall 37".
Vegetation: Ponderosa pine, incense cedar, black oak, madrona, sweet birch, mountain misery, ripgut, lupine.
Remarks: This is a medial Reddish Brown Lateritic soil, containing a few cobbles in the profile. In this area a few rock outcrops occur. The site has been cultivated in the past. Samples were obtained for the Bureau of Public Roads of the following horizons: 0-14", 29-47" and 74-97" (A_p, B_{22}, and C_1 horizons).
Classification: Ultic Haploxeralf, fine-loamy, mixed, mesic.

HORIZON		DESCRIPTION
A_p	0-14"	Reddish brown (5YR 4/4) loam, dark reddish brown (5YR 3/4) when moist; moderate very fine and fine granular structure; soft when dry, friable when moist; abundant very fine, fine and medium, plentiful coarse roots; many very fine, fine and medium, common coarse pores; common very fine and fine shot (now magnetic); medium acid, pH 6.0; gradual wavy lower boundary.
B_1	14-23"	Yellowish red (5YR 4/6) heavy loam, dark red (2.5YR 3/6) when moist; massive; slightly hard when dry, friable when moist, slightly plastic and nonsticky when wet; roots and pores as in horizon above; few thin discontinuous clay films, mainly in pores; medium acid, pH 5.7; clear, smooth lower boundary.
B_{21}	23-29"	Red (2.5YR 4/8) heavy clay loam, dark red (2.5YR 3/8) when moist; massive; hard when dry, firm when moist, plastic and sticky when wet; common very fine, fine, and medium roots, few coarse; many very fine and fine, occasional medium and coarse roots; many moderately thick continuous clay films in pores and in bridges; strongly acid, pH 5.5; gradual, smooth lower boundary.
B_{22}	29-47"	Similar to above except moist color is red (10R 4/6); gradual smooth lower boundary.
B_{31}	47-60"	Light red (2.5YR 6/8) sandy loam, red (2.5YR 4/8) when moist; massive; slightly hard when dry, friable when moist; slightly sticky and nonplastic when wet; few roots; common very fine, fine, and medium pores; few discontinuous clay films in pores and in bridges; medium acid, pH 5.6; diffuse lower boundary.
B_{32}	60-74"	Similar to above but coarse sandy loam texture and pH 5.5; clear, irregular lower boundary.
C_1	74-97"	Reddish yellow (5YR 6/6) fine sandy loam with light red (2.5YR 6/8) staining on fracture planes, red and dark red (2.5YR 4/8 & 3/8) when moist; massive; slightly hard when dry, friable when moist; few roots; many very fine and fine pores; strongly acid, pH 5.4; abrupt irregular lower boundary.
D_r	97"+	Speckled white, reddish yellow, and very dark gray weathered granodiorite with reddish yellow (5YR 6/8) stains, red (2.5YR 4/8) when moist; rock structure visible in place but this horizon crumbles into fine subangular blocks when disturbed.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Boomer loam (taxadjunct) **LOCATION** El Dorado County, California

SOIL FAMILY: Ultic Haploxeralf, fine-loamy, mixed, thermic.

SOIL NOS. S61Calif-9-3 **LAB. NOS.** 6193 - 6198

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0- 5	A1	6.9	14.1	5.7	9.0	5.1	39.4	19.8	23.0	26.5	26	l
5-13	A3	5.0	11.8	4.9	8.5	5.4	39.5	24.9	22.4	27.4	21	l
13-24	B21t	5.1	13.5	5.1	7.6	4.3	31.4	33.0	18.4	21.4	31	cl
24-37	B22t	10.7	22.7	6.2	7.9	3.9	20.2	28.4	14.8	13.6	40	scl
37-52	B31	19.6	21.0	4.9	5.3	2.8	20.4	26.0	10.6	15.4	64	scl
52-63+	B32 & R	25.7	19.1	4.4	4.6	2.9	21.1	22.2	10.8	15.7	81	scl

pH		Organic Matter			6C1b Free Fe_2O_3	4A3a Bulk Den.	4B2 Soil water 15 atmos.
8C1b Saturated Paste 1:1	8C1c KCl 1:1	6A1a Organic Carbon Pct.	6B1a Nitrogen Pct.	C/N	%	gm/cc	Pct.
6.6	5.4	2.52	0.137	18.4	7.6	1.28	12.8
6.2	4.7	0.99	0.056	17.7	8.5	1.37	13.2
5.9	4.4	0.60	0.036	16.7	8.7	1.47	16.8
5.8	4.0	0.26	0.015		6.2	1.53	16.9
6.1	4.1	0.10			5.5		13.7
6.2	4.1	0.08			4.2		12.9

5A2a CATION EXCHANGE CAPACITY	EXTRACTABLE CATIONS 5B1a					BASE SAT. % 5C3	5A3a Sum of Cations	Calc. Sum of Cations	Calc. Sum of Cations
	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Na 6P2a	K 6Q2a		soil	clay	clay + fine silt
← (Na)	milliequivalents per 100g. soil →						← milliequivalents per 100g. →		
26.9	11.9	6.1	8.2	0.2	0.9	70	27.3	138	46
20.4	9.7	6.0	9.1	0.2	0.6	65	25.6	103	40
27.7	11.7	7.1	8.7	0.2	0.3	69	28.0	85	43
36.0	7.2	12.6	7.7	0.2	0.2	72	27.9	98	57
24.3	14.3	11.7	5.9	0.2	0.2	82	32.3	124	70
29.2	13.6	11.8	4.9	0.2	0.1	84	30.6	138	71

1/ Percent of whole soil <1 inch

BOOMER LOAM (taxadjunct) 1/
S61Calif-9-3

Collectors: Grant Kennedy, Reuben Nelson, John Rogers, Paul Nazar, David Estrada, Lynn Brittan, Lothair Grant **Description by: Grant Kennedy.**
Date of Sampling: April 27, 1961
Location: El Dorado County, 6 miles northwest of Coloma, California, NE corner of NW1/4SW1/4 of sec. 33, T. 12 N., R. 9 E., **El Dorado County.**
Elevation: 1040 feet
Relief: Steep uplands with a 40 percent slope to the east.
Drainage: Well drained; medium runoff; moderate permeability
Parent Material: Basic Schist
Climate: Mean annual rainfall 35", T 60°, J 44°, J 77°
Vegetation: Ponderosa pine, black oak, blue wild rye, poison oak, lupine, and annual grasses
Classification: **Ultic Haploxeralf, fine-loamy, mixed, thermic.**
Remarks: The B31 and B32&R horizons are well-fractured schists, breaking to gravels size; the gravels are coated with clay films. Colors on the B31 and B32&R are the clay coatings. The color of the B horizons dry are between hue 2.5YR and 5YR. Horizons 1, 4, and 5 (A1, B22t, and B31) were sampled for the Bureau of Public Roads and the California State Division of Highways.

HORIZON		DESCRIPTION
O1 & O2	1- 0"	Pine needles and decomposed litter
A1	0- 5"	Yellowish red (5YR 5/6) loam, dark reddish brown (5YR 3/4) when moist; moderate fine granular; slightly hard when dry, friable when moist, and slightly sticky and slightly plastic when wet; abundant very fine, plentiful fine roots; many very fine tubular and interstitial, common fine tubular pores; medium acid, pH 6.0; clear smooth boundary.
A3	5-13"	Yellowish red (5YR 5/6) gravelly clay near loam, yellowish red (5YR 3/6) when moist; moderate medium subangular blocky breaking to weak fine to medium granular; slightly hard when dry, friable when moist, sticky and plastic when wet; abundant very fine to fine, plentiful medium roots; many very fine and fine tubular and interstitial, few medium pores; few thin clay films in pores; medium acid, pH 6.0; clear smooth boundary.
B21t	13-24"	Red (2.5YR 4/6) gravelly clay loam, dark red (2.5YR 3/6) when moist; moderate fine to medium subangular blocky; slightly hard when dry, friable when moist, sticky and plastic when wet; plentiful very fine to coarse roots; many very fine tubular and interstitial pores; few fine tubular pores; many thin clay films in pores; medium acid, pH 6.0: clear smooth boundary.
B22t	24-37"	Red (2.5YR 4/8) gravelly clay loam near clay, variegated dark red, (2.5YR 3/6) and yellowish red (5YR 4/6) when moist; moderate medium and fine subangular blocky; hard when dry, firm when moist, and sticky, plastic when wet; few fine to coarse roots; many very fine tubular and interstitial, few fine tubular pores; many thin clay films in pores; medium acid; pH 6.0; gradual smooth lower boundary.
B31	37-52"	Red (2.5YR 4/6) very gravelly clay loam, variegated red (2.5YR 4/6) and yellowish red (5YR 4/6) when moist; massive; hard when dry, firm when moist, sticky and plastic when wet; few very fine to coarse roots; many very fine tubular and interstitial, few fine tubular pores; many thin clay films in bridges; medium acid, pH 6.0; clear smooth wavy lower boundary.
B32 &R	52-63"+	Dark red (2.5YR 3/6) very gravelly clay loam, variegated dark red (2.5YR 3/6), yellowish red (5YR 4/6) and strong brown (7.5YR 5/6), when moist; massive; firm when moist, sticky and slightly plastic when wet; few very fine to coarse roots; many thin clay films in bridges; medium acid, pH 6.0.

1/ Labeled a taxadjunct because soil temperature is marginal to mesic and thermic. The Boomer series has a mesic temperature regime.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Boomer loam (taxadiunct) **LOCATION** El Dorado County, California

SOIL FAMILY: Ultic Haploxeralf, fine-loamy, mixed, thermic.

SOIL NOS. S61Calif-9-4 **LAB. NOS.** 6199 - 61105

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0- 8	A_1	6.3	10.3	4.8	8.4	6.0	40.7	23.5	23.7	28.0	30	1
8-15	A_3	5.8	9.7	5.0	8.3	6.4	39.1	25.7	22.7	27.8	34	1
15-23	B_{21t}	7.6	11.0	4.0	5.9	4.9	37.4	29.2	19.0	26.8	26	cl
23-36	B_{22t}	3.9	8.4	4.8	8.8	6.3	37.2	30.6	22.8	26.1	19	cl
36-46	B_{31}	4.4	11.1	7.0	14.6	8.7	35.6	18.6	31.8	21.5	1	1
46-58	B_{32} & R	0.8	7.0	8.2	20.2	10.5	37.2	16.1	38.7	21.0	0	1
58-70+	R	1.1	9.9	10.2	19.8	11.3	34.9	12.8	38.5	19.3	0	fsl-1

pH		Organic Matter					6C1b	4A3a			4B2
8C1b Saturated Paste 1:1	8C1c KCl 1:1	6A1a Organic Carbon Pct.	6B1a Nitrogen Pct.	C/N			Free Fe_2O_3 %	Bulk Den. gm/cc			Soil water 15 atmos. Pct.
6.2	4.9	2.04	0.083	24.6			9.7				16.3
6.0	4.7	1.04	0.051	20.4			10.4	1.17			17.8
6.1	4.8	0.64	0.040	16.0			10.7	1.21			19.3
6.0	4.6	0.33	0.023				10.7	1.36			21.8
6.1	4.1	0.16					7.0	1.37			19.4
5.8	4.0	0.16					4.1				18.5
5.8	3.8	0.08					5.0				17.9

5A2a	EXTRACTABLE CATIONS 5B1a					BASE SAT. %	5A3a	Calc	Calc	
CATION EXCHANGE CAPACITY	5B1a Ca	5B1a Mg	6H2a H	Mg	K	5C3	Sum of Cations	Sum of Cations	Sum of Cations	
	6N2b	6O2c		6P2a	6Q2a		soil	clay	clay + fine silt	
← Na →	milliequivalents per 100 g. soil →						← milliequivalents per 100 g. →			
33.7	11.1	10.7	11.9	0.2	0.7	66	34.6	147	54	
33.7	10.6	14.3	10.7	0.2	0.6	71	36.4	142	56	
34.6	12.2	11.6	9.9	0.2	0.5	71	34.4	118	52	
45.0	8.2	27.2	9.3	0.2	0.4	80	45.3	148	67	
64.9	10.1	48.5	8.7	0.2	0.3	87	67.8	365	125	
64.7	7.3	51.2	8.7	0.2	0.3	87	67.7	420	127	
64.5	41.7	14.8	8.5	0.3	0.2	87	65.5	512	137	

1/ Percent of whole soil <1 inch

BOOMER LOAM (taxadjunct) 1/
S61Calif-9-4

Collectors: Grant Kennedy, Reuben Nelson, John Rogers, Paul Nazar, David Estrada, Lynn Brittan, Lothair Grant **Description by: Grant Kennedy.**
Date of Sampling: April 28, 1961
Location: El Dorado County, California, 5 miles west of Coloma along Highway 49, SE1/4SW1/4 sec. 4, T. 11 N., R. 9 E.
Elevation: 900 feet
Relief: Steep uplands with a 38 percent slope to the northwest.
Drainage: Well drained, medium runoff; moderate permeability
Parent Material: Basic Schist
Climate: Mean annual rainfall 35 inches, T 60°, J 44°, J 77°
Vegetation: Ponderosa pine, black oak, Douglas fir, manzanita, poison oak, blue wild rye, lupine and other forbs.
Classification: **Ultic Haploxeralf, fine-loamy, mixed, thermic.**
Remarks: Some flattened medium and coarse roots extend to 70 inches in crevices and old fracture planes. The C1 horizon breaks into fractured pieces, gravel size, that are all coated with thin to moderately thick clay films, the R is similar but less weathered and shows less clay films. The dry color of the B horizons are between hue 2.5YR and 5YR. Horizons 1, 4, and 5 (A1, B22t, and B31) were sampled for the Bureau of Public Roads and the California State Division of Highways.

HORIZON		DESCRIPTION
O1 & O2	1-0"	Pine needles and decomposed litter.
A1	0-8"	Yellowish red (5YR 5/6) loam, dark reddish brown (5YR 3/4) when moist; moderate fine to medium granular; slightly hard when dry, friable when moist; slightly sticky and slightly plastic when wet; abundant very fine plentiful fine to medium roots; many very fine, common fine tubular and interstitial pores; medium acid, pH 6.0; gradual smooth boundary.
A3	8-15"	Yellowish red (5YR 5/6) loam near clay loam, dark reddish brown (2.5YR 3/4) when moist; moderate fine to medium granular; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; abundant very fine to medium and plentiful coarse roots; many very fine tubular and interstitial, common fine tubular and few medium tubular pores; few thin clay films in pores; slightly acid, pH 6.3; clear slightly wavy boundary.
B21t	15-23"	Red (2.5YR 4/6) clay loam, dark red (2.5YR 3/6) when moist; moderate very fine to fine subangular blocky; hard when dry, friable when moist; sticky and plastic when wet; plentiful very fine to coarse roots; many very fine tubular and interstitial, common fine tubular and few medium tubular pores; many thin clay films in pores; slightly acid, pH 6.3; clear slightly wavy boundary.
B22t	23-36"	Red 2.5YR 4/8) clay loam near clay, dark red (2.5YR 3/6) when moist; moderate very fine to fine subangular blocky; hard when dry, firm when moist, sticky and plastic when wet; few fine to coarse roots; common very fine tubular few fine to coarse tubular pores; continuous thin clay film in pores; slightly acid pH 6.3; clear slightly wavy boundary.
B31	36-46"	Reddish yellow (7.5YR 6/6) clay loam, yellowish red (5YR 4/6) with red (2.5YR 4/6) coatings; weak very fine to fine subangular blocky; hard when dry, firm when moist, and sticky and plastic when wet; few fine to coarse roots; common very fine pores; common thin clay films in pores; slightly acid pH 6.2; gradual smooth boundary.
B32 dR	46-50"	Reddish yellow (7.5YR 6/6), yellowish red (5YR 5/8) with red (2.5YR 4/6) coatings, when moist; massive, very hard when dry, firm when moist; see remarks on clay films; slightly acid, pH 6.2; gradual smooth boundary.
R	50-70"+	Strong brown (7.5YR 5/8) weathered basic schist, yellowish red (5YR 5/8) with black manganese stains, with red (2.5YR 4/6) coatings; massive; very hard when dry, firm when moist; see remarks on clay films.

1/ Labeled a taxadjunct because soil temperature is marginal to mesic and thermic. The Boomer series has a mesic temperature regime.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Ramona fine sandy loam (taxadjunct) **LOCATION** Riverside County, Calif.

SOIL FAMILY: Ultic Haploxeralf, fine-loamy, mixed, thermic

SOIL NOS. S59Calif-33-1 **LAB. NOS.** 59548 - 59555

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0-14	A1p	5.3	13.2	8.5	19.0	13.7	31.6	8.7	43.9	13.1	5	fs1
14-23	A12	5.4	11.8	7.0	16.0	12.6	33.3	13.9	40.4	15.4	3	fs1-1
23-29	B1	6.3	11.2	6.6	14.6	13.1	32.3	15.9	39.1	15.2	2	1-fs1
29-37	B21	6.0	10.7	6.5	15.4	12.8	30.5	18.1	38.9	14.3	5	1-fs1
37-46	B22	5.9	12.2	7.2	16.7	12.3	26.7	19.0	36.9	12.6	4	fs1
46-58	B23	5.3	10.5	7.7	19.5	13.2	25.6	18.2	38.7	12.4	4	fs1
58-68	B3	6.6	11.8	7.7	16.8	11.4	27.1	18.6	35.1	13.9	9	fs1
68-74	C	3.8	7.9	6.0	18.1	15.4	30.7	18.1	43.5	14.6	4	1-fs1

8C1b SATURATED PASTE 1:1	pH 1:5	8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	8A1a Elec. Conduc. mmhos/cm. at 25° C.	$CaCO_3$ equivalent %	Ext. Iron % Fe 6C1b	6I1a CO_3 meq/l	6J1a HCO_3 meq/l	4B2 S il water 15 atmos. Pct.
5.9		6.6	0.40	0.046	8.7		1.1		1.1	-	0.7	4.4
6.4		6.7	0.45	0.049	9.2		0.3		1.3	-	0.6	6.2
6.6		6.9	0.34	0.044	7.7		0.4		1.3	-	0.6	6.8
6.7		7.0	0.22	0.035			0.3		1.5	-	0.3	7.7
6.9		7.2	0.13				0.2		1.6	-	0.4	9.8
7.0		7.4	0.09				0.2		1.6	-	0.5	10.5
7.0		7.5	0.07				0.2		1.8	-	0.4	11.6
7.0		7.5	0.10				0.2		2.0	-	0.4	11.4

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil						milliequivalents per liter					
8.7	4.0	1.2	2.4	0.1	0.5	71	1.2	0.7	4.6	1.4	1.7	21.7
11.2	5.5	1.7	3.0	0.1	0.4	72	0.9	0.2	1.4	0.4	0.7	23.1
12.4	5.8	2.6	3.0	0.1	0.4	75	0.7	0.1	2.0	0.8	0.6	25.8
14.2	6.4	3.1	3.7	0.1	0.3	73	0.7	0.1	1.6	0.8	0.5	28.2
18.0	8.2	4.3	3.5	0.2	0.2	79	0.7	<0.1	0.9	0.7	0.3	34.8
20.4	9.9	4.8	3.5	0.2	0.1	81	0.8	<0.1	0.7	0.5	0.3	38.5
23.4	11.5	5.7	3.9	0.3	0.1	85	0.8	<0.1	0.6	0.4	0.4	37.0
21.6	12.3	6.1	3.3	0.3	0.1	85	0.9	<0.1	0.5	0.5	0.6	35.6

1/ Percent of whole soil

RAMONA FINE SANDY LOAM (taxadjunct) 1/
S59Calif-33-1

Location: Approximately 1100 feet north, 500 feet west of the south quarter corner of section 31, T. 2 S., R. 1 W., Riverside County, California, about 3 miles northwest of the town of Banning.
Date: September 10, 1959
Description By: Arnold Knecht and George Borst
Samples Collected By: Arnold Knecht, Fred Eggers and Reuben Nelson
Classification: Ultic Haploxeralf, fine-loamy, mixed, thermic.
Vegetation: Grain stubble
Climate: Average annual precipitation 16 inches; average January temperature 50°F., average July temperature 70°F. and average annual temperature about 62° F.
Parent Material: Moderately coarse alluvium predominately from granitic sources.
Topography: Gently sloping alluvial terrace, with about 3 percent west-southwesterly slope. Elevation: 2,410 feet.
Soil Moisture: Moist below 12 inches Drainage: Well drained.
Remarks: This profile was described about 1300 feet southwest of the location at which surface soil samples were collected for nutrient level determination by the University of California. It is characterized by an ochric epipedon and an argillic horizon, according to the revised system of soil classification (7th Approximation).

HORIZON		DESCRIPTION
A1p RSL No. 59548	0-14"	Brown (10YR 5/3) fine loam, dark brown (10YR 3/3) moist; massive; hard, very friable, nonsticky and nonplastic; few fine roots; many very fine interstitial and tubular pores; medium acid (pH 6.0); clear, smooth boundary.
A12 RSL No. 59549	14-23"	Brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; massive, hard, very friable, slightly sticky and slightly plastic; few fine roots; common fine tubular pores; slightly acid (pH 6.5); clear, smooth boundary.
B1 RSL No. 59550	23-29"	Brown (7.5YR 5/4) loam, dark reddish brown (5YR 3/4) moist; moderate coarse angular blocky structure; hard, friable, slightly sticky and slightly plastic; few fine roots; many fine tubular pores; few thin clay films on ped faces and in pores; slightly acid (pH 6.5); clear smooth boundary.
B21 RSL No. 59551	29-37"	Reddish brown (5YR 4/4) clay loam, dark reddish brown (5YR 3/4) moist; moderate coarse prismatic structure; very hard, firm, sticky and plastic; few fine roots; common fine tubular pores; common thin clay films on ped faces and in pores; slightly acid (pH 6.5); gradual, smooth boundary.
B22 RSL No. 59552	37-46"	Yellowish red (5YR 5/6) clay loam, yellowish red (5YR 4/6) moist; moderate coarse prismatic structure; very hard, firm, sticky and plastic; very few fine roots; few fine tubular pores; many moderately thick clay films on ped faces and in pores; slightly acid (pH 6.5); gradual smooth boundary.
B23 RSL No. 59553	46-58"	Yellowish red (5YR 5/6) clay loam, yellowish red (5YR 4/6) moist; moderate coarse prismatic structure; very hard, firm, sticky and plastic; few fine tubular pores; many moderately thick clay films on ped faces and in pores; slightly acid (pH 6.5); gradual smooth boundary.
B3 RSL No. 59554	58-68"	Yellowish red (5YR 5/6) clay loam, yellowish red (5YR 4/6) moist; moderate coarse angular blocky structure; very hard, firm, sticky and plastic; few fine tubular pores; many moderately thick clay films on ped faces and in pores; neutral (pH 6.8); clear, irregular boundary.
C RSL No. 59555	68-74+"	Strong brown (7.5YR 5/6) fine sandy loam, brown to dark brown (7.5YR 4/4) moist; massive; hard, firm, slightly sticky and slightly plastic; few fine tubular pores; neutral (pH 7.0).

1/ The Ramona series is in a fine-loamy, mixed, thermic family of Typic Haploxeralfs. This pedon is in an Ultic subgroup.

OIL SURVEY LABORATORY Riverside, California

SOIL TYPE Red Bluff gravelly loam variant **LOCATION** Amador County, California

SOIL FAMILY: Ultic Haploxeralf, fine-loamy, mixed, thermic

SOIL NOS. 59Calif-3-10 **LAB. NOS.** 59320 - 59324

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0-1	A_{11}	9.3	13.5	6.0	9.9	6.2	37.0	18.1	25.1	23.9	35	1
1-9	A_{12}	9.0	12.2	5.9	10.1	7.1	36.3	19.4	25.9	23.6	34	1
9-22	B_1	6.8	12.7	6.0	8.6	6.4	32.7	26.8	22.6	21.6	34	1-cl
22-31	B_2	13.4	17.2	4.6	4.5	4.4	24.7	31.2	14.6	17.1	33	cl-scl
31-42+	D*	11.3	7.3	2.7	5.3	14.8	33.4	25.2	36.8	15.0	3	1

	pH		ORGANIC MATTER				ELECTRICAL			MOISTURE TENSIONS		
	8C1a. H_2O 1:1	8C1c KCl 1:1		6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6C1b "Free" Fe_2O_3 %	CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
	6.4	5.7		4.86	0.268	18.1	5.0						10.7
	6.7	5.8		1.89	0.150	12.6	5.2						9.1
	6.0	5.0		0.60	0.058	10.3	6.9						10.7
	5.2	4.2		0.21	0.028		7.8						13.0
	4.5	3.2		0.24	0.018		2.8						13.0

5A2a	EXTRACTABLE CATIONS				5B1a	BASE SAT. %	SATURATION EXTRACT SOLUBLE			MOISTURE AT SATURATION
CATION EXCHANGE CAPACITY (+(Na)	6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K	5C3	Na	K		
	milliequivalents per 100g. soil →						← milliequivalents per liter →			%
19.6	13.5	2.7	5.7	<0.1	0.9	75				
16.3	9.8	2.1	3.9	0.1	0.5	76				
13.5	5.9	2.5	4.8	<0.1	0.5	65				
17.0	4.6	5.0	5.4	0.2	0.3	65				
20.9	3.8	7.3	7.4	0.4	0.2	61				

* "Sand" mostly disintegrated sandstone fragments.

1/ Percent of the whole soil

RED BLUFF GRAVELLY LOAM variant [1]
S59Calif-3-10

Collectors: Grant Kennedy, Reuben Nelson, Bob Sketchley.
Date of Sampling: June 16, 1959. Description by: Grant Kennedy.
Location: Amador County, California near Buena Vista School, approximately 1/4 mile west of the NE corner of Section 18, T5N, R9E.
Elevation: 300 feet.
Relief: Gently rolling, high terrace on a W-facing slope of 10 percent.
Drainage: Well drained; moderate runoff; moderate over slow permeability.
Parent Material: Arroyo Seco gravels resting on the Ione formation.
Climate: 20 inches, mean annual rainfall.
Vegetation: Oak-grass-wedge leaf ceanothus.
Remarks: This ia a medial developed Noncalcic Brown soil which is gravelly and cobbly above the sandstone (about 35 percent by volume).
The gravels & cobbles consist of slate, greenstone, quartz, etc.
Classification: Ultic Haploxeralf, fine-loamy, mixed, thermic.

HORIZON		DESCRIPTION
A_{11}	0-1"	Reddish brown (5YR 4/4) light gravelly loam, dark reddish brown (5YR 3/4) when moist; moderate fine and medium granular structure; soft when dry, friable when moist; abundant very fine roots; many fine and very fine pores; slightly acid, pH 6.4; abrupt, smooth lower boundary.
A_{12}	1-9"	Yellowish red (5YR 4/6) gravelly loam, dark reddish brown (5YR 3/4) when moist; massive or very weak very fine subangular blocky; slightly hard when dry, friable when moist; abundant very fine, fine and medium roots; many very fine, fine, common medium, few coarse pores; neutral pH 6.7; clear, smooth lower boundary.
B_1	9-22"	Reddish brown (2.5YR 4/5) gravelly loam near gravelly clay loam, dark reddish brown (2.5YR 3/5) when moist; massive; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; plentiful very fine to coarse roots; many very fine and fine, common medium, few coarse pores; thin continuous clay films in pores and bridges; medium acid, pH 6.0; gradual, smooth lower boundary.
B_2	22-31"	Reddish brown (2.5YR 4/5) gravelly clay loam, dark reddish brown (2.5Y 3/5) when moist; massive; hard when dry, firm when moist, slightly sticky and plastic when wet; few very fine, fine, medium, and coarse roots; common very fine, fine and medium, few coarse pores; moderately thick continuous clay films in pores and bridges; strongly acid, pH 5.2; abrupt, smooth lower boundary.
D	31-42"+	Light yellowish brown (10YR 6/4) soft sandstone (loam) with some brown (7.5YR 5/4) staining, brown (7.5YR 4/4) with reddish brown (5YR 4/4) when moist; hard and brittle when dry, very firm when moist; occasional fine root; very strongly acid, pH 4.5; many feet thick.

1/ The Red Bluff series is in a fine, kaolinitic, thermic family of Ultic Palexeralfs. This pedon has less clay in the upper 20 inches of the argillic horizon than is required of the series.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Sierra coarse sandy loam **LOCATION** Amador County, California

SOIL FAMILY: Ultic Haploxeralf, fine-loamy, mixed, thermic

SOIL NOS. 59Calif-3-15 **LAB. NOS.** 59355 - 59361

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0-6	A_p	12.1	14.2	6.2	12.2	9.7	33.3	12.3	33.7	16.7	3	cosl
6-15	A_3	11.6	11.7	5.7	11.2	9.1	33.0	17.7	31.6	17.4	4	l
15-24	B_1	10.9	11.6	5.5	10.8	9.0	31.7	20.5	30.4	16.8	4	l
24-33	B_{21}	6.5	11.6	5.3	12.0	9.9	33.7	21.0	33.9	16.9	3	l
33-45	B_{22}	8.4	11.7	5.4	11.7	10.3	33.3	19.2	34.0	16.8	4	l
45-66	B_3	9.4	12.5	5.3	11.8	10.8	34.9	15.3	35.0	18.0	4	l
66-73	C_1	15.6	16.4	6.4	12.8	11.1	29.0	8.7	34.6	13.2	5	cosl

DEPTH INCHES	8C1a pH H_2O 1:1	8C1c pH KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6C1b "Free" Fe_2O_3 %	ELECTRICAL CONDUCTIVITY EC x 10^3 MILLIMHOS PER CM 25°C.	$CaCO_3$ equivalent %	Bulk Density 4A3a g/cc	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
0-6	6.0	4.9	1.34	0.100	13.4	1.7			1.45			6.3
6-15	5.9	4.6	0.37	0.036	10.3	2.2			1.61			7.8
15-24	6.0	4.6	0.17	0.021		2.5			1.54			8.8
24-33	6.2	4.7	0.14	0.018		2.5			1.64			9.0
33-45	6.3	4.8	0.09	0.014		2.6			1.74			9.1
45-66	6.5	4.6	0.07			2.2			1.72			9.1
66-73	6.0	4.3	0.04			1.5			1.77			6.6

DEPTH INCHES	5A2a CATION EXCHANGE CAPACITY (← Na)	EXTRACTABLE CATIONS 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	5B1a 6Q2a K	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE Na	K	MOISTURE AT SATURATION %
		milliequivalents per 100g. soil →						← milliequivalents per liter →		
0-6	10.5	4.7	1.1	4.5	0.1	0.5	59			
6-15	9.3	4.5	1.0	3.5	<0.1	0.3	62			
15-24	10.0	4.3	1.2	2.7	0.1	0.3	69			
24-33	10.3	4.9	1.5	2.8	0.1	0.3	71			
33-45	11.3	5.6	1.6	2.5	0.1	0.3	75			
45-66	14.8	8.6	2.9	2.2	0.1	<0.1	84			
66-73	14.4	7.5	8.3	1.9	0.1	0.1	89			

1/ Percent of the whole soil

SIERRA COARSE SANDY LOAM
S59Calif-3-15

Collectors: Grant Kennedy, Bob Sketchley, and John Rogers.
Date of Sampling: September 4, 1959. Description by: Grant Kennedy.
Location: Amador County, California on Jameson Ranch. 60 yards NE of intersection of Shenandoah Road. Shenandoah School Road in the NE1/4 SE1/4 of Section 19, T8N, R11E.
Elevation: 1,610 feet
Relief: On gently sloping uplands with a convex slope of about 9 percent to south
Drainage: Well drained, moderate runoff, moderate to moderately slow permeability.
Parent Material: Granodiorite.
Climate: Mean annual rainfall is 33 inches.
Vegetation: Annual grasses, mainly soft chess and wild oats. Field formerly cultivated over 8 years past, now reverted to annual grassland. Field pastured annually by sheep.
Remarks: Profile dry to 29 inches. Below 29" the moisture increases with depth to almost field capacity in the B_3. Occasional rock outcrops in the area. Some 2-inch Krotavinas in the B_{21}.
Classification: Ultic Haploxeralf, fine-loamy, mixed, thermic.
This soil is a medial developed Reddish Brunizem. Samples were obtained for the Bureau of Public Roads on the A_p, B_{22}, and C_1 horizons. Oriented ring samples were obtained on all but the A_p horizon.

HORIZON		DESCRIPTION
A_p	0-6"	Brown (7.5YR 5/4) coarse sandy loam, dark reddish brown (5YR 3/3) when moist; massive; slightly hard when dry, friable when moist, nonsticky and nonplastic when wet; abundant very fine roots; many very fine and common fine tubular pores; medium acid, pH 6.0; abrupt, smooth lower boundary.
A_3	6-15"	Yellowish red (5YR 5/6) loam, dark red (2.5YR 3/6) when moist; massive; hard when dry, friable when moist, slightly sticky and slightly plastic when wet; plentiful very fine roots; many very fine and common fine tubular pores; few thin discontinuous clay films in pores and bridges; medium acid, pH 5.9; clear, smooth lower boundary.
B_1	15-24"	Yellowish red (5YR 5/6) loam, dark red (2.5YR 3/6) when moist; massive; very hard when dry, friable when moist, slightly sticky and slightly plastic when wet; few very fine roots; many very fine, common fine tubular pores; few thin continuous clay films in pores and adjacent areas; medium acid pH 6.0; clear smooth lower boundary.
B_{21}	24-33"	Red (2.5YR 5/6) loam, dark red (2.5YR 3/6) when moist; massive; very hard when dry, firm when moist, sticky and slightly plastic when wet; very few fine roots; many very fine and common fine tubular pores; common thin continuous clay films in pores and adjacent areas; slightly acid, pH 6.2; gradual smooth lower boundary.
B_{22}	33-45"	Red (2.5YR 5/6) loam, dark red (2.5YR 4/6) when moist; massive; very hard when dry, firm when moist, sticky and plastic when wet, very few fine roots; few very fine tubular pores; common thin continuous clay films in pores and adjacent areas; slightly acid, pH 6.3; clear smooth lower boundary.
B_3	45-66"	Yellowish red (5YR 5/6) loam, dark red (2.5YR 4/6) when moist; massive; very hard when dry, firm when moist, sticky and plastic when wet; few very fine tubular pores; very few fine roots; common thin continuous clay films in pores and adjacent areas; slightly acid, pH 6.5; abrupt wavy lower boundary.
C_1	66-73"	Reddish yellow (7.5YR 7/6) coarse sandy loam, yellowish red (5YR 5/6) when moist; massive; hard when dry, friable when moist; slightly sticky and nonplastic when wet; few very fine pores; thin discontinuous clay films in pores and coatings and grains; medium acid, pH 6.0.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Sierra coarse sandy loam **LOCATION** Amador County, California

SOIL FAMILY: Ultic Haploxeralf, fine-loamy, mixed, thermic

SOIL NOS. 59Calif-3-16 **LAB. NOS.** 59349 - 59354

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0-8	A_p	11.8	14.5	5.8	12.3	10.1	35.4	10.1	34.6	18.6	2	cosl
8-18	A_3	9.7	11.3	4.9	10.5	9.1	34.2	20.3	31.0	18.9	2	l
18-27	B_1	8.6	10.3	4.6	9.7	8.4	33.0	25.4	29.5	18.2	3	l
27-48	B_2	8.4	9.0	3.8	8.3	8.0	32.1	30.4	26.4	19.0	2	cl
48-68	B_3	8.6	8.7	3.6	10.1	10.5	35.7	22.8	33.7	19.4	2	l
68-78+	C_1	10.5	11.8	5.8	13.8	13.0	33.0	12.1	39.6	15.5	2	fsl

pH 8C1a H_2O 1:1	pH 8C1c KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6C1b "Free" Fe_2O_3 %	ELECTRICAL CONDUCTIVITY EC x 10^3 MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	Bulk Density 4A3a g/cc	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
5.7	4.5	1.03	0.069	14.9	1.9						6.3
5.9	4.8	0.54	0.042	12.9	2.6			1.57			8.4
6.2	4.9	0.36	0.033	10.9	3.1			1.60			10.1
6.5	5.3	0.18	0.021		4.1			1.64			12.7
6.5	5.1	0.10			3.6			1.70			11.4
6.5	4.6	0.11			2.3			1.69			7.6

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B1a 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K	BASE SAT. % 5C3	Clay mineralogy (<0.002 mm.) Mont.	Verm.	Mixed layer Mica-Verm.	Mica	% Kaolin DTA 7A3	% Gibb. DTA 7A3
		milliequivalents per 100g. soil →					←	X-ray 7A2		→		
9.3	3.6	0.9	5.0	<0.1	0.4	50						
9.3	4.9	1.1	4.5	0.1	0.4	59						
10.3	4.7	1.9	3.6	<0.1	0.3	66						
12.5	6.9	1.6	3.1	<0.1	0.2	74	x	-	x	xx	20	0
17.0	9.7	2.7	2.8	<0.1	0.2	82						
16.7	9.7	3.5	2.3	<0.1	0.1	85	-	-	xx	xx	30	-

1/ Percent of the whole soil

\- = looked for but not found
tr = detected, very small amount
x = detected, small amounts
xx = moderate amounts
xxx = large amounts
xxxx = predominant amounts

SIERRA COARSE SANDY LOAM
S59Calif-3-16

Collectors: Grant Kennedy, Reuben Nelson, Bob Sketchley, John Rogers.
Date of Sampling: June 20, 1959. Description by: Grant Kennedy.
Location: Amador County, California on the Ken Deaver Ranch, 1/2 mile south of Shenandoah School on the Shenandoah School Road in the SW1/4 of the SW1/4 of Section 29, T8N, R11E.
Elevation: 1,560 feet.
Relief: On gently sloping uplands with a convex slope of about 9 percent to the north.
Drainage: Well drained, slow runoff, moderate to moderately slow permeability.
Parent Material: Granodiorite.
Biological Activity: Burrowing rodents and earthworms are active in these soils.
Climate: Mean annual rainfall is 33 inches.
Vegetation: Cultivated, oat hay.
Remarks: The soil is a medial developed Reddish Brunizem. Samples were obtained for the Bureau of Public Roads on the A_p, B_2, and C_1 horizons.
Classification: Ultic Haploxeralf, fine-loamy, mixed, thermic.

HORIZON		DESCRIPTION
A_p	0-8"	Brown (7.5YR 5/4) coarse sandy loam, dark reddish brown (5YR 3/4) when moist; massive; slightly hard when dry, friable when moist, nonsticky and nonplastic when wet; abundant very fine roots; many very fine and fine pores; medium acid, pH 5.7; clear, smooth lower boundary.
A_3	8-18"	Reddish brown (5YR 5/4) loam, yellowish red (5YR 3/6) when moist; massive; hard when dry, friable when moist, slightly sticky and slightly plastic when wet; abundant very fine roots; many very fine, common fine, few medium and coarse pores; few thin discontinuous clay films in pores; medium acid, pH 5.9; gradual, smooth lower boundary.
B_1	18-27"	Yellowish red (5YR 5/6) heavy loam, dark red (2.5YR 3.6) when moist; massive; very hard when dry, firm when moist, slightly sticky and slightly plastic when wet; plentiful very fine roots; many very fine, common fine, few medium and coarse pores; thin, continuous clay films in pores; slightly acid, pH 6.2; gradual, smooth lower boundary.
B_2	27-48"	Red (2.5YR 4/6) clay loam, dark red (2.5YR 3/6) when moist; massive; very hard when dry, firm when moist, sticky and plastic when wet; plentiful very fine roots; common very fine, few fine pores; moderately thick continuous clay films in most pores and in bridges between sand grains; slightly acid, pH 6.5; gradual, smooth lower boundary.
B_3	48-68"	Yellowish red (5YR 5/8) loam, dark red (2.5YR 3/8) when moist; massive; very hard when dry, firm when moist, sticky and plastic when wet; few very fine roots; common very fine and few fine pores; thin continuous clay films in some pores and in bridges between sand grains; slightly acid, pH 6.5; clear irregular lower boundary.
C_1	68-78"+	Yellowish red (5YR 5/8) fine sandy loam with dark red coatings (2.5YR 3/8), yellowish red (5YR 3/8) when moist with dark red (2.5YR 3/8) coatings; massive; original granitic structure is evident; hard when dry, friable when moist, nonsticky and nonplastic when wet; thin, discontinuous clay films along cleavage planes; slightly acid, pH 6.5.

SOIL SURVEY LABORATORY Lincoln, Nebraska

SOIL TYPE Aiken loam (taxadjunct) **LOCATION** Amador County, California

SOIL FAMILY: Ultic Haploxeralf, fine, kaolinitic, mesic.

SOIL NOS. S59Calif-3-11 **LAB. NOS.** 11348 - 11355

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 1B1b: VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	* 2A2 > 2	TEXTURAL CLASS
0-15	A1	4.6a	5.1a	4.7a	11.0a	13.7a	41.5	19.4	36.7	25.1	8	1
15-24	A3	2.1a	2.9a	3.0a	8.6a	13.3a	42.4	27.7	34.3	26.8	8	cl
24-37	B11t	1.7a	3.4a	2.7a	7.7a	11.7a	40.7	32.1	31.8	25.4	7	cl
37-49	B12t	1.1a	2.1a	2.0a	6.0a	9.4a	38.8	40.6	26.4	25.6	7	c
49-59	B21t	1.9a	2.1a	1.6a	5.1a	8.9a	37.4	43.0	23.3	26.2	8	c
59-75	B22t	0.8b	1.4b	1.7b	5.1b	8.2b	37.0	45.8	21.5	26.9	19	c
75-84	B31t	1.2b	3.1b	3.0b	7.4b	9.0b	36.8	39.5	22.8	27.4	17	cl-c
84-92	B32t	1.5b	3.0b	2.8b	7.2b	9.4b	37.3	38.8	23.3	27.8	37	cl

pH 8C1a 1:1	pH 8C1a 1:5	pH 8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC·10³ MILLIMHOS PER CM @25°C.	6C1a Free Iron as % Fe_2O_3	4A3a Bulk Density g/cc	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
6.0	6.2	6.4	3.21	0.145	22			5.3	1.04			18.6
5.8	6.0	6.2	0.92	0.044	21			6.1	0.95			19.0
5.8	6.0	6.2	0.66					6.3	1.05			19.6
6.0	6.1	6.3	0.34					6.6	1.20			21.0
6.0	6.3	6.5	0.33					5.8	1.39			22.5
6.0	6.2	6.4	0.09					5.0	1.39			23.8
6.0	6.2	6.4	0.09					5.0	1.39			22.4
6.0	6.2	6.2	0.08					5.2	1.31			22.8

1/ CATION EXCHANGE CAPACITY 5A3a (Sum)	EXTRACTABLE CATIONS 5B1a 6N2b Ca	6O2b Mg	6H2a H	6P2a Na	6Q2a K	BASE SAT. % 5C3	Clay mineralogy (<0.002 mm.) Mont.	Verm.	Mixed layer Mica-Verm.	Mica	% Kaolin DTA 7A3	% Gibb. DTA 7A3
	milliequivalents per 100g. soil ⟶						⟵	X-ray 7A2		⟶		
30.5	6.4	1.3	21.8	<0.1	1.0	28		xx			20	19
19.6	5.1	0.7	13.1	<0.1	0.7	33						
18.6	4.8	0.9	12.2	<0.1	0.7	34		xxx			27	27
16.6	4.6	1.4	10.0	<0.1	0.6	40						
13.5	3.7	1.2	8.0	<0.1	0.6	41		x			45	10
11.9	2.4	1.4	7.6	<0.1	0.5	36						
9.8	2.0	1.0	6.2	<0.1	0.6	37						
10.4	2.0	1.3	6.6	<0.1	0.5	36					45	tr.

a. Many (>50 percent) Fe? nodules
b. Few (5 - 25 percent) Fe? nodules
2 mm. - 3/4" fraction

1/ In acid soils CEC (NH_4OAc) is almost always lower than either CEC (Na) or CEC (sum).

AIKEN LOAM (taxadjunct) 1/
S59Calif-3-11

Location: On the Allen Ranch, 100 feet north of road east of Fiddletown to Highway 88 in the SW1/4 of the NE1/4 of sec. 34, T. 8 N., R. 13 E., Amador Co., Calif.
Date of Sampling: June 19, 1959 Description by: Grant Kennedy.
Collectors: Grant Kennedy, Reuben Nelson, and Bob Sketchley
Vegetation: Ponderosa pine, incense cedar, black oak, sweet birch, bracken fern
Climate: Mean annual rainfall - 45 inches
Parent Material: Andesitic tuff-breccia
Relief: Broad, gently sloping ridgetop with a plane or slightly convex slope of 8 percent, facing west.
Elevation: 3,980 feet
Drainage: Well drained; slow runoff; moderate over moderately slow permeability
Remarks: This is a Reddish-Brown Lateritic soil with a good stand of timber. Horizons 1, 5, and 8 (A1, B21t, and B32t) were sampled for the Bureau of Public Roads. Soil was moist when described.
Classification: Ultic Haploxeralf, fine, kaolinitic, mesic.

HORIZON		DESCRIPTION
O1	2- 0"	Organic layer consisting of fresh pine needles, leaves, and twigs, becoming more decomposed with depth (not sampled).
A1 LSL No. 11348	0-15"	Reddish brown (5YR 4/4) loam, dark reddish brown (5YR 3/3) when moist; strong very fine and fine granular structure; soft, very friable; abundant very fine, fine, and medium roots; many very fine and fine interstitial pores; common very fine and fine shot*; slightly acid (pH 6.3); clear smooth boundary.
A3 LSL No. 11349	15-24"	Reddish brown (5YR 4/5) heavy loam, dark reddish brown (5YR 3/4) when moist; moderate very fine and fine granular structure; soft, very friable, slightly plastic; abundant very fine and fine, few medium and coarse roots; many very fine, fine, and medium, few coarse pores; occasional thin, discontinuous clay films in pores; common very fine and fine shot*; medium acid (pH 6.0); clear smooth boundary.
B11t LSL No. 11350	24-37"	Reddish brown (5YR 4/5) clay loam, dark reddish brown (2.5YR 3/4) when moist; weak very fine and fine granular structure; slightly hard, friable, slightly plastic and slightly sticky; abundant very fine and fine, few medium and coarse roots; few thin discontinuous clay films in pores; medium acid (pH 5.8); clear wavy boundary.
B12t LSL No. 11351	37-49"	Yellowish red (5YR 4/6) heavy clay loam, dark red (2.5YR 3/6) when moist; massive; slightly hard, firm, slightly plastic and slightly sticky; plentiful very fine and fine, few medium and coarse roots; common very fine, fine, and medium, few coarse pores; thin continuous clay films in pores and bridges; common shot*; medium acid (pH 5.8); clear smooth boundary.
B21t LSL No. 11352	49-59"	Yellowish red (5YR 5/5) clay, reddish brown (2.5YR 4/5) when moist; massive; hard, firm, plastic and slightly sticky; plentiful very fine and fine, few medium and coarse roots; few very fine and fine, occasional medium pores; moderately thick continuous clay films in pores and bridges; common shot*; medium acid (pH 6.0); gradual smooth boundary.
B22t LSL No. 11353	59-75"	Brown (7.5YR 5/5) clay, yellowish red (5YR 4/6) when moist; massive; very hard, very firm, plastic and slightly sticky; few roots; few very fine and fine, occasional medium pores; moderately thick continuous clay films in pores and bridges; few shot*; medium acid (pH 6.0); gradual smooth boundary.
B31t LSL No. 11354	75-84	Light brown (7.5YR 6/4) clay, brown (7.5YR 4/4) when moist; massive; hard, very firm, plastic and slightly sticky; few roots and pores; thin continuous clay films in pores; few shot*; medium acid (pH 5.9); diffuse smooth boundary.
B32t LSL No. 11355	84-92"	Similar to above except light yellowish brown (10YR 6/4) when dry and pH may be slightly lower.

* Shot are magnetic. In lower profile as much as a half of the soil mass can be picked up with a small magnet when soil is crushed.

1/ The Aiken series is in a clayey, kaolinitic, mesic family of Xeric Haplohumults. This pedon is a taxadjunct because the base saturation in the lower part of the profile is higher than 35 percent.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Hoda stony loam **LOCATION** San Diego County, California

SOIL FAMILY: Ultic Haploxeralf, fine, kaolinitic, mesic.

SOIL NOS. S60Calif-37-8 **LAB. NOS.** 60437 - 60445

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0- 3	A11	*2.9	*5.6	*3.1	7.8	8.9	51.2	20.5	34.6	30.7	4	sil
3-11	A12	3.1	6.1	4.7	11.2	10.5	44.4	20.0	35.0	27.0	10	l
11-17	B1	1.3	4.7	3.4	9.4	8.5	43.1	29.6	29.0	28.5	2	cl
17-25	B21	0.4	3.9	3.4	8.3	7.3	33.8	42.9	21.7	24.6	0	c
25-39	B22	0.6	4.1	3.3	8.1	7.2	34.7	42.0	23.8	23.2	0	c
39-53	B23	0.2	3.3	3.0	8.3	8.1	37.0	40.1	26.3	24.1	0	c-cl
53-66	B31	0.5	5.0	3.9	9.8	8.9	38.0	33.9	29.0	24.2	0	cl
66-75	B32	0.2	4.6	4.4	11.0	9.7	39.4	30.7	30.8	25.2	0	cl
75-88+	B33	0.4	5.2	5.4	11.7	10.7	37.0	29.6	29.8	25.1	0	cl

pH 8C1a H_2O 1:1	pH 8C1c KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC x 10^3 MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	Free Fe_2O_3 6C1b %	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
6.6	5.7	9.22	0.377	24.5				7.0			25.4
6.0	4.8	2.84	0.127	22.4				7.8			17.1
6.2	4.9	0.72	0.042	17.1				7.8			21.0
5.9	4.9	0.60	0.031					8.8			24.8
5.6	4.6	0.29	0.019					10.5			26.8
5.4	4.4	0.20	0.013					8.6			26.9
5.6	4.5	0.40	0.012					7.9			25.6
5.6	4.4	0.17						7.7			25.1
5.7	4.5	0.16						8.8			25.2

5A2a CATION EXCHANGE CAPACITY (- Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Na 6P2a	K 6Q2a	BASE SAT. % 5C3	Sum of Cations me./100 g. soil 5A3a	g. K	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil ⟶						milliequivalents per liter ⟶		
41.5	25.0	8.1	16.8	0.3	1.8	68	52.0		
27.7	9.9	3.6	16.5	0.2	1.2	48	31.4		
18.7	6.9	4.3	9.8	0.3	1.6	57	22.9		
21.1	6.3	5.1	10.1	0.4	1.7	57	23.6		
22.8	7.1	5.1	11.4	0.6	1.1	55	25.3		
22.9	7.5	5.1	10.8	0.9	0.6	57	24.9		
21.8	7.6	5.5	11.0	1.2	0.1	57	25.4		
22.8	7.6	6.0	10.7	1.4	0.1	59	25.8		
25.7	7.9	6.8	11.6	1.5	0.1	58	27.9		

* Sand is largely organic matter

1/ Percent of total soil

HODA STONY LOAM
S60Calif-37-8

Description: George Borst
Date of Sampling: November 18, 1960
Collectors: Reuben Nelson, Cliff Henry, James Lockard, and George Borst
Location: Approximately 150 feet north-northwest of the intersection of Pera Alta Drive and Juneta Drive. Pine Hills, in NW1/4 sec. 13, T. 13 S., R. 3 E. San Diego County, California.
Elevation: 4,100 feet
Relief: Moderately steep, 22 percent
Use: Woodland
Vegetation: Pine and oak forest, with scattered manzanita
Drainage: Well drained
Parent Material: Deeply weathered basic intrusive rocks
Climate: This soil occurs under an average annual rainfall of about 38", a mean annual temperature of 53°, a mean January temperature of 39°, and a mean July temperature of 70°.
Remarks: This soil has some characteristics similar to Aiken and Cohasset soils. The thickness of solum and degree of development are like Aiken but the base status is more like Cohasset. It has higher chromas than Cohasset and lacks shot. The surface stoniness is unusual for the Aiken series; exchangeable Ca and Mg is higher and the structure of the B horizon is more distinct than is typical of Aiken soils in central and northern California.
Reaction: pH was determined in the field with a Truog (Hellige) soil reaction kit. Horizons below the B1 gave very weak color tests with this indicator, possibly due to absorption by clay minerals.
Classification: Ultic Haploxeralf, fine, kaolinitic, mesic.

HORIZON		DESCRIPTION
O1 & O2	1- 0"	Partially decomposed and undecomposed leaves and litter; slightly acid (pH 6.5).
A11	0- 3"	Reddish brown (5YR 4/3) loam, dark reddish brown (5YR 3/4) when moist; moderate fine crumb structure; soft, very friable, slightly sticky and plastic; abundant very fine random roots; many fine interstitial pores; neutral (pH 7.0); clear smooth boundary.
A12	3-11"	Reddish brown (5YR 4/4) loam, dark reddish brown (5YR 3/4) when moist; moderate medium crumb structure; slightly hard, friable, slightly sticky and plastic; plentiful fine random roots; many fine interstitial pores; medium acid (pH 6.0); clear wavy boundary.
B1	11-17"	Light reddish brown (5YR 6/4) silty clay loam, yellowish red (5YR 4/6) when moist; strong medium angular blocky structure; hard, firm, sticky and very plastic; few medium random roots; many fine random tubular pores; few thin clay films in pores; slightly acid (pH 6.2); clear wavy boundary.
B21	17-25"	Yellowish red (5YR 5/6) clay, yellowish red (5YR 4/8) when moist; strong medium angular blocky structure; hard, firm, sticky and very plastic; few coarse random roots; many fine random tubular pores; many thick clay films on ped faces; medium acid (pH 6.0); gradual smooth boundary.
B22	25-39"	Yellowish red (5YR 5/6) clay, yellowish red (5YR 4/8) when moist; strong coarse angular blocky structure; hard, firm, sticky and very plastic; very few medium random roots; many fine random tubular pores; many thick clay films on ped faces; medium acid (pH 6.0); diffuse smooth boundary.
B23	39-53"	Yellowish red (5YR 5/6) clay, yellowish red (5YR 4/8) when moist; strong coarse angular blocky structure; hard, firm, sticky and very plastic; very few medium random roots; many fine random tubular pores; many thick clay films on ped faces; medium acid (pH 6.0); diffuse smooth boundary.
B31	53-66"	Yellowish red (5YR 5/6) clay, yellowish red (5YR 4/8) when moist; strong coarse angular blocky structure; hard, firm, sticky and very plastic; very few fine random roots; many fine random tubular pores; many thick clay films on ped faces; medium acid (pH 6.0); gradual smooth boundary.
B32	66-75"	Reddish yellow (5YR 6/8) clay, yellowish red (5YR 5/8) when moist; moderate medium angular blocky structure; hard, firm, sticky and very plastic; very few fine random roots; many fine random tubular pores; common moderately thick clay films in pores; medium acid (pH 6.0); clear wavy boundary.

CONSECUTIVE PEDON NUMBER C 68113 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES HODA SOIL NO. S68 CALI. 29-33 SAMPLE NO. 8 844-8 851 NEVADA COUNTY AREA

SOIL FAMILY ULTIC HAPLOXERALF FINE,KAOLINITIC,MESIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION SAND 2-.05	SILT .05-.002	CLAY LT .002	SANDS VCS 2-1	CS 1-.5	MS .5-.25	FS .25-.10	VFS .1-.05	CSI .05-.02	FSI .02-.002	CLAYS CO. 2-.2U	FINE LT .2U	CARBONATE 3A1	INT. II .2-.02	COARSE FRAGMENTS- PCT. OF WHOLE SOIL I 20-75	II 20-5	III 5-2
			PERCENT OF LESS THAN 2MM														PCT. OF LT 75		
8 844	0- 10	A11	67.0	25.5	7.5	16.4	19.2	9.2	13.8	8.4	11.1	14.4				26.4	11A	--	10	1
8 845	10- 30	A12	52.2	32.5	15.3	8.9	13.4	8.2	13.4	8.3	12.2	20.3				27.4	10A	--	2	8
8 846	30- 46	A3	44.4	36.8	18.8	11.2	11.2	5.9	10.0	6.1	10.6	26.2				22.0	8A	--	2	6
8 847	46- 91	B21T	30.0	25.2	44.8	6.3	7.7	3.9	6.6	5.5	7.3	17.9				16.5	5A	--	TR	5
8 848	91-115	B22T	33.9	21.4	44.7	6.8	8.1	4.1	8.6	6.3	6.3	15.1				17.3	3A	--	TR	3
8 849	115-135	B3	52.9	17.6	29.5	9.9	16.2	7.7	12.4	6.7	5.9	11.7				18.9	3A	--	TR	3
8 850	135-150	C	53.6	22.1	24.3	8.5	14.9	7.5	14.1	8.6	8.6	13.5				24.9	7A	--	1	6
8 851	0- 10	A11												2.7			6A	--	1	5

SAMPLE NO.	DEPTH CM.	ORG.MATTER CARBON 6A1A	NITROGEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B	2-20 6E1B	SESQUIOXIDES DI-CIT FE 6C2B	DI-CIT AL 6G7A	PYROP EXT FE 6C5A	PYROP EXT AL 6G5A	ATTERBERG LL 4F2	PI 4F1	MT EST. 1/3 BAR 4A1F	BULK DENSITY 1/3 BAR 4A1F	DRY 4A1H	CM 3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2	EXTNSBLTY LEF 4D1	LE 4D1
		PERCENT		PERCENT		PERCENT				PCT.	NO.40	GRAMS PER CC				PERCENT			PERCENT	
8 844	0- 10	2.03	0.093			2.4	0.4			NP	NP		1.23	1.24	0.95		13.1	7.3	0.3	0.3
8 845	10- 30	1.35	0.056			3.1	0.6			30	7	1.25			0.95			9.6		
8 846	30- 46	0.55	0.036			3.6	0.7					1.32			0.96			11.4		
8 847	46- 91	0.35				5.2	0.8			53	23	1.30			0.97			19.3		
8 848	91-115	0.17				5.5	0.7			NP	NP		1.27	1.33	0.99		35.4	21.1	1.6	1.5
8 849	115-135					3.7	0.6					1.25			0.98			14.5		
8 850	135-150					3.8	0.5			NP	NP		1.24	1.25	0.97		27.8	13.8	0.3	0.3
8 851	0- 10	3.39	0.149									1.23			0.97			9.6		

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6D2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACI-DITY 6H2A	KCL EXT. AL 6G1E	CEC SUM 5A3A	CEC NH4-OAC 5A6A	BASE SATURATION SUM+ ACI- DITY	SUM+ AL	NH4-OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CACL2 8C1E
		MEQ/100G									PERCENT					
8 844	0- 10	3.4	0.8	TR	0.5	4.7	9.2		13.9	11.1	34		43		5.8	5.1
8 845	10- 30	1.6	0.6	0.1	0.5	2.8	4.5	1.0	7.3	10.7	38	74	26		5.3	4.5
8 846	30- 46	2.4	1.1	0.1	0.5	4.1	4.2	0.5	8.3	9.5	49	89	43		5.2	4.6
8 847	46- 91	3.5	1.9	TR	0.6	6.0	13.6	0.1	19.6	11.7	31	98	52		5.5	5.2
8 848	91-115	3.0	1.8	0.1	0.5	5.4	12.0	0.1	17.4	10.6	31	98	51		5.5	5.3
8 849	115-135	2.0	1.1	TR	0.5	3.6	5.1	0.1	8.7	9.8	42	97	37		5.4	5.0
8 850	135-150	1.7	1.0	0.1	0.5	3.3	4.7	0.4	8.0	10.5	41	89	31		5.4	4.6
8 851	0- 10														6.0	5.4

CLAY MINERALOGY

SAMPLE NO	DEPTH CM.	LESS THAN 0.002 MM X RAY I 7A2E	II 7A2E	III 7A2E	IV 7A2E	DTA 7A3 PERCENT	L.T. 0.0002 MM MINERAL X RAY I 7A2E	II 7A2E	III 7A2E
8 844	0- 10	KK 4 VR 1							
8 845	10- 30								
8 846	30- 46								
8 847	46- 91								
8 848	91-115	KK 4 VR 1							
8 849	115-135								
8 850	135-150	KK 3 VR 1							
8 851	0- 10								

CODE	RELATIVE AMOUNT
KK KAOLINIT	1 TRACE
VR VERMICLT	2 SMALL
	3 MODERATE
	4 ABUNDANT
	5 DOMINANT
	6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

HODA SANDY LOAM
S68Calif-29-33

Location: Nevada County, California; 800 feet west and 500 feet south of the E 1/4 corner of sec. 30, T. 17 N., R.9E., 150 feet west of Rock Creek Road, 3 miles NNE of Nevada City, California. Date of Sampling: September 6, 1968.

Description by: G. Staidl, C. Goudey. Collectors: G. M. Kennedy, L. A. Brittan, G. Staidl, C. B. Goudey, T. M. Ryan.

Classification: Ultic Haploxeralf, fine, kaolinitic, mesic.

Vegetation: Ponderosa pine, incense cedar, black oak, madrone, manzanita, ceanothus, bear clover. Not cultivated. Climate: Average annual precipitation is 46 inches. Mean annual temperature is 57°F. Parent Material: Granodiorite, coarse grained. Topography: Mountainous upland, strongly sloping, convex slope on 10 percent slope with a northeast aspect. Elevation: 2,775 feet. Drainage: Well drained; runoff is medium; permeability is moderate in surface to moderately slow in subsoil. Soil Moisture: Profile very slightly moist.

Remarks: pH taken by Hellige method. Reaction of this profile is lower than normal. There are fragments of weathered granodiorite in the B22t and B3 horizons. They are 1 to 4 inches in diameter. They occupy 10 to 15 percent by volume of the B22t and 30 to 40 percent by volume of the B3 horizon. The B22t horizon contains 10 percent by weight fragments 3 to 4 inches in diameter. Individual light and dark mineral grains are visible in the C horizon. The A11 and A12 horizons (combined), B21t and B22t (combined), and the C horizon were sampled for the California Division of Highways.

HORIZON	DESCRIPTION
O1	3 to 1/2 inches, pine needles, oak leaves, twigs and litter.
O2	1/2 to 0 inches, partially decomposed litter.
	(0-10 cm.)
A11	0 to 4 inches, brown (10YR 4/3) sandy loam, very dark grayish brown (10YR 3/2) moist;
RSL	strong very fine and fine granular structure; slightly hard, friable, slightly sticky,
68844	slightly plastic; many very fine, fine, medium and coarse roots; many very fine interstitial pores; medium acid (pH 6.0); clear smooth boundary.
	(10-30 cm.)
A12	4 to 12 inches, brown (7.5YR 5/4) sandy loam, dark brown (7.5YR 3/4) moist; moderate
RSL	fine and medium granular structure; slightly hard, friable, slightly sticky, plastic;
68845	many very fine, fine, medium and coarse roots; many very fine interstitial pores; medium acid (pH 6.0); clear smooth boundary.
	(30-46 cm.)
A3	12 to 18 inches, reddish yellow (7.5YR 6/6) loam, yellowish red (5YR 5/6) moist; weak
RSL	fine and medium subangular blocky structure; slightly hard, friable, sticky, plastic;
68846	common very fine, medium and coarse roots; many very fine interstitial pores; few thin clay films bridging and coating mineral grains; strongly acid (pH 5.5); clear wavy boundary.
	(46-91 cm.)
B21t	18 to 36 inches, yellowish red (5YR 5/6) clay, yellowish red (5YR 4/6) moist; moder-
RSL	ate medium and coarse angular blocky structure; hard, friable, sticky, plastic; common
68847	very fine and fine and few medium roots; common very fine tubular and interstitial pores; many thin clay films on faces of peds and continuous moderately thick clay films line pores; strongly acid (pH 5.5); gradual wavy boundary.
	(91-115 cm.)
B22t	36 to 46 inches, yellowish red (5YR 5/8) clay, yellowish red (5YR 4/8) moist; moder-
RSL	ate medium and coarse angular blocky structure; hard, friable, sticky, plastic; few
68848	very fine, fine and medium roots; common very fine interstitial and few fine tubular pores; many moderately thick clay films on faces of peds and lining pores; very strongly acid (pH 5.0); clear irregular boundary.
	(115-135 cm.)
B3	46 to 53 inches, yellowish red (5YR 5/8) sandy clay loam, yellowish red (5YR 4/8)
RSL	moist; weak coarse angular blocky structure; slightly hard, very friable, slightly
68849	sticky, slightly plastic; few fine and medium roots; common very fine tubular and interstitial pores;common thin clay films on faces of peds and lining pores; very strongly acid (pH 5.0); abrupt irregular boundary.
	(135-150 cm.)
C	53 to 59 inches, yellowish red (5YR 5/6) sandy clay loam, yellowish red (5YR 5/8)
RSL	moist; massive; slightly hard, very friable, slightly sticky, slightly plastic; very
68850	few very fine roots; common very fine pores; few moderately thick red (2.5YR 4/8, 5/8 moist) clay films bridge mineral grains and line pores; continuous moderately thick clay films line old root channels; very strongly acid (pH 5.0); many feet to unweathered rock.

CONSECUTIVE PEDON NUMBER C 68114 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES HODA SOIL NO. S68 CALI. 29-34 SAMPLE NO. S 852-S 859 NEVADA COUNTY AREA

SOIL FAMILY ULTIC HAPLOXERALF FINE,KAOLINITIC,MESIC RIVERSIDE SOIL SURVEY LABORATORY

SAMPLE NO.	DEPTH CM.	HORZ.	SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION 2- .05	.05- .002	LT .002	SANDS VCS 2-1	CS 1- .05	MS .5- .25	FS .25- .10	VFS .1- .05	SILTS CSI .05- .02	FSI .02- .002	CLAYS CO. 2- .2U	FINE LT .2U	CARBONATE 3A1A	INT. 1A2A .2-.02	COARSE FRAGMENTS PCT. OF WHOLE SOIL	I 75- 20 PCT.	II 20-5 OF LT 75	III 5-2
			PERCENT OF LESS THAN 2MM																	
S 852	0- 10	A11	58.6	27.1	14.3	16.9	18.4	7.2	10.5	5.6	11.0	16.1				22.0	2A	--	TR	2
S 853	10- 25	A12	56.6	27.8	15.6	18.7	15.4	7.0	9.8	5.7	10.2	17.6				21.0	3A	--	1	2
S 854	25- 46	A3	51.3	28.0	20.7	12.9	16.0	7.4	9.4	5.6	10.4	17.6	15.7	5.0		20.9	3A	--	TR	3
S 855	46- 69	B1 T	35.7	29.9	34.4	4.6	9.7	6.1	9.0	6.3	10.6	19.3	24.7	9.7		21.8	3A	--	--	3
S 856	69-100	B2 T	32.9	24.9	42.2	10.6	8.4	4.2	5.9	3.8	9.1	15.8	26.8	15.4		16.1	1A	--	--	1
S 857	100-140	B3 T	33.0	27.2	39.8	9.0	10.2	4.1	5.9	3.8	7.3	19.9				14.3	2A	--	--	2
S 858	140-170	C	39.4	24.6	36.0	11.8	10.9	4.8	7.2	4.7	7.4	17.2				16.0	2A	--	--	2
S 859	0- 10	A11															6A	--	TR	6

SAMPLE NO.	DEPTH CM.	ORG. MATTER CARBON 6A1A -PERCENT-	NITROGEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	2-20 6E1B	SESQUIOXIDES DI-CIT FE 6C2B	EXT AL 6G7A	PYROP FE 6C5A	EXT AL 6G5A	ATTERBERG LIMIT LL 4F2 PCT.	PL 4F1 NO.40	EST. 1/3 4A1F GRAMS	BULK DENSITY 1/3 BAR 4A1F PER CC	DRY 4A1H	CN 3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C -PERCENT-	15 BAR 4B2	EXTNSBLTY LEF 4D1 -PERCENT-	LE 4D1
S 852	0- 10	5.29	0.215			2.2	0.6			NP	NP		1.00	1.01	0.99			11.8	0.3	0.3
S 853	10- 25	2.93	0.123			2.4	0.7						1.09	1.10	0.99		13.6	10.0	0.3	0.3
S 854	25- 46	0.75	0.041			2.8	0.5						1.37	1.40	0.98		19.0	9.0	0.7	0.7
S 855	46- 69	0.21				3.2	0.6			37	25		1.52	1.55	0.99		22.4	13.6	0.7	0.6
S 856	69-100	0.13				4.1	0.5			48	35		1.38	1.44	0.99		28.2	17.9	1.4	1.4
S 857	100-140					3.6	0.5						1.46	1.53	0.99		25.8	16.5	1.6	1.6
S 858	140-170					3.5	0.5			NP	NP		1.47	1.53	0.99		25.6	15.1	1.3	1.3
S 859	0- 10	3.85	0.172				0.4					1.00			0.97			10.6		

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6Q2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACI- DITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 9A3A	NH4-OAC 5A6A	BASE SATURATION SUM+ ACI- DITY	SUM+ AL	NH4-OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA-CL2 8C1E
		MEQ/100G									PERCENT					
S 852	0- 10	7.6	1.2	0.1	0.5	9.4	18.2		27.6	23.9	34		39		5.6	5.0
S 853	10- 25	6.7	0.9	TR	0.5	8.1	15.0		23.1	16.5	35		49		5.8	5.2
S 854	25- 46	3.9	0.9	TR	0.5	5.3	5.9		11.2	8.7	48		61		5.9	5.3
S 855	46- 69	3.6	1.5	TR	0.5	5.6	6.7		12.3	8.3	46		68		5.9	5.3
S 856	69-100	3.3	2.0	TR	0.5	5.8	5.7		11.5	9.1	51		64		5.8	5.6
S 857	100-140	2.9	3.1	TR	0.5	6.5			6.5	8.3	100+		79		5.7	5.6
S 858	140-170	2.3	2.3	TR	0.4	5.0	4.9	0.1	9.9	7.7	51	98	66		5.5	5.3
S 859	0- 10														5.8	5.4

CLAY MINERALOGY

SAMPLE NO.	DEPTH CM.	LESS THAN 0.002 MM X RAY 7A2E I	7A2E II	7A2E III	7A2E IV	DTA 7A3 -PERCENT-	L.T. 0.0002 MM X RAY 7A3	7A2E I	7A2E II	7A2E III
S 852	0- 10	KK 3	VR 1	MI 1						
S 853	10- 25									
S 854	25- 46									
S 855	46- 69	KK 3	VR 1							
S 856	69-100	KK 3	VR 1							
S 857	100-140									
S 858	140-170	KK 3	VR 1							
S 859	0- 10									

MINERAL CODE: KK KAOLINIT, VR VERMICLT, MI MICA

RELATIVE AMOUNT: 1 TRACE, 2 SMALL, 3 MODERATE, 4 ABUNDANT, 5 DOMINANT, 6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

HODA LOAM
S68Calif-29-34

Location: Nevada County, California; 1,150 feet S. and 600 feet E. of the N 1/4 corner of sec. 36, T. 17 N., R. 8 E., 2½ miles north of Nevada City, 1/2 mile south of Lake Vera, 200 feet west of Lake Vera Road. Date of Sampling: September 6, 1968.
Description by: C. B. Goudey and G. Staidl. Collectors: L. A. Brittan, G. Staidl, C. B. Goudey, T. M. Ryan, G. M. Kennedy.
Classification: Ultic Haploxeralf, fine, kaolinitic, mesic.
Vegetation: Ponderosa pine, incense cedar, black oak, bear clover, ferns. Not cultivated.
Climate: Average annual precipitation 47 inches. Mean annual temperature 56°F.
Parent Material: Granodiorite, coarse grained. Topography: Mountainous upland, strongly sloping, concave, 13 percent slope, NNE aspect. Top of slope. Elevation: 2,590 feet.
Drainage: Well drained; runoff is medium; permeability is moderate to moderately slow in the subsoil. Soil Moisture: Profile very slightly moist.
Remarks: pH taken by Hellige method. The pH is lower than normal.

HORIZON	DESCRIPTION
O1	2 to 0 inches, pine needles, oak leaves, undecomposed. (0-10 cm.)
A11 RSL 68852	0 to 4 inches, brown (10YR 5/3) light loam, very dark grayish brown (10YR 3/2) moist; strong coarse subangular blocky parting to strong fine and coarse crumb structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine random, common medium and coarse oblique roots; many very fine interstitial pores; strongly acid (pH 5.5); clear wavy boundary. (10-25 cm.)
A12 RSL 68853	4 to 10 inches, brown (10YR 5/3) loam, dark brown (7.5YR 3/2) moist; moderate coarse subangular blocky parting to strong fine and coarse crumb structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine random, common medium and coarse oblique and horizontal roots; many very fine interstitial pores; medium acid (pH 6.0); abrupt wavy boundary. (25-46 cm.)
A3 RSL 68854	10 to 18 inches, brown (7.5YR 5/4) heavy loam, brown and dark brown (7.5YR 4/4) moist; weak coarse subangular blocky structure; slightly hard, friable, sticky, plastic; common very fine, and fine random, common medium and coarse horizontal and oblique roots; many very fine interstitial, few fine tubular pores; few thin clay films line pores and as bridges; medium acid (pH 6.0); clear wavy boundary. (46-69 cm.)
B1t RSL 68855	18 to 27 inches, light brown (7.5YR 6/4) clay loam, reddish brown (5YR 4/4) moist; weak medium and coarse angular blocky structure; hard, friable, sticky, plastic; few very fine and fine random, common medium oblique roots; common very fine and fine interstitial, few fine tubular pores; few thin clay films on faces of peds and common moderately thick clay films line pores; strongly acid (pH 5.5); clear wavy boundary. (69-100 cm.)
B2t RSL 68856	27 to 40 inches, yellowish red (5YR 5/6) clay loam, yellowish red (5YR 3/6) moist; moderate medium and coarse angular blocky structure; hard, friable, sticky, plastic; few very fine, fine and medium oblique roots; many very fine and fine interstitial and few fine tubular pores; many moderately thick yellowish red (5YR 4/8) clay films on faces of peds and lining pores; very strongly acid (pH 4.8); gradual wavy boundary. (100-140 cm.)
B3t RSL 68857	40 to 56 inches, yellowish red (5YR 5/6) light clay loam, yellowish red (5YR 4/6) moist; weak medium and coarse angular blocky structure; slightly hard, friable, sticky, plastic; few very fine random roots; common very fine interstitial pores; many moderately thick dark red(2.5YR 3/6 moist)clay films on faces of peds and lining pores; individual weathered mineral grains present; very strongly acid (pH 4.8); gradual wavy boundary. (140-170 cm.)
C RSL 68858	56 to 66 inches, reddish yellow (7.5YR 6/6) loam, strong brown (7.5YR 5/6) moist; massive; slightly hard, very friable, slightly sticky, plastic; few very fine random roots; common very fine interstitial pores; common moderately thick red (2.5YR 4/8 dry, 4/6 moist) clay films line pores and as bridges; very strongly acid (pH 4.8).

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Ultic Haploxeralf, fine, kaolinitic, thermic

SOIL Red Bluff clay loam (taxadjunct) SOIL Nos. S4557-10 LOCATION Tehama County, California

SOIL SURVEY LABORATORY _____ LAB. Nos. _____

Depth (in.)	Horizon	1B1b Total Sand (2–0.05) Pct. of < 2 mm	Total Silt (0.05–0.002) Pct. of < 2 mm	Total Clay (< 0.002) Pct. of < 2 mm	Sand Very coarse (2–1) Pct. of < 2 mm	Sand Coarse (1–0.5) Pct. of < 2 mm	Sand Medium (0.5–0.25) Pct. of < 2 mm	Sand Fine (0.25–0.1) Pct. of < 2 mm	Sand Very fine (0.1–0.05) Pct. of < 2 mm	Silt (0.05–0.02) Pct. of < 2 mm	Silt Int. III (0.02–0.002) Pct. of < 2 mm	3A1 Int. II (0.2–0.02) Pct. of < 2 mm	(2–0.1) Pct. of < 2 mm			Coarse fragments > 2 Pct.	Coarse fragments 2 – 19 Pct. of < 76mm	Coarse fragments 19 – 76 Pct. of < 76mm
0-8	Ap	42.5	29.7	27.8	9.7	7.8	4.0	8.6	12.4	11.9	17.8		30.1					
8-15½	A1	41.3	28.9	29.8	7.6	7.3	4.2	8.7	13.5	11.9	17.0		27.8					
15½-23	B1t	41.8	28.1	30.1	9.0	8.1	4.2	8.1	12.4	11.0	17.1		29.4					
23-32	B21t	30.7	23.9	45.4	7.2	5.0	2.7	5.9	9.9	10.2	13.7		20.8					
32-40	B22t	33.4	25.0	41.6	6.2	5.6	3.4	7.4	10.8	7.3	17.7		22.6					
40-54	B23t	36.6	26.9	36.5	5.8	6.6	4.2	8.9	11.1	11.1	15.8		25.5					
54-60	B24t	44.5	26.2	29.3	9.4	9.1	5.1	9.5	11.4	10.8	15.4		33.1					

Depth (in.)	6A2a Organic carbon Pct	6B1a Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct.		Bulk density g/cc	Bulk density g/cc	Bulk density g/cc		Water content Pct.	Water content Pct	Water content Pct				pH 8C1a (1:1)
0-8	0.66	0.070															5.1
8-15½	0.26	0.039															4.7
15½-23	0.17	0.034															4.9
23-32	0.09	0.028															5.0
32-40	0.06	0.020															5.0
40-54	0.08	0.014															4.6
54-60	0.07	0.014															4.6

Depth (in.)	Extractable bases 5B1a Ca 6N2b meq/100 g	Mg 6O2b meq/100 g	Na 2/ meq/100 g	K 1/ meq/100 g	Sum of bases meq/100 g	6H2a Ext. Acidity meq/100 g	5A3a CEC Sum meq/100 g								Base saturation 5C3 Sum Pct.	Base saturation Pct.
0-8	1.6	0.7	0.01	0.41	2.7	5.9	8.6								32	
8-15½	1.2	0.7	tr.	0.38	2.3	5.9	8.2								28	
15½-23	1.6	1.2	tr.	0.31	3.1	4.9	8.0								39	
23-32	2.4	2.0	0.04	0.31	4.7	4.7	9.4								51	
32-40	2.5	2.1	0.07	0.25	4.9	4.2	9.1								54	
40-54	2.4	2.0	0.06	0.30	4.8	3.6	8.4								57	
54-60	2.3	1.8	0.07	0.21	4.4	2.7	7.0								62	

Depth (in.)					

1/ Precipitated as potassium sodium cobaltinitrite and titrated as potassium permanganate

2/ Gravimetrically as sodium uranyl magnesium acetate

RED BLUFF CLAY LOAM (taxadjunct) 1/
S4557-10

Location: Tehama County, California, NE¼ SW¼ Sec. 34, T27N, R4W, MDB&M. Date of Sampling: April 4, 1945.

Description by: R. C. Roberts and R. A. Gardner. Collectors: R. C. Roberts, F. O. Youngs, R. A. Gardner, L. T. Alexander, H. Jenny and R. E. Storie.

Classification: Ultic Haploxeralf, fine, kaolinitic, thermic.

Vegetation: Pasture - formerly cultivated. Cover consists of sparse annual plants dominated by alfilaria. Climate: Average annual precipitation is 24 inches. Average annual temperature is 62°F., January temperature is 45°F., and average July temperature is 82°F. Parent Material: Mixed alluvium. Topography: On nearly level to gently sloping very old terraces of mixed valley fill. Elevation: 400 feet. Drainage: Well drained, moderately slow permeability, slow runoff. Soil Moisture: Moist.

Remarks: In the field this profile appeared to be very similar to the profile of Red Bluff gravelly loam. The two profiles occur within a few miles of each other.

HORIZON	DESCRIPTION
Ap	0 to 8 inches, reddish brown (5YR 4/4) gravelly light clay loam (very near loam), dark reddish brown (2.5YR 3/4) moist; granular structure; slightly hard, friable, slightly plastic; manganese oxide present; plentiful small roots; strongly acid (pH 5.1); clear smooth boundary.
A1	8 to 15.5 inches, reddish brown (5YR 4/4) gravelly clay loam; strong granular structure; color dry and moist and consistence similar to layer above; manganese oxide present; plentiful small roots; very strongly acid (pH 4.7); very gradual boundary.
B1t	15.5 to 23 inches, reddish brown (5YR 4/4) gravelly clay loam; color dry and moist, structure and consistence similar to layer above; manganese oxide present, concentration appears to be highest in this layer; plentiful small roots; very strongly acid (pH 4.9); abrupt irregular boundary.
B21t	23 to 32 inches, red (10R 4/7) clay containing a slight amount of gravel, dark red (10R 3/6) moist; strong blocky structure; layer appears to be weakly cemented with iron oxide; hard, firm and brittle, plastic; manganese oxide present; layer contains numerous cavities that appear to be old rodent runways; roots present but fewer than in layer above; very strongly acid (pH 5.0); gradual boundary.
B22t	32 to 40 inches, red (10R 4/7) gravelly light clay (near clay loam), color dry and moist, structure and consistence similar to layer above; appears to be weakly cemented with iron oxide; layer contains numerous cavities that appear to be old rodent runways; few fine roots; very strongly acid (pH 5.0); gradual boundary.
B23t	40 to 54 inches, red (2.5YR 4/7) gravelly clay loam, red (10R 4/6) moist; structure and consistence similar to layer above; layer appears to be weakly cemented with iron oxide; layer contains numerous cavities that appear to be old rodent runways, these appear to be more numerous in this layer than in other layers; few fine roots; very strongly acid (pH 4.6); gradual boundary.
B24t	54 to 60 inches, red (2.5YR 4/7) gravelly clay loam (very near gravelly sandy clay loam), red (10R 4/7) moist; some reticulate mottling; structure and consistence similar to layer above; manganese oxide present; very few roots; very strongly acid (pH 4.6).

1/ The Red Bluff series is in a fine, kaolinitic, thermic family of Ultic Palexeralfs. The clay percentage in this pedon decreases by more than 20 percent of its maximum within 1.5 m. of the soil surface.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Argonaut gravelly silt loam (taxadjunct) **LOCATION** Amador County, California

SOIL FAMILY: Ultic Haploxeralf, fine, montmorillonitic, thermic.

SOIL NOS. 59Calif-3-5 **LAB. NOS.** 59294 - 59299

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 1B1b: VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0-2	A_{11}	2.8	3.8	3.4	8.9	7.6	56.8	16.7	38.3	31.5	24	sil
2-10	A_{12}	2.7	4.4	3.0	8.1	8.1	55.0	18.7	35.8	32.4	13	sil
10-18	B_1	2.1	3.9	3.0	7.9	8.3	52.0	22.8	34.1	31.3	8	sil
18-22	B_{21}	2.4	3.7	2.3	5.0	4.7	30.1	51.8	17.3	20.6	35	c
22-30	B_{22}	4.2	8.2	4.2	7.8	5.7	29.3	40.6	19.2	20.4	26	c-cl
30+	Weathered meta-andesite											

pH 8C1a H_2O 1:1	pH 8C1c KCl 1:1	1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	"Free" Fe_2O_3 as % 6C1b	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
6.2	5.0		2.45	0.198	12.4	3.4						9.6
6.2	4.7		0.71	0.065	10.9	3.6						7.9
6.1	4.5		0.39	0.042	9.3	4.1						10.0
5.8	4.1		0.33	0.030	11.0	2.9						21.2
6.0	3.9		0.20	0.019		2.4						18.2
	Weathered meta-andesite											

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B1a: 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Na 6P2a	K 6Q2a	BASE SAT. % 5C3	Clay mineralogy (<0.002 mm.): Mont.	Verm.	Mixed layer Mica-Verm.	Mica	% Kaolin DTA 7A3	% Gibb. DTA 7A3
	milliequivalents per 100g. soil →						←	X-ray 7A2		→		
19.8	10.3	3.1	7.6	0.2	0.3	65						
16.9	9.1	3.0	5.4	0.2	0.1	70						
19.5	11.6	4.7	5.7	0.1	<0.1	74	xx	-	-	tr	12	-
42.3	23.9	12.3	6.1	0.2	0.2	86						
41.4	28.4	12.2	5.1	0.5	0.2	89	-	xx	-	tr	30	5
	Weathered meta-andesite											

1/ Percent of the whole soil

\- = looked for but not found
tr = detected, very small amounts
x = detected, small amounts
xx = moderate amounts
xxx = large amounts
xxxx = predominant amounts

ARGONAUT GRAVELLY SILT LOAM (taxadjunct) 1/

S59Calif-3-5

Collectors: Grant Kennedy, Reuben Nelson, Bob Sketchley.
Date of Sampling: June 17, 1959. Description by: Grant Kennedy.
Location: Amador County, California, on the Garbarini Ranch, 1-1/4 miles west of Jackson on the Pardee Dam Road in the SW1/4 of SW1/4 of Section 20, T6N, R11E, HDB&M.
Elevation: 1,450 feet.
Relief: Uplands in the upper portion of a swale with a very slightly concave slope of 7 percent, facing north.
Drainage: Moderately well drained; moderately rapid runoff when wet; moderately permeable over very slow.
Parent Material: Metamorphosed andesite.
Climate: Rainfall 27"
Vegetation: Oak-grass including white and blue oak, scattered Digger pine, soft chess, wild oats, filaree, and tar weed.
Remarks: The soil is a maximal Noncalcic Brown near the Brunizem soil zone. At 10 to 18 inches about 25 percent of the solids consist of cobbles of over 1 inch in diameter; not sampled.
Classification: Ultic Haploxeralf, fine, montmorillonitic, thermic.

HORIZON		DESCRIPTION
A_{11}	0-2"	Brown (7.5YR 5/4) gravelly silt loam with common, fine yellowish red (5YR 5/8) organic stains, dark brown (7.5YR 3/4) when moist; massive; slightly hard when dry, friable when moist; abundant very fine roots; common very fine and fine, few medium and coarse pores; slightly acid, pH 6.3; clear, smooth lower boundary.
A_{12}	2-10"	Strong brown (7.5YR 5/6) silt loam, dark reddish brown (5YR 3/4) when moist; massive; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; abundant very fine and fine roots; many very fine and fine, common medium tubular pores; slightly acid, pH 6.2; gradual, smooth lower boundary.
B_1	10-18"	Yellowish red (5YR 5/6) silt loam, dark reddish brown (5YR 3/4) when moist; massive; slightly hard when dry, friable when moist, sticky and plastic when wet; abundant very fine and fine, few medium roots; many very fine and fine, few medium and coarse pores; thin, nearly continuous clay films in some pores; slightly acid, pH. 6.1; abrupt, wavy lower boundary.
B_{21}	18-22"	Yellowish brown (10YR 5/4) gravelly clay, brown (7.5YR 5/4) when moist; massive; very hard when dry, very firm when moist, sticky and very plastic when wet; few very fine, fine, and medium roots; common very fine and fine, few medium and coarse pores; moderately thick continuous clay films in pores and in bridges; medium acid, pH 5.8; clear, smooth lower boundary.
B_{22}	22-30"	Similar to above but with heavy gravelly clay loam texture; few very fine, fine, and medium pores; medium acid, pH 6.0; clear, irregular lower boundary.
D_r	30"+	Dominantly yellowish brown (10YR 5/6) weathered meta-andesite with some olive gray staining, dry and moist; massive, medium acid, pH 6.0.

1/ The Argonaut series is in a fine, montmorillonitic, thermic family of Mollic Haploxeralfs. This pedon is a taxadjunct because the base saturation of the upper part of the argillic horizon is less than 75 percent.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Natrixeralf, fine-loamy, mixed, thermic
SOIL Placentia sandy loam (taxad,junct) SOIL Nos. S65Calif-27-15 LOCATION Monterey County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65507 - 65517

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	* Coarse fragments >2	1A2a 2 – 19	19 – 76	
		Pct. of < 2 mm														Pct	Pct of < 76 mm		
0-12	Ap1	59.1	29.9	11.0	13.8	14.7	8.4	13.7	8.5	15.8	14.1	31.4	50.6	0	11	13	13	0	**
12-16	Ap2	59.8	27.1	13.1	11.7	14.8	8.8	14.7	9.8	13.8	13.3	31.4	50.0	0	13	16	16	0	**
16-24	B21t	50.6	13.0	36.4	9.8	11.8	7.8	14.2	7.0	6.6	6.4	20.9	43.6	0	36	18	18	0	**
24-31	B22t	58.0	21.3	20.7	9.8	11.8	8.4	17.9	10.1	11.1	10.2	31.4	47.9	0	21	17	17	0	**
31-40	B23t	34.1	27.8	38.1	4.4	5.8	4.0	10.0	9.9	13.4	14.4	29.5	24.2	0	38	13	13	0	**
40-57	B31t	22.7	40.6	36.7	2.0	2.4	1.8	7.6	8.9	15.1	25.5	29.2	13.8	0	37	7	7	0	**
57-71	B32t	40.4	33.6	26.0	8.6	7.9	3.9	10.8	9.2	14.5	19.1	30.5	31.2	0	26	20	20	0	**
71-83	B33t	43.4	33.5	23.1	3.4	6.4	5.4	16.0	12.2	16.0	17.5	38.0	31.2	0	23	11	11	0	**
83-89+	C1	59.3	16.5	24.2	13.7	14.7	7.8	14.6	8.5	7.8	8.7	24.5	50.8	0	24	19	19	0	**
115-120	C***	50.1	23.8	26.1	4.2	11.8	9.3	16.4	8.4	6.8	17.0	24.2	41.7	0	26	0	0	0	**
24'	C***	92.4	4.0	3.6	34.6	37.5	11.3	7.3	1.7	1.7	2.3	6.2	90.7	0	4	43	42	1	

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven dry		Water content: 4B1c 1/3 bar	Water content: 4B2 15 bar	4D1 Extensibility COLE	4D1 Extensibility COLE	pH: 8C1b Saturated Paste	pH: 8C1a H_2O 1:1	pH: 8C1a H_2O 1:10
	Pct.	Pct.		Pct.	Pct.	g/cc	g/cc	g/cc	Pct.	Pct.	Pct.	in./in.	in./in.			
0-12	0.60	0.054	11		-					4.8				7.2	
12-16	0.35	0.035	10		-					5.4				6.8	
16-24	0.45				-					14.2				7.6	
24-31	0.09				tr.					9.0				8.6	
31-40	0.07				1					15.7				8.5	
40-57	0.11				-					17.6				8.4	
57-71	0.08				-					12.7				8.4	
71-83	0.07				tr.					11.9				8.2	
83-89+	0.05				-					9.3				8.6	
115-120					-					12.0				8.1	
24'					-					2.3				6.6	

Depth (In.)	Extractable bases: 6N2a Ca	6O2a Mg	6P2a Na	5B1a 6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste: 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K		8A1 6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0-12	4.1	1.8	0.8	0.2	6.9	2.0		7.9										
12-16	4.7	2.7	1.0	0.1	8.5	2.8		9.6										
16-24	11.9	8.5	2.2	0.2	22.8			24.2										
24-31	11.5	5.6	3.1	0.3	20.5		19.5	16.1	1.6	1.4	16.1	0.1		-	3.0	12.8		2.00
31-40	17.9	9.6	6.0	0.4	33.9		30.7	28.3	1.1	0.8	16.4	0.1		-	3.3	11.8		1.93
40-57	16.8	11.9	6.1	0.8	35.6		38.3	36.9	1.1	0.8	17.2	0.1		-	2.6	12.4		1.96
57-71	11.9	7.8	6.6	0.3	26.6		28.7	25.6	0.4	0.8	15.2	0.1		-	1.4	14.4		2.04
71-83	11.5	7.1	5.7	0.2	24.5		26.3	23.9	0.6	0.5	17.5	0.1		-	1.0	12.7		1.81
83-89+	12.8	5.0	2.8	0.3	20.9		17.8	14.4	0.6	0.3	11.4	0.1		-	4.0	6.0		1.25
115-120	10.9	7.0	5.1	0.3	23.3		26.8	22.7	0.5	0.4	13.8	0.1		-	1.5	11.2		1.55
24'	3.0	2.0	1.6	0.1	6.7		7.5	5.0	12.6	10.6	55.8	0.1		-	0.5	57.4	0.4	6.3

Depth (In.)	8A Water at Saturation	5D2 Exchangeable Na	5B1b Exch. Na meq./100g.	Gypsum	5C1 Base Sat. NH_4OAc	Clay mineralogy (<0.002 mm.)/A: Mont.	Verm.	Mica	Kaolin	
	Pct.	Pct.		Pct.	Pct.	X-ray				
0-12		10			87			XXXX	x	
12-16		10			88					
16-24		9			94					
24-31	41.3	12	2.4		100+	XXX		x	x	
31-40	58.6	16	5.0		100+					
40-57	68.2	13	5.0		96					
57-71	48.5	21	5.9		100+					
71-83	45.1	19	4.9		100+					
83-89+	32.0	13	2.4		100+	XX		XXX	x	
115-120	46.1	16	4.4		100+					
24'	25.0	27	0.2		100+	XXX		XX	x	

* From characterization sample (5Kg) (except as noted).
** 2-19 mm. from characterization sample, 19-76 mm. from field volume estimate.
*** C horizon material sampled in a gravel pit 1.5 miles east of Chualar.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

PLACENTIA SANDY LOAM (taxadjunct) 1/

S65Calif-27-15

Location: Monterey County, California, 85 feet NW from drainageway 280 feet SW into field from Iverson Road, 0.53 mile NW on Iverson from Gloria Road. Date of Sampling: May 21, 1965. Description by: Lewis C. Leifer. Collectors: W.D. Nettleton, B.R.Brasher, C.J. Weisel, R. D. Waggoner, F. J. Pecarich; site selection by T. D. Cook. Classification: Typic Natrixeralf, fine-loamy, mixed, thermic. Noncalcic Brown (maximal). Vegetation: Formerly irrigated alfalfa field, temporarily abandoned, soon to be plowed; alfalfa, barley, wild oats. Climate: Precipitation 12 inches; mean annual temperature 58°F., mean January 50°F., mean July 65°F. Parent Material: Alluvium from phaneritic, intermediate igneous rocks. Topography: Very slightly convex, smooth, 3 percent slope towards drainageway, west exposure. Elevation: 300 feet. Drainage: Well drained, A horizons have moderately rapid permeability, B2 horizons have very slow permeability, runoff is medium. Soil Moisture: Nearly dry.

Remarks: The field pH determinations by Truog Kit. Matched pair S65Calif-27-14-1 through 8. This site has had some ripping and leveling operations with considerable disruption of A1 and A2 horizons.

HORIZON	DESCRIPTION
Ap1 RSL 65507	0 to 12 inches, brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; massive; some clods due to tillage; hard, friable, slightly sticky and slightly plastic; plentiful very fine and medium roots; many very fine interstitial, common very fine and few fine tubular pores; slightly acid (pH 6.5); clear wavy boundary.
Ap2 RSL 65508	12 to 16 inches, brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; 10 to 30 percent of soil consists of discrete fragments of A2, very pale brown (10YR 7/4) dry, dark yellowish brown (10YR 4/4) moist; massive; hard, friable, slightly sticky and slightly plastic; plentiful very fine and medium roots; many very fine interstitial and common very fine and few fine tubular pores; slightly acid (pH 6.5); abrupt smooth boundary.
B21t RSL 65509	16 to 24 inches, reddish brown (5YR 4/4 interior of peds) clay, reddish brown (5YR 4/4) moist, brown (10YR 4/3) rubbed, dry exterior upper portion very dark grayish brown (10YR 3/2 dry) lower part exterior dark reddish gray (5YR 4/2); moderate coarse prismatic structure; extremely hard, firm, very sticky and plastic; plentiful very fine roots on ped exterior; few very fine interstitial pores; continuous thin clay films in bridges and continuous moderately thick films on ped faces; mildly alkaline (pH 7.5); clear wavy boundary.
B22t RSL 65510	24 to 31 inches, dark brown (7.5YR 3/4) heavy sandy clay loam, slightly lighter color (7.5YR 4/4) moist; massive; very hard, firm, sticky and plastic; few very fine roots; few very fine interstitial and few very fine tubular pores; common thin clay films in bridges and common moderately thick films in pores; films are dark reddish brown (5YR 3/4 dry); very few very fine lime segregations throughout horizon, effervescent in seams; moderately alkaline (pH 8.0); gradual wavy boundary.
B23t RSL 65511	31 to 40 inches, dark reddish brown (5YR 3/4) light clay, reddish brown (5YR 4/4) moist undisturbed or rubbed; weak medium prismatic and strong medium angular blocky structure; hard, firm, very sticky and plastic; plentiful very fine roots on ped exterior; very few very fine interstitial and very few very fine tubular pores; continuous moderately thick films on ped faces; common fine lime segregations and common black Mn stains on ped faces, effervescent in segregations; moderately alkaline (pH 8.0); gradual smooth boundary.
B31t RSL 65512	40 to 57 inches, dark reddish brown (5YR 3/4), brown (7.5YR 5/4 crushed) silty clay, dark reddish brown (5YR 3/4), brown (7.5YR 4/4 crushed) moist; strong fine and medium angular blocky structure; hard, firm, very sticky and plastic; few very fine roots on ped exteriors; common very fine tubular pores; continuous moderately thick clay films on ped faces, few Mn stains on ped faces, violently effervescent in few soft lime seams, moderately alkaline (pH 8.0); gradual smooth boundary.
B32t RSL 65513	57 to 71 inches, dark reddish brown (5YR 3/4), brown (7.5YR 5/4 crushed) heavy clay loam, dark reddish brown (5YR 3/4), brown (7.5YR 4/4 rubbed) moist; moderate medium angular blocky structure; hard, firm, sticky and plastic; few very fine roots on ped exteriors; common very fine interstitial, many very fine tubular pores; continuous thin clay films on ped faces, few Mn stains on peds; moderately alkaline (pH 8.0), noncalcareous; clear smooth boundary.
B33t RSL 65514	71 to 83 inches, strong brown (7.5YR 5/6) silt loam, dark yellowish brown (10YR 4/4), brown (7.5YR 4/4 rubbed) moist; massive; hard, very friable, sticky and plastic; no roots; common very fine interstitial and few very fine tubular pores; common thin clay films on joints of upper portion of horizon, considerable stratification, suggestion of weak clay bands; moderately alkaline (pH 8.0), noncalcareous; clear smooth boundary.
C RSL 65515	83 to 89 inches, strong brown (7.5YR 5/6) fine sandy loam, brown (7.5YR 4/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; many very fine interstitial and common fine and medium tubular pores; few thin clay films in tubular pores; augered to 100 inches without change; moderately alkaline (pH 8.0), noncalcareous.

1/ The Placentia series is in a fine, montmorillonitic, thermic family of Typic Natrixeralfs. This pedon has an argillic horizon with less than 35 percent clay.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Natrixeralf, fine-loamy, mixed, thermic
SOIL Solano loam SOIL Nos. S64Calif-48-4 LOCATION Solano County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64511 - 64519

Depth (cm)	Horizon	1B1b Total Sand (2-0.05)	Total Silt (0.05-0.002)	Total Clay (<0.002)	Sand: Very coarse (2-1)	Sand: Coarse (1-0.5)	Sand: Medium (0.5-0.25)	Sand: Fine (0.25-0.1)	Sand: Very fine (0.1-0.05)	Silt (0.05-0.02)	Silt: Int. III (0.02-0.002)	Int. II (0.2-0.02)	2-0.1			Coarse fragments 1A2a: >2 Pct. of whole soil	2-19 Pct. of <76mm	19-76 Pct. of <76mm
		Pct. of <2 mm																
0-15	A2	41.6	45.9	12.5	tr.	0.8	2.6	18.4	19.8	25.0	20.9	56.4	21.8			0		
15-36	B21t	36.9	41.8	21.3	tr.	0.6	2.6	17.3	16.4	21.2	20.6	48.9	20.5			0		
36-66	B22t	35.4	40.6	24.0	tr.	0.7	2.4	16.3	16.0	20.2	20.4	47.1	19.4			0		
66-100	B23t	23.8	41.5	34.7	0.2	0.7	1.5	9.8	11.6	14.6	26.9	32.7	12.2			0		
100-125	B24t	13.3	44.5	42.2	1.0	1.4	1.1	4.5	5.3	11.8	32.7	20.0	8.0			0		
125-165	B3ca	32.8	37.7	29.5	5.4	5.3	3.1	9.3	9.7	14.2	23.5	30.7	23.1			0		
165-195	C1	36.5	33.0	30.5	0.8	1.7	2.5	17.5	14.0	14.7	18.3	40.1	22.5			0		
195-230	C2	39.4	44.5	27.7	tr.	0.1	0.9	19.9	18.5	28.4	16.1	61.0	20.9			0		
230-270	C3	39.3	36.9	23.8	tr.	0.1	0.8	18.1	20.3	20.8	16.1	54.3	19.0			0		

Depth (cm)	6A1a Organic carbon a/ Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. iron as Fe Pct.	Carbonate as $CaCO_3$: 6E1b <2 mm Pct.	Carbonate as $CaCO_3$: 6E1c Clay size Pct.	Bulk density: 4A1f 1/3 bar g/cc	Bulk density: 4A1h Oven dry g/cc	Bulk density: g/cc	3B2 Cm	Water content: 4B1c 1/3 bar Pct.	Water content: 4B2 15 bar Pct.	Water content: 4C1 1/3 to 15 bar cm/cm	4D1 Extensibility COLEf cm/cm	4D1 Extensibility COLE cm/cm	pH: 8C1b Saturated paste	pH: 8C1a H_2O 1:1	pH: 8C1a H_2O 1:10
0-15	1.13	0.105	11	0.8	-		1.62	1.66		1.00	14.3	4.8		0.008	0.008		5.5	6.0
15-36	0.41	0.054	8	0.9	-		1.71	1.80		1.00	14.4	10.4		0.018	0.018		7.4	8.0
36-66	0.15	0.026		0.9	-		1.60	1.79		1.00	18.0	11.7		0.037	0.037		8.4	9.1
66-100	0.11			1.2	3		1.41	1.68		1.00	26.0	16.4		0.061	0.061		8.4	9.4
100-125	0.10			1.4	8	tr.	1.44	1.71		1.00	25.6	18.5		0.060	0.060		8.4	9.5
125-165	0.06			1.0	22	1	1.70	1.80		1.00	18.2	13.9		0.019	0.019		8.7	9.8
165-195	0.05			1.0	8	tr.	1.66	1.81		1.00	19.9	13.8		0.028	0.028		8.7	9.7
195-230	0.02			1.1	tr.		1.75	1.85		1.00	18.5	12.7		0.019	0.019		8.5	9.4
230-270	0.02			1.0	tr.							11.1					8.4	9.0

Depth (cm)	Extractable bases: 6N2a Ca	6O2a Mg	6P2a Na	5B1a 6Q2a K	6H2a Ext. acidity	5A2a CEC NaOAc	5D2 Exchangeable Sodium Pct.	5E Sodium adsorption ratio	8A Water at saturation Pct.	Water extract from saturated paste 8A1: 6N1b Ca	6O1b Mg	6P1a Na	6Q1a K	6I1a CO_3	6J1a HCO_3	6K1a Cl	6L1a SO_4	8A1a Electrical conductivity mmho/cm
	meq/100g									meq/liter								
0-15	3.6	4.6	0.8	0.2		12.6	6	5	33.7	0.6	0.6	3.5	0.2	-	tr.	2.6	1.1	0.52
15-36	1.6	9.4	0.5	0.2		17.5	2	2	48.2	0.5	1.0	18.6	0.1	-	0.9	16.9	3.3	2.33
36-66	1.6	10.4	11.8	0.2		17.3	43	35	71.7	0.5	5.4	60.4	0.6	-	2.0	34.3	37.0	7.0
66-100	4.3	17.4	17.7	0.3		24.7	42	35	89.2	0.9	10.1	82.7	0.1	-	2.7	47.5	52.6	9.4
100-125	4.5	18.5	17.6	0.3		28.1	40	35	101.5	0.5	5.8	63.5	0.3	-	2.6	36.1	36.3	7.1
125-165	8.5	15.2	10.6	0.3		23.6	32	33	85.0	0.6	1.5	34.2	0.2	-	3.1	20.7	11.6	3.62
165-195	15.3	15.2	6.4	0.3		25.6	20	18	67.9	0.3	1.6	16.9	0.2	-	3.5	12.4	3.1	2.10
195-230	8.0	14.2	3.4	0.3		24.3	12	10	56.9	0.6	1.2	9.7	0.1	-	3.0	7.8	1.0	1.32
230-270	6.7	13.5	1.7	0.3		21.9	7	6	48.0	0.5	1.0	5.0	tr.	-	2.6	2.2	1.3	0.69

Depth (cm)	Ratios to clay 8D1: CEC NaOAc	Ext. iron	15 bar water	Salt Pct.	6F1a Gypsum Pct.	Clay fraction mineralogy 3A1: 7A2 X-ray b/	Atterberg limits: Plastic limit	Liquid limit	Plastic index
							Pct. of <0.4 mm.		
0-15	1.01	0.06	0.38			MT3, KK3	N.P.	21	N.P.
15-36	0.82	0.04	0.49						
36-66	0.72	0.04	0.49		-	MT5, KK2			
66-100	0.71	0.03	0.47		-		17	36	19
100-125	0.67	0.03	0.44		-				
125-165	0.80	0.03	0.49			MT4, KK2			
165-195	0.84	0.03	0.45			MT5, KK2	19	40	21
195-230	0.88	0.04	0.46						
230-270	0.92	0.04	0.47						

a/ 5.5 kg of organic carbon per square meter to a depth of 1 meter

b/ Mineral code
MT = montmorillonite
KK = kaolinite
Approximate weight fraction (X-ray)
5 = more than half
4 = one-third to half
3 = one-fifth to one-third
2 = one-twentieth to one-fifth

SOLANO LOAM
S64Calif-48-4

Location: Solano County, California. Art Brown Ranch, a pit located in NW corner of SW1/4 of NW1/4, Sec. 36, T. 6 N., R. 1 E., eight miles south of Dixon. Date of Sampling: October 6, 1964.
Description by: Grant Kennedy and Sam Johnson. Collectors: Reuben E. Nelson, Ben R. Brasher, Leland Bates, Sam Johnson, Grant Kennedy, and Wells Andrews.
Classification: Typic Natrixeralf, fine-loamy, mixed, thermic.
Vegetation: Not cultivated. Vegetation consists of diminished annual weeds and grasses, dominantly salt grass (Distichlis spicata), soft chess (Bromus mollis), and tarweed. Climate: 18 inches rainfall, 60° F. mean annual temperature. Parent Material: Alluvium from sedimentary rocks. Topography: Basin rim or low terrace, nearly level with hummocks up to 15 inches high. Elevation: 24 feet. Drainage: Runoff is very slow, permeability is very slow, drainage is imperfect. No water table encountered within 107 inches of the surface. Soil Moisture: Dry 0-12 inches, slightly moist 12-24 inches, moist below 24 inches.
Remarks: 1) pH determined by Hellige-Truog and Thymol blue. 2) Sample number of paired profile S64Calif-48-7. 3) Diagnostic horizons are ochric and natric. 4) Thickness of A horizons is greater on hummocks than in between. The thickness of the A horizons are about the same as the height of the hummocks. Between the hummocks the A horizon is very thin. Hummocks vary in height from almost nil to about 2 feet. Most hummocks are less than 15 inches in height, vary in diameter but average about 15-20 feet. Hummocks are almost continuous in some areas and fairly well scattered in other areas.

HORIZON	DESCRIPTION
	Colors are for the dry soil unless otherwise indicated.
A2 RSL No. 64511	0-6 inches (0-15 cm.), pale brown (10YR 6/3) light loam with common fine faint mottles of yellowish brown (10YR 5/4), dark grayish brown (10YR 4/2) with common fine faint mottles of brown (10YR 4/3) moist; weak coarse prismatic with capping of weak coarse platy structure; hard (dry), friable (moist), slightly sticky and slightly plastic (wet); plentiful micro and very fine random roots; common tubular micro pores; abrupt smooth boundary.
B21t RSL No. 64512	6-14 inches (15-36 cm.), brown (10YR 5/3) heavy loam, brown (10YR 4/3) moist; strong coarse columnar structure; extremely hard (dry), firm (moist), sticky and very plastic (wet); plentiful micro horizontal roots; common micro pores; common thin clay skins on ped faces and in pores; clear smooth boundary.
B22t RSL No. 64513	14-26 inches (36-66 cm.), pale brown (10YR 6/3) heavy loam, brown (10YR 4/3) moist; moderate coarse prismatic structure; hard (dry), firm (moist), sticky and plastic (wet); common very fine roots; many micro tubular pores; common thin clay skins on ped faces and in pores; gradual smooth boundary.
B23t RSL No. 64514	26-40 inches (66-100 cm.), pale brown (10YR 6/3) clay loam, dark yellowish brown (10YR 4/4) moist; weak coarse prisms breaking to moderate fine angular blocks; hard (dry), firm (moist), sticky and plastic (wet); few fine random roots; many micro tubular pores; many moderately thick clay skins on ped faces and in pores; strongly effervescent with lime in soft masses; clear wavy boundary.
B24t RSL No. 64515	40-49 inches (100-125 cm.), pale brown (10YR 6/3) silty clay with dark reddish brown (5YR 3/4) stains, dark yellowish brown (10YR 4/4) moist; weak coarse prisms breaking to moderate fine angular blocks; hard (dry), firm (moist), sticky and plastic (wet); few fine random roots; many micro, few very fine pores; many moderately thick clay skins on ped faces and in pores; strongly effervescent with carbonate in soft masses; clear wavy boundary.
B3ca RSL No. 64516	49-64 inches (125-165 cm.), mottled white (10YR 8/2) and light yellowish brown (10YR 6/4) light clay loam, dark yellowish brown (10YR 4/4) with light brownish gray (10YR 6/2) mottles (lime seams) moist; weak fine angular blocky structure; extremely hard (dry), very firm (moist), sticky and plastic (wet); few fine random roots; common micro and very fine pores; common moderately thick clay skins on ped faces and in pores; strongly effervescent with carbonate in seams and concretions; iron and manganese concretions; clear wavy boundary.
C1 RSL No. 64517	64-76 inches (165-195 cm.), yellowish brown (10YR 5/4) light clay loam, dark yellowish brown (10YR 4/4) moist; massive; extremely hard (dry), very firm (moist), sticky and plastic (wet); common micro and very fine pores; strongly effervescent with carbonate in soft masses and seams; iron and manganese concretions; clear smooth boundary.
C2 RSL No. 64518	76-91 inches (195-230 cm.), yellowish brown (10YR 5/4) light clay loam, dark yellowish brown (10YR 4/4) moist; massive; hard (dry), firm (moist), sticky and plastic (wet); few micro and very fine tubular pores; strongly effervescent with carbonate in soft masses and seams.
C3 RSL No. 64519	91-107 inches (230-270 cm.), augered composite sample obtained for laboratory analysis but no description was written for this horizon.

A2, B23t and C1 samples obtained for Bureau of Public Roads.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Natrixeralf, fine, montmorillonitic, thermic
SOIL Antioch loam SOIL Nos. S64Calif-48-8 LOCATION Solano County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64537 - 64547

Depth (in.)	Horizon	1B1b Total: Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Size class and particle diameter (mm) Sand: very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	Coarse fragments 1A2a: > 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76 mm	
0-5	Ap	39.2	45.4	15.4	0.3	1.8	4.9	19.6	12.6	22.5	22.9	45.7	26.6			0		
5-14	A12	39.8	43.1	17.1	0.2	1.9	5.0	20.1	12.6	21.1	22.0	44.9	27.2			0		
14-19	A2	41.8	42.5	15.7	0.4	2.3	5.2	20.4	13.5	20.5	22.0	45.0	28.3			0		
19-34	B21t	20.2	39.5	40.3	tr.	0.3	1.4	6.8	11.7	19.0	20.5	35.1	8.5			0		
34-37	B22t	19.1	44.7	36.2	tr.	0.2	0.8	4.9	13.2	23.6	21.1	40.2	5.9			0		
37-46	B23t	19.6	47.5	32.9	tr.	0.2	0.5	3.6	15.3	24.9	22.6	42.9	4.3			0		
46-60	B24t	11.7	54.4	33.9	0.8	0.6	0.8	3.7	5.8	21.5	32.9	29.7	5.9			0		
60-76	B3t	43.9	34.5	21.6	0.4	1.7	4.9	19.5	17.4	18.2	16.3	47.8	26.5			0		
76-81	C1	58.2	27.5	14.3	0.2	2.4	7.6	28.6	19.4	15.8	11.7	52.4	38.8			0		
81-87	IIC2	45.1	22.8	32.1	0.1	2.1	6.6	22.1	14.2	12.2	10.6	39.4	30.9			0		
100-111		50.9	24.5	24.6	1.0	14.0	10.9	15.0	10.0	11.8	12.7	30.3	40.9					

Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Bulk density: 4A1f 1/3 bar	4A1h Oven dry	3B2 Cm	Water content: 4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility COLE	4D1 Extensibility COLE	pH: 8C1b Saturated Paste	8C1a H_2O 1:1	8C1a H_2O 1:10
	Pct.	Pct.		Pct.	Pct.	g/cc	g/cc	g/cc	Pct.	Pct.	fn./in.	fn./in.			
0-5	1.35	0.127	11	1.4	-	1.59	1.63	1.00	17.8	6.6	0.010	0.010		5.8	6.2
5-14	0.54	0.064	8	1.4	-	1.60	1.64	1.00	16.3	6.5	0.008	0.008		6.2	6.4
14-19	0.28	0.042	7	1.5	-	1.68	1.72	1.00	14.3	6.5	0.006	0.006		6.5	6.8
19-34	0.28	0.047	6	2.0	-	1.56	1.87	1.00	24.1	19.5	0.062	0.062		6.2	7.1
34-37	0.10			2.0	-	1.52	1.84	1.00	28.5	20.3	0.066	0.066		7.5	8.4
37-46	0.09			1.9	-	1.61	1.78	1.00	21.9	18.3	0.035	0.035		8.1	8.9
46-60	0.07			1.9	2	1.62	1.78	1.00	22.0	19.7	0.033	0.033		8.4	9.2
60-76	0.04			1.1	1	1.76	1.83	1.00	14.8	9.7	0.013	0.013		8.6	9.3
76-81	0.03			1.0	tr.	1.72	1.78	1.00	14.5	6.6	0.013	0.013		8.5	8.8
81-87	0.01			1.5	tr.	1.70	1.86	1.00	17.5	13.9	0.031	0.031		8.1	8.8
100-111	0.02			2.1	tr.					11.8				8.4	9.2

Depth (in.)	Extractable bases 6N2a Ca	6O2a Mg	6P2a Na	5B1a 6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 6N1b Ca	6O1b Mg	6P1a Na	6Q1a K	8A1 6I1a CO_3	6J1a HCO_3	6K1a Cl	6L1a SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter								mmho/cm
0-5	7.7	2.0	0.3	0.4	10.4	4.9	14.1		2.0	0.8	2.8	0.4	-	0.2	2.9		0.67
5-14	6.8	2.3	0.4	0.2	9.7	3.6	13.7		0.8	0.6	2.4	0.2	-	0.2	1.8		0.42
14-19	6.1	2.7	0.8	0.1	9.7	2.9	12.4		0.7	0.6	4.4	0.1	-	0.2	3.5		0.64
19-34	13.8	7.3	7.0	0.3	28.4	3.9	34.3		0.4	0.7	10.8	0.2	-	0.4	7.9		1.31
34-37	15.6	8.4	8.8	0.3	33.1		34.7		0.6	0.3	14.4	0.3	-	0.6	11.1		1.61
37-46	15.5	8.1	8.4	0.2	32.2		33.4		0.7	0.3	12.4	0.2	-	1.9	8.9		1.38
46-60	17.7	8.7	8.8	0.2	35.4		35.3		0.6	0.2	11.7	tr.	-	2.6	7.6		1.31
60-76	10.8	4.5	4.1	0.1	19.5		18.0		0.4	0.4	8.5	0.3	-	4.4	2.8		0.80
76-81	7.9	3.0	2.2	0.1	13.2		12.8		0.4	0.4	6.7	0.3	-	3.8	1.2		0.63
81-87	15.6	6.2	3.6	0.2	25.6		25.3		0.3	0.4	4.5	tr.	-	2.6	1.0		0.46
100-111	17.0	5.6	2.7	0.3	25.6		25.0		0.4	0.2	4.8	tr.	-	3.4	1.1		0.48

Depth (in.)	8A Water at Saturation	Atterberg limits: Plastic limit	Liquid limit	Plastic index	5D2 Exchangeable Na	5E SAR	5B1b Exchangeable Na	Clay mineralogy (<0.002 mm. fra.): Mont.	Verm.	Mica	Kaolin.	
	Pct.	Pct. of <0.4 mm.			Pct.		meq/100 g	X-ray 7A2				
0-5	40.1	20	23	3	1	2	0.2					
5-14	33.1				2	3	0.3	-	xx	x	x	
14-19	31.2				5	5	0.6					
19-34	63.8	18	43	25	18	15	6.3					
34-37	66.0				23	21	7.9					
37-46	59.0				23	18	7.7					
46-60	58.7				23	18	8.1	xxxx	-	-	x	
60-76	38.4	17	26	9	21	13	3.7					
76-81	29.7				16	11	2.0	xxx	-	-	xx	
81-87	46.8				13	8	3.4	xxx	-	tr	x	
100-111	44.0				10	9	2.5					

- = look for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

ANTIOCH LOAM
S64Calif-48-8

Location: Solano County, California. A pit located SW¼, SE¼, SW¼ of Sec. 29, T5N, R1W, MDB&M, 1½ miles east of Suisun, California. Date of Sampling: October 8, 1964.
Description by: Leland Bates, Sam Johnson. Collectors: Reuben Nelson, Ben Brasher, Leland Bates, Sam Johnson, Wells Andrews.
Classification: Typic Natrixeralf, fine, montmorillonitic, thermic.
Vegetation: Fallow. Climate: 20 inches rainfall, 60°F. mean annual temperature. Parent Material: Alluvium from sedimentary rocks. Topography: Old terrace. Elevation: 12 feet. Drainage: Runoff is slow, permeability is very slow, drainage is moderately well. No water table encountered within 111 inches of the surface. Soil Moisture: Dry 0-19", moist below 19".
Remarks: (1) pH determined by Hellige-Truog. (2) Sample number of paired profile 64 CAL 48-1-(1-8). (3) Diagnostic horizons are ochric, argillic and albic. (4) Thickness of the A2 varies from thin capping on B2 horizon to 5 inches in the general area of this soil.

HORIZON	DESCRIPTION
Ap RSL 64537	0 to 5 inches, light brownish gray (10YR 6/2) loam with common fine distinct yellowish brown (10YR 5/6) mottles, dark grayish brown (10YR 4/2) with common fine distinct strong brown (7.5YR 5/6) mottles moist; massive; hard, friable, slightly sticky, slightly plastic; plentiful micro roots; many very fine and medium tubular pores; medium acid (pH 5.6); clear smooth boundary.
A12 RSL 64538	5 to 14 inches, brown (10YR 5/3) loam with few fine distinct yellowish brown (10YR 5/6) mottles, dark brown (10YR 3/3) with few fine distinct strong brown (7.5YR 5/6) mottles moist; massive; hard, friable, slightly sticky, slightly plastic; few micro roots; many fine and medium tubular pores; medium acid (pH 6.0); clear wavy boundary.
A2 RSL 64539	14 to 19 inches, light gray (10YR 7/2) loam with common fine distinct yellowish brown (10YR 5/6) mottles, dark grayish brown (10YR 4/2) with common fine distinct strong brown (7.5YR 5/6) mottles moist; massive;hard, friable, slightly sticky, slightly plastic; very few micro roots; many fine and very fine pores; slightly acid (pH 6.5); manganese stains; abrupt smooth boundary.
B21t RSL 64540	19 to 34 inches, light yellowish brown (10YR 6/4) clay with common medium faint pale brown (10YR 6/3) mottles, dark yellowish brown (10YR 4/4) with common medium dark brown (10YR 3/3) mottles moist; moderate very coarse prismatic structure; extremely hard, very firm, sticky, very plastic; very few micro roots; common micro tubular pores; many moderately thick clay films on ped faces and in pores; medium acid (pH 6.0); few iron and manganese concretions; clear wavy boundary.
B22t RSL 64541	34 to 37 inches, yellowish brown (10YR 5/4) clay, dark brown (10YR 4/3) moist; weak medium angular blocky structure; extremely hard, very firm, sticky, plastic; common micro tubular pores; many moderately thick clay films on ped faces and in pores; moderately alkaline (pH 8.0); many iron and manganese concretions; clear wavy boundary.
B23t RSL 64542	37 to 46 inches, pale brown (10YR 6/3) clay, dark yellowish brown (10YR 4/4) with dark brown (7.5YR 3/2) and dark grayish brown (2.5Y 4/2) ped faces moist; weak medium angular blocky structure; hard, firm, sticky, plastic; common micro tubular pores; continuous moderately thick clay films on ped faces and in pores; moderately alkaline (pH 8.0); common iron and manganese concretions; diffuse boundary.
B24t RSL 64543	46 to 60 inches, pale brown (10YR 6/3) light clay, olive brown (2.5Y 4/4) with dark grayish brown (2.5Y 4/2) and dusky red (2.5YR 3/2) ped faces moist; weak medium angular blocky structure; hard, firm, sticky, plastic; common micro tubular pores; continuous moderately thick clay films on ped faces and in pores; moderately alkaline (pH 8.0); common iron and manganese concretions; clear wavy boundary.
B3t RSL 64544	60 to 76 inches, pale brown (10YR 6/3) loam, dark yellowish brown (10YR 4/4) moist; weak medium angular blocky structure; slightly hard, friable, slightly sticky, plastic; many micro tubular pores; common thin clay films on ped faces and in pores; moderately alkaline (pH 8.0); common iron and manganese stains; clear wavy boundary.
C1 RSL 64545	76 to 81 inches, dark yellowish brown (10YR 4/4) (moist) fine sandy loam; weak medium angular blocky structure; slightly hard, friable, nonsticky, nonplastic; many micro tubular pores; few thin clay films on ped faces and in pores; moderately alkaline (pH 8.0); common iron and manganese stains.
II C2 RSL 64546	81 to 87 inches. Composite sample taken for laboratory - no description.
	87 to 100 inches. No sample taken and no description made.
RSL 64547	100 to 111 inches. Composite sample taken for laboratory - no description.

Samples taken for Bureau of Public Roads: Ap, B21t, and B3t.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Natrixeralf, fine, montmorillonitic, thermic
SOIL Placentia sandy loam SOIL Nos. 865Calif-27-14 LOCATION Monterey County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 63498 - 65506

Depth (in.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand Very coarse (2–1)	Sand Coarse (1–0.5)	Sand Medium (0.5–0.25)	Sand Fine (0.25–0.1)	Sand Very fine (0.1–0.05)	Silt 0.05–0.02	Silt Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	4 Coarse fragments 1A2a ≥ 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76 mm	
0–13	Ap1	52.5	33.8	13.7	11.8	12.7	7.6	12.3	8.1	16.4	17.4	31.2	44.4	0	14	8	8	0
13–32	Ap2***	52.9	33.8	13.3	11.2	13.9	7.5	11.8	8.5	16.0	17.8	31.0	44.4	0	13	8	8	0
32–51	B21t	35.1	17.3	47.6	7.4	8.1	5.2	8.7	5.7	7.7	9.6	18.2	29.4	0	48	8	8	0
51–74	B22t	49.8	16.8	33.4	9.5	11.0	7.3	14.3	7.7	7.2	9.6	22.9	42.1	0	33	18	18	0
74–91	B23tca	54.6	17.1	28.3	10.3	14.3	8.7	14.2	7.1	7.4	9.7	21.8	47.5	0	28	20	20	0
91–110	B24t	54.3	20.3	25.4	12.1	14.9	7.7	12.0	7.6	9.9	10.4	23.4	46.7	0	25	11	11	0
110–150	B3t	61.1	20.1	18.8	12.3	17.1	9.7	14.4	7.6	10.4	9.7	25.3	53.5	0	19	15	15	0
150–175+	C ****	65.3	18.2	16.5	13.9	18.2	10.5	15.6	7.1	9.4	8.8	24.3	58.2	0	17	36	24	12
240–255	Auger*****	70.5	11.5	18.0	10.7	16.8	12.1	22.6	8.3	6.1	5.4	25.6	62.2	0	18	15	15	0

Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Atterberg limits Plastic limit	Liquid limit	Plastic index	Bulk density 4A1f 1/3 bar	4A1h Oven dry	3B2 Cm	Water content 4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH 8C1b Saturated Paste	8C1a H_2O 1:1	8C1a H_2O 1:10
	Pct.	Pct.		Pct.	Pct.	Pct. of <0.4 mm			g/cc	g/cc		Pct.	Pct.	in./in.	in./in.			
0–13	0.97	0.087	11	0.9	-	16	19	3	1.57	1.60	0.95	13.3	5.4	0.007	0.006		6.2	
13–32	0.86	0.072	12	0.8	-				1.58	1.63	0.95	11.4	5.2	0.011	0.010		5.9	
32–51	0.68			1.4	-				1.46	1.81	0.95	28.1	19.8	0.073	0.069		7.6	
51–74	0.33			1.2	1	25	58	33	1.56	1.89	0.89	24.1	15.0	0.066	0.058		8.5	
74–91	0.18			1.1	1				1.62	1.85	0.87	19.9	12.4	0.043	0.039		8.4	
91–110	0.11			0.8	-				1.73	1.87	0.93	15.0	10.4	0.026	0.024		8.4	
110–150	0.13			0.6	-				1.73	1.79	0.89	12.0	7.3	0.011	0.010		8.1	
150–175+	0.06			0.5	-				1.76	1.82	0.83	10.9	6.9	0.011	0.009		7.7	
240–255	0.16			0.7	-								8.2				7.2	

Depth (in.)	Extractable bases 6N2a Ca	6O2a Mg	6P2a Na	5B1a 6Q2a K	6N2a Sum of bases	6H2a Extr. Acidity	Cation Exch. capacity 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K		6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1 8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0–13	4.4	2.5	0.4	0.4	7.7	4.4		10.0										
13–32	4.8	2.4	0.4	0.2	7.8	4.1		10.8										
32–51	12.8	13.7	5.5	0.3	32.3	3.1	36.3	32.5										
51–74	18.8	12.4	5.7	0.2	37.1		30.4		1.6	2.1	24.6	0.1		-	2.3	22.7	1.3	3.04
74–91	13.9	11.1	7.2	0.2	32.4		27.5	25.8	1.8	3.4	26.5	0.1		-	2.4	31.0	1.3	3.92
91–110	7.0	8.7	6.0	0.2	21.9		22.6	19.5	2.5	2.7	41.1	0.1		0.5	1.7	40.8	0.9	4.69
110–150	4.1	4.9	4.2	0.2	13.4		14.3	11.4	3.7	5.9	51.5	0.1		-	1.3	55.1	0.7	6.17
150–175+	3.3	3.9	3.5	0.1	10.8		12.0	9.1	4.4	6.6	51.2	0.2		-	0.9	57.9	0.4	6.85
240–255	5.4	5.8	4.7	0.2	16.1			14.3	8.2	11.6	61.2	0.2		-	0.7	78.0	0.1	8.33

Depth (in.)	8A Water at Saturation	5D2 Exchangeable Na	5B1b Exch. Na meq./100g.	Gypsum	5C1 Base Sat. NH_4OAc	Clay mineralogy (<0.002 mm.) 7A Mont.	Verm.	Mica	Kaolin	
	Pct.	Pct.		Pct.	Pct.	X-ray				
0–13					77			XXXX	XX	
13–32					72					
32–51		15			69					
51–74	55.9	14	4.4		100+	XXXX		XX	X	
74–91	48.0	21	5.9		100+					
91–110	41.0	19	4.4		100+					
110–150	28.7	19	2.7		100+					
150–175+	26.8	18	2.1		100+					
240–255	31.6	18	2.6		100+	XXX		XXX	X	

* From characterization sample (5Kg) (except as noted).
** 2-19 mm. from characterization sample, 19-76 mm. from field volume estimate.
*** The A2 horizon (12.5-13") was not sampled.
**** Auger sample from below base of pit.

\- = looked for but not found
t = trace
x = small
XX = moderate
XXX = abundant
XXXX = dominant

PLACENTIA SANDY LOAM
S65Calif-27-14

Location: Monterey County, California. 40 feet NW of fence, 300 feet SW from base of Reservoir 0.47 mile NE, .72 mile NW from intersection Iverson and Johnson Canyon Roads. Date of Sampling: May 21, 1965.
Description by: Lewis C. Leifer. Collectors: W. D. Nettleton, B. R. Brasher, C.J. Weisel, R. D. Waggoner, F. J. Pecarich; site selection by T. D. Cook.
Classification: Typic Natrixeralf, fine, montmorillonitic, thermic. Noncalcic Brown (maximal).
Vegetation: Pasture - grass, ripgut brome, some soft chess, mustard, filaree. Climate: Precipitation is 12 inches; mean annual temperature 58°F., mean January 50°F., mean July is 65°F. Parent Material: Alluvium from phaneritic, intermediate igneous rocks. Topography: Gently sloping, slightly convex west-facing slope of 4 percent. Elevation: 300 feet. Drainage: Well drained, B2 horizons have very slow permeability, runoff is medium. Soil Moisture: Dry, wilting point or below throughout.
Remarks: Field pH determinations by Truog Kit. Paired samples are: S65Calif-27-15-1 through 9. Asterisks indicate horizons sampled for California Division of Highways.

HORIZON	DESCRIPTION
*Ap1 RSL 65498	0 to 5 inches, brown (7.5YR 5/4) sandy loam, dark brown (7.5YR 3/2) moist; massive; compacted by tillage; hard, very friable, slightly sticky and slightly plastic; plentiful very fine and few fine roots; many very fine interstitial and few very fine and medium tubular pores; medium acid (pH 6.0); clear smooth boundary.
Ap2 RSL 65499	5 to 12½ inches, brown (7.5YR 5/4) sandy loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; abundant very fine roots; many very fine interstitial and common very fine and fine tubular pores; medium acid (pH 6.0); horizon somewhat disturbed by many gopher holes filled with mixed granular material, roots much more numerous in the granular material; abrupt smooth boundary.
A2 (Not sampled)	12½ to 13 inches, brown (10YR 5/3) sandy loam, darker brown (7.5YR 4/4) moist; weak medium platy structure; hard, very friable, slightly sticky and slightly plastic; many very fine interstitial and few very fine tubular pores; medium acid (pH 6.0); very abrupt smooth boundary.
B21t RSL 65500	13 to 20 inches, dark reddish brown (5YR 3/4) moist or dry, clay; moderate coarse prismatic structure, prisms slightly rounded at top; extremely hard, very firm, very sticky and plastic; plentiful very fine roots on ped exterior; few very fine interstitial and few very fine tubular pores; continuous thin clay films as bridges and continuous moderately thick clay films on ped faces; moderately alkaline (pH 8.0), noncalcareous; gradual smooth boundary.
*B22t RSL 65501	20 to 29 inches, dark reddish brown (5YR 3/3) clay, dark brown (7.5YR 3/4) moist; strong coarse angular blocky structure; extremely hard, very firm, very sticky and plastic; plentiful very fine roots on ped exteriors; few very fine interstitial and few very fine tubular pores; continuous thin clay films in bridges and continuous moderately thick films on ped faces; moderately alkaline (pH 8.0), noncalcareous; few black Mn (?) stains on ped faces; clear wavy boundary.
B23tca RSL 65502	29 to 36 inches, reddish brown (5YR 4/4) moist or dry, heavy clay loam, same color rubbed; moderate medium angular blocky structure; very hard, firm, sticky and plastic; few very fine roots on ped exteriors; common very fine interstitial and common very fine tubular pores; many thin clay films as bridges and continuous thin films on ped faces; moderately alkaline (pH 8.0), strongly effervescent in medium lime seams; gradual smooth boundary.
B24t RSL 65503	36 to 42 inches, strong brown (7.5YR 5/6) heavy sandy clay loam, dark reddish brown (5YR 3/4) moist; moderate medium angular blocky structure; very hard, firm, sticky and plastic; very few very fine roots; many very fine interstitial pores; many thin clay films as bridges and continuous thin clay films on ped faces; moderately alkaline (pH 8.0); few lime seams trailing down from B23tca; clear smooth boundary.
B3t RSL 65504	43 to 58 inches, strong brown (7.5YR 5/6) light sandy clay loam, brown (7.5YR 4/4) moist; same moist color rubbed; massive; very hard, friable, sticky and plastic; very few very fine roots; many very fine interstitial and few very fine and few medium tubular pores; common thin clay films in bridges; moderately alkaline (pH 8.0), noncalcareous; this horizon somewhat brittle with weak duripan features; gradual smooth boundary.
C RSL 65505	58 to 68 inches, strong brown (7.5YR 5/6) gravelly sandy loam, brown (7.5YR 4/4) moist; massive; hard, very friable, slightly sticky and slightly plastic; no roots; many very fine interstitial and few fine tubular pores; common very thin clay films as bridges; moderately alkaline (pH 8.0); augered to depth of 100 inches without change.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Natrixeralf, fine, montmorillonitic, thermic

SOIL San Miguel stony silt loam SOIL Nos. S64Calif-37-18 LOCATION San Diego County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65602 - 65606

Depth (In.)	Horizon	1B1b Total Sand (2–0 05)	Total Silt (0.05–0 002)	Total Clay (< 0 002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non carbonate clay	1/ Coarse fragments 1A2a: > 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct	Pct. of < 76 mm	
0- 4	A1	34.2	52.3	13.5	5.0	7.4	5.1	9.4	7.3	12.7	39.6	25.2	26.9			13	13	-
4- 8	A2	26.0	54.4	19.6	3.4	6.0	3.9	6.8	5.9	8.7	45.7	18.3	20.1			5	5	-
8-18	B21t	16.3	31.8	51.9	0.4	0.9	1.1	6.7	7.2	8.5	23.3	20.4	9.1			-	-	-
18-23	B22t	55.8	28.6	15.6	5.5	11.8	7.3	18.7	12.5	12.8	15.8	36.6	43.3			-	-	-
23-31+	R																	

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	6G1d KCl ext. Al^{+++}	Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven dry	3B2 Cm	Water content: 4B1c 1/3 bar	Water content: 4B2 15 bar	4D1 Extensibility LEf	4D1 Extensibility LE	pH: 8C1b Saturated Paste	pH: 8C1a H_2O 1:1	pH: 8C1a H_2O 1:10
	Pct.	Pct.		Pct.	Pct.	meq/100g	g/cc	g/cc	g/cc	Pct.	Pct.	Pct	Pct.			
0- 4				1.6		-	1.38	1.41	0.93		18.7	6.7	0.7	0.7	6.1	6.2	
4- 8				1.4		0.4	1.63	1.68	0.97		18.4	7.7	1.0	1.0	5.0	5.2	
8-18				2.0		1.5	1.36	1.86	1.00		29.8	19.7	11.1	11.1	4.5	4.8	
18-23				1.7		0.9						9.8			4.2	5.3	
23-31+				1.5		0.2	2.15	2.21	1.00		8.6	6.2	1.0	1.0	5.7	6.2	

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 8A1: 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K		6I1a CO_3	6J1a HCO_3	6K1a Cl	6L1b SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0- 4	8.3	2.8	2.0	0.8	13.3	4.2	16.1	11.6	3.0	2.0	1.0	0.2		-	1.7	2.1		0.76
4- 8	5.2	6.3	4.8	0.2	16.5	4.8	17.2	13.3	0.7	0.3	1.2	0.1		-	0.6	1.3		0.37
8-18	12.5	20.1	5.8	0.5	38.9	9.8	45.6	39.6	0.4	0.4	4.1	0.1		-	0.4	2.4		0.57
18-23	8.5	12.8	5.6	0.1	27.0	7.6	30.0	26.3	0.5	0.6	5.6	tr.		-	0.2	4.2		0.78
23-31+	6.5	10.6	5.4	0.2	22.7	4.0	23.0	20.8	0.6	1.0	7.9	0.1		-	0.4	7.6		1.26

Depth (In.)	8A Water at Saturation	Exch. bases: 5B3b Ca	5B3b Mg	5B1b Na	5D2 Exchangeable Na	5E SAR	Base saturation NH_4OAc	Clay mineralogy (<0.002 mm) 3A1: Mont.	2:1 to 2:2 intergrade	Mica 7A2 X-ray	Kaolin.	DTA whole soil % kaolinite
	Pct.	meq./100 g.			Pct.		Pct.					
0- 4	31.7	8.2	2.7	2.0	12	0.6	100+	xx			xxx	
4- 8	26.6	5.2	6.3	4.8	28	1.7	100+	xx			xxx	14
8-18	65.2	12.5	20.1	5.5	12	6.5	98	xx	x		xx	20
18-23	35.9	8.5	12.8	5.4	18	7.5	100+	xx	x		xx	19
23-31+	29.1	6.5	10.6	5.2	23	8.8	100+	xx	x		xx	18

1/ From characterization sample (5 kg.). The R horizon was ground whole.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

SAN MIGUEL STONY SILT LOAM
S64Calif-37-18

Location: The site is on the west side of Otay Mountain about 9.5 miles east and 1 mile north of San Ysidro, California. It is in the southwest 1/4 of the southwest 1/4 of Section 27. T. 19 S., R. 1 E., San Diego County, California. Date of Sampling: October 22, 1964. Description by: Gerald Kester and George Borst. Collectors: K. W. Flach and W. D. Nettleton. Classification: Typic Natrixeralf, fine, montmorillonitic, thermic. Vegetation: Chamise, Ceonothis, sumac, Yerba Santa. Climate: Mean annual precipitation is about 15 inches and comes mostly as rain in the winter and early spring; mean annual air temperature is about 57° F., January about 40° F., and July about 74° F. Parent Material: Fine grained metabasic or metavolcanic rock. Topography: Mountainous, 38 percent southwest facing slope. Elevation: About 2,010 feet. Drainage: Well drained, slow permeability, high runoff, moderate erosion. Soil Moisture: Dry, ground water very deep. Remarks: The A1 horizon is 12 inches thick on 35 to 45 percent of the area. Gravel, cobbles, and stones occur throughout the profile but are less than 35 percent of the soil volume. Rock outcrops are common. Color of the B21t horizon is mostly in hues of 5 and 7.5YR but ranges to 10YR.

HORIZON	DESCRIPTION
A1 RSL No. 65602	0 to 4 inches (0 to 10 cm.), light yellowish brown (10YR 6/4)* silt loam, brown to dark brown (7.5YR 4/4) moist; moderate fine to coarse granular structure; slightly hard, friable, nonsticky, nonplastic; plentiful very fine roots; common fine to medium tubular and common fine vesicular pores; medium acid (pH 6.0); abrupt wavy boundary.
A2 RSL No. 65603	4 to 8 inches (10-20 cm.), very pale brown (10YR 7/3) silt loam, yellowish brown (10YR 5/6) moist; massive; hard, friable, nonsticky, slightly plastic; plentiful fine to medium roots; many fine vesicular pores; strongly acid (pH 5.2); abrupt wavy boundary.
B21t RSL No. 65604	8 to 18 inches (20 to 45 cm.), strong brown (7.5YR 5/6) clay, yellowish red (5YR 4/6) moist, reddish yellow (7.5YR 6/6) crushed, yellowish red (5YR 4/6) crushed moist; strong coarse prismatic structure; extremely hard, firm, very sticky, very plastic; few medium and plentiful fine roots; few fine to medium pores; many pressure faces on peds and a few slickensides; strongly acid (pH 5.1); clear wavy boundary.
B22t RSL No. 65605	18 to 23 inches (45 to 58 cm.), yellowish brown (10YR 5/4) gravelly clay, brown to dark brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; very hard, friable, very sticky, plastic; plentiful very fine and fine roots; few fine pores; common pressure faces on peds; strongly acid (pH 5.1); abrupt irregular boundary.
R RSL No. 65606	23 to 31 inches (58 to 78 cm.), light yellowish brown (2.5Y 6/4) metabasic rock, light olive brown (2.5Y 5/4) moist; many fine and medium roots in fractures in the rock.

* Colors are for dry condition unless otherwise noted.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Aquic Natrixeralf, fine-loamy, mixed, thermic

SOIL Solano loam (taxadjunct) SOIL Nos. S64Calif-48-7 LOCATION Solano County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64520 - 64527

Depth (in)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	Coarse fragments 1A2a: > 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76 mm	
0-4	A21	31.8	53.3	14.9	0.2	1.1	3.0	12.8	14.7	24.0	29.3	46.9	17.1			0		
4-9	A22	31.4	52.7	15.9	0.2	1.0	2.5	12.2	15.5	22.7	30.0	46.1	15.9			0		
9-21	B21t	26.0	43.3	30.7	0.1	0.8	2.4	10.7	12.0	19.6	23.7	38.5	14.0			0		
21-32	B22t	36.4	32.6	31.0	tr.	1.0	4.0	15.8	15.6	15.3	17.3	40.3	20.8			0		
32-48	B23t	23.7	44.1	32.2	2.8	2.3	1.5	7.0	10.1	19.3	24.8	34.4	13.6			0		
48-62	B24t	17.4	50.4	32.2	2.5	2.9	1.3	3.7	7.0	18.0	32.4	27.5	10.4			0		
62-80	B25t	15.4	49.2	35.4	3.4	2.8	1.6	4.1	3.5	11.8	37.4	17.6	11.9			0		
80-92		42.3	34.5	23.2	0.1	0.4	2.9	20.6	18.3	19.3	15.2	50.6	24.0			0		

Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	6E1c Clay-size carbonate	Atterberg limits: Plastic limit	Liquid limit	Plastic index	Water content:	4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility COLEf	4D1 Extensibility COLE	pH: 8C1b Saturated Paste	8C1a H_2O 1:1	8C1a H_2O 1:10
	Pct.	Pct.		Pct.	Pct.	Pct.	Pct. of <0.4 mm			Pct.	Pct.	Pct.	in./in.	in./in.			
0-4	2.25	0.177	13		-		N.P.	30	N.P.			6.7				5.6	6.0
4-9	0.90	0.080	11		-							6.2				5.7	6.4
9-21	0.39	0.050	8		-		17	33	16			17.5				6.8	7.6
21-32	0.14				-							16.6				8.3	8.9
32-48	0.07				9	tr.						17.8				8.7	9.8
48-62	0.05				11	tr.	20	56	36			17.6				8.8	9.9
62-80	0.05				11	tr.						18.6				8.7	9.8
80-92	0.02				1							11.4				8.6	9.4

Depth (in.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 8A1: 6N1b Ca	6O1b Mg	6P1a Na	6Q1a K	6I1a CO_3	6J1a HCO_3	6K1a Cl	6L1a SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter								mmho/cm
0-4	5.2	2.1	0.7	0.2	8.2	6.8	15.7		0.8	0.5	3.7	0.1	-	0.2	2.5	1.2	0.68
4-9	4.5	2.8	1.1	0.1	8.5	6.3	14.9		0.5	0.1	4.0	0.1	-	0.2	3.1	0.8	0.57
9-21	6.0	7.6	7.5	0.2	21.3	2.9	22.8		0.5	0.9	17.5	0.1	-	0.5	15.1	3.0	2.13
21-32	5.2	9.6	14.1	0.3	29.2		28.0		0.7	1.3	36.4	0.5	-	1.4	26.1	5.8	3.57
32-48	13.6	11.6	15.6	0.3	41.1		33.3		0.5	0.6	25.6	0.5	-	3.3	19.7	2.8*	2.86
48-62	16.9	12.3	11.9	0.3	41.4		34.1		0.5	0.3	12.6	tr.	-	4.3	8.3	0.9	1.49
62-80	21.0	12.7	9.3	0.3	43.3		37.8		0.3	0.1	9.2	tr.	-	4.3	4.4	0.4	0.95
80-92	18.4	8.3	3.0	0.3	30.0		25.5		4.8	4.2	20.9	0.5	-	2.2	6.7	22.0	2.83

Depth (in.)	8A Water at Saturation	Exch. bases: 5B3b Ca	5B3b Mg	5B1b Na	5D2 Exchangeable Na	5E SAR	6F1a Gypsum	Clay mineralogy (<0.002 mm.) 3A1: Mont.	Verm.	Mica	Kaolin.	
	Pct.	meq./100 g.			Pct.		Pct.	X-ray 7A2				
0-4	46.8			0.6	4	5		xx	-	-	x	
4-9	36.4			0.9	6	7						
9-21	60.9			6.4	28	21						
21-32	101.6			10.4	37	36		xxxx	-	-	x	
32-48	101.4			13.0	39	34		xxxx			tr.	
48-62	84.6			10.8	32	20						
62-80	75.5			8.6	23	21		xxxx	-	-	tr.	
80-92	49.1			2.0	8	10	-					

* Nitrites detected.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

SOLANO LOAM (taxadjunct) 1/
S64Calif-48-7

Location: Solano County, California. A pit located at the NE corner of Sec. 3, T.4N., R.1W., M.D.B.&M., 5 miles east of Fairfield and 1 mile south of State Highway 12. Date of Sampling: October 8, 1964.
Described by: Wells Andrews. Collectors: Wells Andrews, Reuben Nelson, Ben Brasher, Leland Bates, Samuel Johnson.
Classification: Aquic Natrixeralf, fine-loamy, mixed, thermic.
Vegetation: Not cultivated. Natural vegetation consists of halophytic weeds and annual grasses. Climate: Average annual precipitation - 18 inches; mean annual temperature - 60°F. Parent Material: Alluvium from sedimentary rocks of the Coast Range. Topography: Convex basin rim or low terrace with an irregular slope of less than 1 percent. Elevation: 10 feet. Drainage: Very slow runoff, very slow permeability, and imperfect drainage. Free water was encountered at 68 inches. Soil Moisture: Dry to 12 inches, moist from 12 inches to 68 inches, and wet from 68 inches to 92 inches.
Remarks: Field pH determined by Hellige-Truog method and thymol blue. Paired profile No. Cal 48-4 (1-9). Diagnostic horizons are: Ochric epipedon, natric horizon.

HORIZON	DESCRIPTION
A21 R&L 64520	0 to 4 inches, light brownish gray (10YR 6/2) loam with few fine distinct yellowish brown (10YR 5/8) mottles; dark grayish brown (10YR 4/2) with few fine distinct yellowish red (5YR 4/8) mottles when moist; massive; hard, friable, nonsticky, slightly plastic; abundant micro and fine random roots; many micro and very fine tubular and common fine tubular pores; very strongly acid (pH 5.0); clear wavy boundary.
A22 R&L 64521	4 to 9 inches, light gray (10YR 7/2) loam with few fine distinct yellowish brown (10YR 5/6) mottles; dark grayish brown (10YR 4/2) with few fine distinct dark reddish brown (5YR 3/4) mottles when moist; massive; hard, friable, sticky, slightly plastic; abundant micro and very fine random roots; many micro and very fine tubular pores; strongly acid (pH 5.5); abrupt wavy boundary.
B21t R&L 64522	9 to 21 inches, brown (10YR 5/3) clay, brown (10YR 4/3) matrix and dark grayish brown (10YR 4/2) ped faces moist; strong coarse columnar structure; extremely hard, firm, sticky, plastic; plentiful micro and very fine random roots; many micro tubular pores; many thin clay films on ped faces and pores; neutral (pH 7.0); gradual wavy boundary.
B22t R&L 64523	21 to 32 inches, light yellowish brown (2.5Y 6/4) clay, olive brown (2.5Y 4/4) with dark reddish brown (5YR 2/2) stains moist; weak medium and coarse prismatic to weak medium angular blocky structure; extremely hard, firm, sticky, plastic; few micro random roots; common micro tubular pores; many moderately thick clay films on ped faces; moderately alkaline (pH 8.4); common Fe and Mn concretions; few slickensides; clear wavy boundary.
B23t R&L 64524	32 to 48 inches, light yellowish brown (10YR 6/4) clay, yellowish brown (10YR 5/6) matrix and light olive brown (2.5Y 5/4) ped faces moist with dark reddish brown (5YR 2/2) stains; weak medium and coarse prismatic to weak medium angular blocky structure; very hard, friable, slightly sticky, plastic; very few micro roots; common micro tubular pores; many moderately thick clay films on ped faces; strongly alkaline (pH 8.6); strongly effervescent medium soft masses and concretions of lime; many Fe and Mn concretions; few slickensides; gradual wavy boundary.
B24t R&L 64525	48 to 62 inches, light yellowish brown (10YR 6/4) clay, light olive brown (2.5Y 5/6) matrix and light olive brown (2.5Y 5/4) ped faces moist with dark reddish brown (5YR 2/2) stains; weak fine angular blocky structure; very hard, friable, sticky, plastic; no roots; common micro tubular pores; continuous moderately thick clay films on ped faces; strongly alkaline (pH 8.8); strongly effervescent large soft masses and concretions of lime; many Fe and Mn concretions; diffuse boundary.
B25t R&L 64526	62 to 80 inches, pale olive (5Y 6/3) light clay, olive (5Y 4/3) and yellowish brown (10YR 5/4) moist with dark reddish brown (5YR 2/2) stains; weak fine angular blocky structure; hard, friable, sticky, plastic; no roots; common micro tubular pores; continuous moderately thick clay films on ped faces; strongly alkaline (pH 8.8); strongly effervescent large soft masses and concretions of lime; many Fe and Mn concretions.
R&L 64527	80 to 92 inches, composite sample of which no description was made.

Samples taken for Bureau of Public Roads: A21, B21t, B24t

1/ The Solano series is in a fine-loamy, mixed, thermic family of Typic Natrixeralfs. This pedon has mottles within 30 inches of the soil surface.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Aquic Natrixeralf, fine, montmorillonitic, thermic
SOIL Pescadero clay loam SOIL Nos. S64Calif-48-3 LOCATION Solano County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64451 - 64459

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt (0.05–0.002): 0.05–0.02	Silt (0.05–0.002): Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	Coarse fragments 1A2a: > 2 Pct.	Coarse fragments 1A2a: 2 – 19 Pct. of < 76 mm	Coarse fragments 1A2a: 19 – 76 Pct. of < 76 mm
		Pct. of < 2 mm																
0-4	A2	9.2	58.4	32.4	0.3	0.5	0.9	2.8	4.7	17.2	41.2	23.5	4.5			0		
4-14	B21t	19.3	41.5	39.2	0.1	0.3	1.0	7.3	10.6	18.3	23.2	34.1	8.7			0		
14-22	B22t	18.1	40.9	41.0	tr.	0.2	0.7	6.9	10.3	17.5	23.4	32.8	7.8			0		
22-34	B23t	20.0	40.4	39.6	0.2	0.4	0.9	7.5	11.0	16.7	23.7	33.2	9.0			0		
34-47	B3t	23.0	42.1	34.9	0.5	0.8	1.0	8.0	12.7	17.0	25.1	35.7	10.3			0		
47-58	C1	31.2	39.4	29.4	1.3	1.6	1.5	11.4	15.4	19.7	19.7	43.6	15.8			1		
58-69	C2	29.4	39.9	30.7	1.9	1.8	1.8	10.8	13.1	19.8	20.1	40.6	16.3			0		
69-85	C3	33.1	38.7	28.2	4.4	4.7	3.0	10.5	10.5	17.2	21.5	34.1	22.6			0		
109-119		24.3	44.0	31.7	tr.	0.1	0.6	7.1	16.5	24.7	19.3	46.8	7.8			0		

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. Iron as Fe Pct.	6E1b Carbonate as $CaCO_3$ Pct.	5B2 Cm	Bulk density 4A1f 1/3 bar g/cc	Bulk density 4A1h Oven dry g/cc	Atterberg limits: Plastic limit Pct. of <0.4 mm	Atterberg limits: Liquid limit Pct. of <0.4 mm	Atterberg limits: Plastic index Pct. of <0.4 mm	Water content 4B1c 1/3 bar Pct.	Water content 4B2 15 bar Pct.	4D1 Extensibility COLE in./in.	4D1 Extensibility COLE in./in.	pH 8C1b Saturated Paste	pH 8C1a H_2O 1:1	pH 8C1a H_2O 1:10
0-4	2.13	0.184	12	1.7	-	1.00	1.44	1.58	29	44	15	23.9	11.0	0.032	0.032		5.9	6.7
4-14	0.54	0.052	10	0.8	1	1.00	1.47	1.87				24.7	14.4	0.083	0.083		8.5	9.7
14-22	0.24	0.029	8	0.7	1	1.00	1.44	1.82	14	54	40	27.3	16.3	0.080	0.080		8.6	9.7
22-34	0.12			0.7	1	1.00	1.49	1.84				23.6	17.2	0.073	0.073		8.5	9.5
34-47	0.07			0.8	3	1.00	1.63	1.93				19.7	17.8	0.058	0.058		8.5	9.6
47-58	0.06			0.8	5	1.00	1.73	1.95	18	40	22	18.1	18.1	0.042	0.042		8.7	9.8
58-69	0.04			0.9	5	1.00	1.71	1.87				18.0	15.1	0.032	0.032		8.5	9.8
69-85	0.03			0.8	17	1.00	1.69	1.91				19.0	15.1	0.042	0.042		8.5	9.8
109-119	0.03			0.8	2								13.4				8.4	9.6

Depth (In.)	Extractable bases 6N2a Ca	Extractable bases 6O2a Mg	Extractable bases 6P2a Na	Extractable bases 6Q2a K	5B1a Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity 5A2a NaOAc	Cation Exch. Capacity 5A1a NH_4OAc	Water extract from saturated paste 6N1b Ca	6O1b Mg	6P1a Na	6Q1a K		6I1a CO_3	6J1a HCO_3	8A1 6K1a Cl	6L1a SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0-4	8.2	10.8	3.0	0.5	22.5	7.9	32.3		0.3	0.2	6.6	0.1		-	0.5	5.6	1.8	0.91
4-14	11.3	12.3	18.3	0.6	42.5		28.6		0.5	1.9	91.2	0.2		-	4.2	15.4	30.2	5.33
14-22	9.9	13.7	22.1	0.5	46.2		29.3		1.9	2.9	68.5	0.3		-	2.9	30.0	49.0	7.8
22-34	3.6	13.2	22.5	0.3	39.6		27.5		0.8	2.0	71.5	0.3		-	2.4	27.5	44.6	7.1
34-47	3.9	13.8	20.2	0.2	38.1		26.4		0.6	2.0	57.2	0.3		-	3.0	24.8	37.9	6.3
47-58	6.5	12.0	16.5	0.2	35.2		23.7		0.5	1.2	40.5	0.3		-	3.2	18.2	24.6	4.58
58-69	7.2	12.9	14.2	0.2	34.5		25.8		0.6	1.5	40.0	0.3		-	3.1	19.6	20.6	4.30
69-85	10.7	14.4	10.3	0.2	35.6		25.7		0.7	1.7	30.4	0.1		-	2.7	17.9	14.3	3.67
109-119	10.0	15.0	5.6	0.2	30.8		27.7		0.6	1.0	12.7	0.2		-	2.7	6.4	5.6	1.68

Depth (In.)	8A Water at Saturation Pct.	Exch. bases 5B3b Ca meq./100 g.	Exch. bases 5B3b Mg meq./100 g.	5B1b Na meq./100 g.	5D2 Exchangeable Na Pct.	5E SAR	6F1a Gypsum Pct.	Clay mineralogy (<0.002 mm) 8A1 Mont. X-ray 7A2	Verm. X-ray 7A2	Mica X-ray 7A2	Kaolin. X-ray 7A2
0-4	51.0			2.6	8	13		xxxx	-	-	xx
4-14	107.1			8.5	30	83	-				
14-22	116.0			14.2	48	49	-	xxxx	-	-	x
22-34	135.6			12.8	46	60	-				
34-47	123.6			13.1	50	50	-				
47-58	114.1			11.9	50	44	-	xxxx	-	-	xx
58-69	99.4			10.2	40	39	-				
69-85	81.7			7.8	30	28					
109-119	66.6			4.8	17	14					

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

PESCADERO CLAY LOAM
S64Calif-48-3

Location: Solano County, California. Art Brown Ranch, a pit located 200 feet south of NW corner of NE¼ NE¼ NW¼ Sec. 36, T6N, R1E, MDB&M. Date of Sampling: October 6, 1964
Description by: Grant Kennedy, Wells Andrews Samples Collected by: Reuben Nelson, Ben Brasher, Leland Bates, Sam Johnson, Grant Kennedy, Wells Andrews
Classification: Aquic Natrixeralf, fine, montmorillonitic, thermic.
Vegetation: Diminished annual grasses with some salt vegetation. Not cultivated. Climate: 18 inches of rainfall, 60 degrees mean annual temperature. Parent Material: Alluvium from sedimentary rocks. Topography: Basin with slope less than 1 percent. Elevation: 23 feet. Drainage: Runoff is slow, permeability is slow, drainage is imperfect. No water encountered within 119 inches of the surface. Soil Moisture: Dry 0-14", moist below 14".
Remarks: (1) pH determined by Hellige-Truog and thymol blue. (2) Sample number of paired profile 64 CAL 57-12-(1-8).(3) Diagnostic horizons are ochric and natric.(4) Inconspicuous intermittent gilgai is present.(5) Slickensides are present.(6) 1/2 inch cracks are present on the surface and extend downward 15 to 20 inches.

HORIZON	DESCRIPTION
A2 RSL 64451	0 to 4 inches, light brownish gray (10YR 6/2) clay loam with common fine distinct yellowish brown (10YR 5/4) mottles, grayish brown (10YR 5/2) with common fine faint dark yellowish brown (10YR 4/4) mottles moist; weak medium platy structure on top of strong coarse prismatic; very hard, friable, slightly sticky, plastic; abundant micro and very fine, plentiful medium roots; many micro and very fine tubular pores; very strongly acid (pH 5.0); abrupt smooth boundary.
B21t RSL 64452	4 to 14 inches, gray (10YR 5/1) clay, dark gray (10YR 4/1) moist; strong coarse prismatic structure breaking to moderate fine and medium angular blocky; very hard; firm, sticky, very plastic; plentiful micro, very fine, and medium vertical roots; common micro tubular pores; many moderately thick clay films on ped faces and in pores: moderately alkaline (pH 8.2); very slightly effervescent; clear smooth boundary.
B22t RSL 64453	14 to 22 inches, grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; moderate coarse prismatic structure breaking to moderate fine and medium angular blocky; very hard, firm, sticky, very plastic; plentiful micro, very fine, fine and medium vertical roots; common micro and very fine tubular pores; many moderately thick clay films on ped faces and in pores; very strongly alkaline (pH 9.4); strongly effervescent with lime in soft masses; few slickensides; gradual smooth boundary.
B23t RSL 64454	22 to 34 inches, mottled pale brown (10YR 6/3) and light gray (10YR 6/1) clay, mottled light olive brown (2.5Y 5/4) and dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure breaking to weak fine angular blocky; very hard, firm, sticky, very plastic; few micro and medium roots; many micro and few very fine tubular pores; many moderately thick clay films on ped faces and in pores: very strongly alkaline (pH 9.2), strongly effervescent with lime in soft masses: few slickensides; gradual wavy boundary.
B3t RSL 64455	34 to 47 inches, pale brown (10YR 6/3) clay with few fine faint brownish yellow (10YR 6/6) mottles; light olive brown (2.5Y 5/4) with common fine faint (2.5Y 5/6) mottles moist; weak medium angular blocky structure; very hard, firm, sticky, very plastic; very few micro and very fine roots; many micro, few very fine tubular pores; common thin clay films on ped faces and in pores; very strongly alkaline (pH 9.2), slightly effervescent with lime disseminated and in soft masses; clear wavy boundary.
C1 RSL 64456	47 to 58 inches, light gray (2.5Y 7.2) clay with common medium distinct brownish yellow (10YR 6/6) mottles, light olive brown (2.5Y 5/4) with common fine distinct yellowish brown (10YR 5/6) mottles moist; moderate coarse angular blocky structure; very hard, firm, sticky, plastic; very few micro roots; few micro and very fine tubular pores; pressure faces on peds; very strongly alkaline (pH 9.2), slightly effervescent with lime disseminated and in soft masses; Mn shot; gradual wavy boundary.
C2 RSL 64457	58 to 69 inches, light brownish gray (2.5Y 6/2) clay with common medium distinct brownish yellow (10YR 6/6) mottles; light olive brown (2.5Y 5/4) with common fine distinct yellowish brown (10YR 5/6) mottles moist; moderate medium and coarse angular blocky structure; very hard, firm, sticky, very plastic; very few micro and fine roots; few micro and very fine tubular pores; pressure faces on peds; strongly alkaline (pH 8.8), slightly effervescent with lime in seams; Mn shot; clear wavy boundary.
C3 RSL 64458 1/	69 to 85 inches, light brownish gray (2.5Y 6/2) clay with common medium distinct brownish yellow (10YR 6/6) mottles; light olive brown (2.5Y 5/4) with many medium distinct yellowish brown (10YR 5/6) mottles moist; moderate medium and coarse angular blocky structure; extremely hard; very firm, sticky, very plastic; very few very fine and micro roots; few micro and very fine tubular pores; few thin clay films on ped faces, pressure faces on peds; strongly alkaline (pH 8.8) strongly effervescent with thick seams of lime; Mn shot.
RSL 64459	109 to 119 inches. Composite sample taken for laboratory but no description

Samples taken for Bureau of Public Roads A2, B22t, and C1.

1/ No sample taken and no description made for 85" to 100".

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Aquic Natrixeralf, fine, montmorillonitic, thermic
SOIL Pescadero clay loam SOIL Nos. 864Calif-48-5 LOCATION Solano County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64460 - 64468

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	1A2a Coarse fragments > 2	1A2a Coarse fragments 2 – 19	1A2a Coarse fragments 19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76 mm	
0–4	A2																	
4–14	B21t																	
14–21	B22t																	
21–30	B23t																	
30–34	B24tcs																	
34–49	B25t																	
49–62	B31tca																	
62–72	B32t																	
86–102																		

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Bulk density 4A1f 1/3 bar	Bulk density 4A1h Oven dry	3B2 Cm	Water content 4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility COLEf	4D1 Extensibility COLE	pH 8C1b Saturated Paste	pH 8C1a H_2O 1:1	pH 8C1a H_2O 1:10
	Pct.	Pct.		Pct.	Pct.	g/cc	g/cc	g/cc	Pct.	Pct.	in./in.	in./in.			
0–4										15.9					
4–14						1.49	2.00	1.00	22.8	19.0	0.105	0.105			
14–21										19.9					
21–30										18.5					
30–34						1.54	1.90	1.00	21.6	17.8	0.074	0.074			
34–49						1.59	1.88	1.00	22.3	17.1	0.056	0.056			
49–62										15.9					
62–72						1.70	1.87	1.00	18.6	14.5	0.033	0.033			
86–102										12.8					

Depth (In.)	Extractable bases 6N2a Ca	6O2a Mg	6P2a Na	5B1a 6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 6M1b Ca	6O1b Mg	6P1a Na	6Q1a K	8A1 6I1a CO_3	6J1a HCO_3	6K1a Cl	6L1a SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter								mmho/cm
0–4	6.6	9.5	0.9	0.5	17.5		23.5		1.0	2.0	3.7	0.2	-	0.3	3.2	2.3	0.79
4–14	5.7	25.1	3.5	0.4	34.7		41.4		5.9	31.8	31.0	0.2	-	0.9	22.3	52.8	5.88
14–21	5.1	24.4	7.2	0.4	37.1		37.2		1.0	5.2	24.5	0.2	-	0.8	19.2	11.2	3.29
21–30	4.7	24.6	11.0	0.4	40.7		36.7		6.9	43.0	75.8	0.2	-	2.4	58.3	77.8	10.9
30–34	45.0	23.7	13.1	0.4	82.2		31.2		32.4	62.5	74.8	0.2	-	1.9	43.6	136	13.0
34–49	4.8	23.2	12.3	0.4	40.7		30.9		8.4	58.5	105	0.2	-	2.4	89.3	89.1	14.6
49–62	13.4	19.8	10.5	0.4	44.1		27.7		4.2	26.1	70.0	0.1	-	2.9	64.2	37.4	9.8
62–72	12.4	17.8	7.8	0.3	38.3		27.0		2.3	11.3	45.0	0.1	-	3.1	45.4	13.5	6.0
86–102	11.7	16.6	4.6	0.3	33.2		22.3		0.8	3.6	15.7	0.1	-	2.7	14.7	2.2	2.18

Depth (In.)	8A Water at Saturation	Exch. bases 5B3b Ca	5B3b Mg	5B1b Na	5D2 Exchangeable Na	5E SAR	6F1a Gypsum	Clay mineralogy (<0.002 mm.) Mont.	Verm.	Mica	Kaolin	
	Pct.	meq./100 g.			Pct.		Pct.	X-ray				
0–4	41.3			0.8	3	3						
4–14	64.2			1.5	4	7	-					
14–21	67.0			5.5	15	14	-					
21–30	65.0			6.1	17	15	-					
30–34	60.0			8.6	28	11	2					
34–49	60.7			14.6	47	18	-					
49–62	61.5			6.2	22	18	-					
62–72	55.5			5.3	20	17						
86–102	53.8			3.7	17	11						

PESCADERO CLAY LOAM
S64-Calif-48-5

Location: Solano County, California. A pit on the Art Brown ranch about 9 miles south of Dixon - 300 feet NW of center of Sec. 1, T5N, R1E, MDB&M. Date of Sampling: October 7, 1964.
Description by: Grant Kennedy, Wells Andrews. Collectors: Reuben Nelson, Ben Brasher, Grant Kennedy, Leland Bates, Sam Johnson, Wells Andrews.
Classification: Aquic Natrixeralf, fine, montmorillonitic, thermic.
Vegetation: Not cultivated. Diminished annual grasses mixed with halophytes. Climate: Average annual precipitation - 18 inches. Mean annual temperature - 60°F. Parent Material: Alluvium from sedimentary rocks of the Coast Ranges. Topography: Plane basin with a slope of less than 1 percent. Elevation: 17 feet. Drainage: Slow runoff, slow permeability and somewhat poor drainage. No free water was encountered in the profile. Soil Moisture: Dry 0-21", moist 21-102".
Remarks: Field pH determined by Hellige-Truog method and thymol blue. This is one of the profiles. Diagnostic horizons and features: ochric epipedon, natric horizon, extensive vertical cracks averaging ½ inch wide on surface and extending about 15" into B. Intermittent slight gilgaiing. Prominent slickensides occur at around 30 inches.

HORIZON	DESCRIPTION
A2 RSL 64460	0 to 4 inches, light gray (2.5Y 7/2) and light brownish gray (2.5Y 6/2) clay loam with few, fine, distinct strong brown (7.5YR 5/6) mottles; dark grayish brown (2.5Y 4/2) with common, fine, distinct dark brown (7.5YR 4/4) mottles when moist; weak coarse platy over strong very coarse prismatic structure (prism tops slightly rounded); very hard, friable, sticky, plastic; abundant micro and very fine random with plentiful fine and medium vertical roots; many micro and very fine tubular and interstitial pores; strongly acid (pH 5.5); clear wavy boundary.
B21t RSL 64461	4 to 14 inches, dark gray (10YR 4/1) clay, very dark grayish brown (10YR 3/2) moist; strong very coarse prismatic structure; extremely hard, very firm, sticky, very plastic; abundant micro and very fine random with plentiful fine and medium vertical roots; common micro tubular pores; many moderately thick clay films on ped faces; slightly acid (pH 6.5); clear wavy boundary.
B22t RSL 64462	14 to 21 inches, olive (5Y 4/3) clay, dark olive gray (5Y 3/2) moist; strong very coarse prismatic to moderate coarse angular blocky structure; extremely hard, very firm, sticky, very plastic; plentiful micro and very fine with few medium vertical roots; common micro tubular pores; many moderately thick clay films on ped faces; moderately alkaline (pH 8.0); gradual wavy boundary.
B23t RSL 64463	21 to 30 inches, brown (10YR 5/3) clay, dark yellowish brown (10YR 4/4) with dark yellowish brown (10YR 3/4) ped faces when moist; strong coarse angular blocky structure; extremely hard, extremely firm, sticky, very plastic; plentiful micro and very fine random with few medium vertical roots; common micro and very fine tubular pores; continuous moderately thick clay films in pores and on ped faces; strongly alkaline (pH 8.6); few slickensides; abrupt wavy boundary.
B24tcs RSL 64464	30 to 34 inches, pale brown (10YR 6/3) clay, brown (10YR 4/3) with very dark grayish brown (10YR 3/2) ped faces when moist; strong medium prismatic structure; extremely hard, extremely firm, sticky, very plastic; few micro and very fine roots; common micro and few fine tubular pores; continuous moderately thick clay films on ped faces; moderately alkaline (pH 8.4); many prominent slickensides; gypsum crystals in seams and soft masses; common Fe and Mn concretions; abrupt wavy boundary.
B25t RSL 64465	34 to 49 inches, light yellowish brown (10YR 6/4) clay, yellowish brown (10YR 5/6) with olive brown (2.5Y 4/4) ped faces when moist; weak medium angular blocky structure; very hard, very firm, sticky, plastic; very few micro roots; many micro and few very fine tubular pores; continuous moderately thick clay films on ped faces and many thick clay films in pores; moderately alkaline (pH 8.4); very few gypsum crystals; common Fe and Mn concretions; clear irregular boundary.
B31tca RSL 64466	49 to 62 inches, light yellowish brown (10YR 6/4) clay, yellowish brown (10YR 5/6) with olive brown (2.5Y 4/4) ped faces when moist; weak medium angular blocky structure; very hard, very firm, sticky, plastic; no roots; many micro and common very fine tubular pores; common thin clay films on ped faces and in pores; moderately alkaline (pH 8.2); strongly effervescent large soft masses and concretions of lime; common pressure faces; gradual wavy boundary.
B32t RSL 64467	62 to 72 inches, light yellowish brown (10YR 6/4) clay, yellowish brown (10YR 5/6) with olive brown (2.5Y 4/4) ped faces when moist; weak medium angular blocky structure; very hard, firm, sticky, plastic; no roots; many medium and very fine tubular pores; common thin clay films in pores and on ped faces; moderately alkaline (pH 8.0); slightly effervescent medium soft masses and concretions of lime.
	72 to 86 inches. No sample taken and no description made.
RSL 64468	86 to 102 inches. Composite auger sample of which no description was made.

No Bureau of Public Roads samples taken.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Aquic Natrixeralf, fine, montmorillonitic, thermic
SOIL Pescadero clay loam SOIL Nos. S64Calif-48-6 LOCATION Solano County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64469 - 64479

Depth (In)	Horizon	1B1b Total Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	Coarse fragments 1A2a: > 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76 mm	
0-5	A1																	
5-12	B21t																	
12-22	B22t																	
22-32	B23t																	
32-39	B24t																	
39-42	B25tca																	
42-51	B31tca																	
51-56	B32t																	
56-67	C1																	
67-80	IIC2																	
92-106																		

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. Iron as Fe Pct.	6E1b Carbonate as $CaCO_3$ Pct.	Bulk density: 4A1f 1/3 bar g/cc	4A1h Oven dry g/cc	g/cc	Water content: Pct.	4B1c 1/3 bar Pct.	4B2 15 bar Pct.	4D1 Extensibility COLE in./in.	4D1 Extensibility COLE in./in.	pH: 8C1b Saturated Paste	8C1a H_2O 1:1	8C1a H_2O 1:10
0-5											12.9					
5-12											14.7					
12-22											15.5					
22-32											16.4					
32-39											18.8					
39-42											15.9					
42-51											15.1					
51-56											11.1					
56-67											10.6					
67-80											15.0					
92-106											14.3					

Depth (In.)	Extractable bases 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	5B1a Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 8A1: 6N1b Ca	6O1b Mg	6P1a Na	6Q1a K		6I1a CO_3	6J1a HCO_3	6K1a Cl	6L1a SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0-5	7.5	8.8	0.4	0.9	17.6		24.3		2.6	4.4	2.7	0.6		-	0.3	8.2	1.6	1.22
5-12	9.1	13.9	1.5	0.4	24.9		30.4		0.6	0.8	3.2	0.1		-	0.3	2.2	1.7	0.49
12-22	9.2	13.9	2.9	0.2	26.2		28.7		1.1	1.4	8.4	tr.		-	0.5	7.9	2.4	1.24
22-32	11.0	14.4	5.7	0.3	31.4		27.8		4.5	7.1	25.7	0.5		-	1.0	23.8	14.4	3.97
32-39	11.5	15.4	6.6	0.3	33.8		33.7		6.9	11.1	36.0	0.5		-	1.4	31.2	23.1	5.37
39-42	13.2	14.6	5.9	0.3	34.0		33.6		11.8	17.4	43.0	0.3		-	1.7	34.1	40.3	5.93
42-51	45.8	13.3	6.5	0.3	65.9		22.9		27.7	32.6	53.0	0.3		-	1.9	39.7	80.4	9.4
51-56	10.7	12.2	6.1	0.2	29.2		17.8		10.8	16.0	41.5	0.3		-	1.5	36.3	35.9	6.4
56-67	8.5	11.2	5.7	0.3	25.7		19.2		5.9	12.8	40.0	0.2		-	1.0	38.5	21.2	5.80
67-80	16.2	13.8	6.6	0.4	37.0		17.6		4.2	7.3	29.3	0.2		-	1.5	27.7	14.6	4.28
92-106	18.0	12.4	5.6	0.4	36.4		27.5		4.0	6.5	28.2	0.6		-	1.6	30.8	8.0	4.14

Depth (In.)	8A Water at Saturation Pct.	Exch. bases 5B3b Ca	5B3b Mg	5B1b Na meq./100 g.	5D2 Exchangeable Na Pct.	5R SAR	6F1a Gypsum Pct.	Clay mineralogy (<0.002 mm.) Mont.	Verm.	Mica	Kaolin	
								X-ray				
0-5	42.3			0.3	1	1						
5-12	40.8			1.3	4	4						
12-22	48.9			2.5	9	5						
22-32	54.9			4.3	16	11						
32-39	56.3			4.6	14	12	-					
39-42	53.2			3.6	11	11	-					
42-51	50.8			3.8	17	9	2					
51-56	48.2			4.1	23	11	-					
56-67	41.5			4.0	21	13	-					
67-80	58.6			4.8	27	12						
92-106	57.5			4.0	14	12						

PESCADERO CLAY LOAM
S64Calif-48-6

Location: Solano County, California. Schmeiser Ranch, a pit located NW¼SW¼NW¼ Sec. 30, T.5N, R.2E, MDB&M. 13 miles east of Fairfield and 1 mile north of State Highway 12. Date of Sampling: October 7, 1964.
Description by: Grant Kennedy and Wells Andrews. Collectors: Reuben Nelson, B. R. Brasher, Leland Bates, Samuel Johnson, Grant Kennedy, Wells Andrews.
Classification: Aquic Natrixeralf, fine, montmorillonitic, thermic.
Vegetation: Not cultivated. Diminished annual grasses. Climate: Average annual rainfall is 19 inches; mean annual temperature is 60°F. Parent Material: Alluvium from sedimentary rocks of the Coast Range. Topography: Basin. Elevation: 15 feet. Drainage: Runoff is slow, permeability is slow, drainage is imperfect. No water table encountered within 106". Soil Moisture: Dry 0-22", slightly moist 22-30", moist below 30".
Remarks: (1) pH determined by Hellige-Truog and thymol blue; (2) This is a satellite profile of paired profile number 64 Cal 48-3-(1-9); (3) Diagnostic horizons are ochric and argillic; (4) Soil extracts obtained at the Dixon, California Work Unit did not have high conductance and did not have exchangeable sodium greater than 15 percent. The lack of good vegetational growth is thought to be caused by excessive magnesium; (5) Cracks ¼ to ½ inch wide are present on the surface and extend downward into the B horizon.

HORIZON	DESCRIPTION
A1 RSL 64469	0 to 5 inches, light brownish gray (10YR 6/2) clay loam with common fine faint brown (10YR 5/3) mottles, dark gray (10YR 4/1) with common fine faint dark grayish brown (10YR 4/2) mottles moist; strong coarse prismatic to strong coarse angular blocky structure; hard, friable, sticky, plastic; abundant micro and very fine roots; common micro and very fine tubular pores; very strongly acid (pH 5.0); clear wavy boundary.
B21t RSL 64470	5 to 12 inches, mottled light gray (10YR 6/1) and grayish brown (10YR 5/2) clay, mottled dark gray (10YR 4/1) and dark grayish brown (10YR 4/2) moist; strong very coarse prismatic structure; extremely hard, very firm, sticky, very plastic; abundant micro and very fine exped, plentiful micro inped roots; many micro and very fine tubular pores; common thin clay films on ped faces; strongly acid (pH 5.5); clear irregular boundary.
B22t RSL 64471	12 to 22 inches, mottled gray (10YR 5/1) and grayish brown (10YR 5/2) clay; mottled dark gray (10YR 4/1) and dark grayish brown (10YR 4/2) moist; moderate very coarse prismatic to moderate coarse angular blocky structure; extremely hard, very firm, sticky, very plastic; abundant micro and very fine exped, plentiful micro inped roots; common micro tubular pores; many moderately thick clay films on ped faces; medium acid (pH 6.0); gradual wavy boundary.
B23t RSL 64472	22 to 32 inches, grayish brown (10YR 5/2) clay, dark grayish brown (10YR 4/2) moist; moderate medium angular blocky structure; extremely hard, very firm, sticky, very plastic; plentiful micro and very fine exped roots; common micro pores; continuous moderately thick clay films on ped faces; moderately alkaline (pH 8.0); gradual wavy boundary.
B24t RSL 64473	32 to 39 inches, brown (10YR 5/3) clay, dark yellowish brown (10YR 4/4) moist; moderate medium angular blocky structure; extremely hard, very firm, sticky, very plastic; few micro and very fine roots; few micro tubular pores; continuous moderately thick clay films on ped faces; moderately alkaline (pH 8.0); few Mn shot; abrupt smooth boundary.
B25tca RSL 64474	39 to 42 inches, pale brown (10YR 6/3) clay, dark yellowish brown (10YR 3/4) moist; weak medium angular blocky structure; extremely hard, very firm, sticky, very plastic; few micro tubular pores; continuous moderately thick clay films on ped faces; moderately alkaline (pH 8.0), strongly effervescent with lime in soft masses; common Mn shot; abrupt wavy boundary.
B31tca RSL 64475	42 to 51 inches, mottled light yellowish brown (10YR 6/4) and yellowish brown (10YR 5/4) clay, mottled yellowish brown (10YR 5/4) and dark brown (10YR 4/3) moist; weak medium angular blocky structure; hard, firm, sticky, plastic; many micro tubular pores; common clay films on ped faces; moderately alkaline (pH 8.0); noticeable gypsum crystals; common Mn shot; clear wavy boundary.
B32t RSL 64476	51 to 56 inches, yellowish brown (10YR 5/4) clay with few fine faint yellowish brown (10YR 5/6) mottles, dark yellowish brown (10YR 4/4) moist; massive; hard, friable, sticky, plastic; few micro and very fine pores; moderately alkaline (pH 8.0); many Mn shot; few gypsum crystals; clear wavy boundary.
C1 RSL 64477	56 to 67 inches, light yellowish brown (10YR 6/4) clay loam with few fine distinct yellowish brown (10YR 5/6) mottles, mottled yellowish brown (10YR 5/6), olive (5Y 5/3), dark reddish brown (5YR 2/2) moist; massive; hard, friable, slightly sticky, slightly plastic; few micro tubular, many very fine interstitial pores; moderately alkaline (pH 8.0); many Mn shot; few gypsum crystals; abrupt wavy boundary.
IIC2 RSL 64478	67 to 80 inches, pale yellow (5Y 7/4) clay with many fine distinct dark reddish gray (5YR 4/2) mottles, olive (5Y 5/3) with many fine distinct dark reddish brown (5YR 2/2) mottles moist; weak fine angular blocky structure; very hard, firm, sticky, very plastic; many micro tubular pores; continuous moderately thick clay films or pressure faces; moderately alkaline (pH 8.0), strongly effervescent with lime in seams and soft masses; many Mn shot.
No sample	80 to 92 inches.
RSL(64479)	92 to 106 inches, composite sample taken for laboratory but no description. No sample taken for Bureau of Public Roads.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Aquic Natrixeralf, fine, montmorillonitic, thermic
SOIL Pescadero clay SOIL Nos. 8640calif-57-12 LOCATION Yolo County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 6443 - 6450

Depth (in.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	Coarse fragments 1A2a: ≥ 2 Pct.	Coarse fragments 1A2a: 2 – 19 Pct. of < 76 mm	Coarse fragments 1A2a: 19 – 76 Pct. of < 76 mm
		Pct. of < 2 mm																
0-3	A1	5.2	54.9	39.9	0.3	0.5	0.5	1.6	2.3	8.7	46.2	12.0	2.9			0		
3-13	B21t	2.0	46.0	52.0	0.1	0.1	0.1	0.5	1.2	6.6	39.4	8.1	0.8			0		
13-26	B22tcs	2.1	49.8	48.1	0.3	0.3	0.1	0.5	0.9	6.2	43.6	7.4	1.2			0		
26-40	B23tca	8.5	51.2	40.3	0.5	0.8	0.4	1.8	5.0	12.0	39.2	18.3	3.5			0		
40-52	B31ca	16.7	48.6	34.7	1.0	1.1	0.6	3.8	10.2	19.2	29.4	32.3	6.5			0		
52-67	B32ca	17.7	46.2	36.1	0.2	0.5	0.4	4.1	12.5	21.0	25.2	36.8	5.2			0		
67-95	C1ca	22.4	46.0	31.6	0.2	0.2	0.3	5.0	16.7	21.7	24.3	42.6	5.7			0		
95-105	C2	20.8	56.5	22.7	tr.	0.1	0.2	4.9	15.6	23.1	33.4	43.0	5.2			0		

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. Iron as Fe Pct.	6E1b Carbonate as $CaCO_3$ Pct.	Bulk density: 4A1f 1/3 bar g/cc	Bulk density: 4A1h Oven dry g/cc	g/cc	3B2 Cm	Water content: Pct.	Water content: 4B1c 1/3 bar Pct.	Water content: 4B2 15 bar Pct.	4D1 Extensibility COLE in./in.	4D1 Extensibility COLE in./in.	pH: 8C1b Saturated Paste	pH: 8C1a H_2O 1:1	pH: 8C1a H_2O 1:10
0-3	2.84	0.200	14	1.4	-	1.60	1.85		1.00		24.0	11.0	0.050	0.050		7.7	8.3
3-13	1.01	0.081	12	1.8	-	1.33	1.68		1.00		33.0	20.8	0.080	0.080		8.9	9.6
13-26	0.58	0.055	11	1.7	3	1.45	1.78		1.00		27.9	27.7	0.070	0.070		8.6	9.6
26-40	0.43	0.043	10	1.8	5	1.56	1.75		1.00		23.3	21.3	0.040	0.040		8.1	9.3
40-52	0.26			1.7	3	1.67	1.81		1.00		19.1	18.5	0.028	0.028		7.9	8.7
52-67	0.19			1.7	2	1.69	1.89		1.00		18.7	13.7	0.038	0.038		8.0	8.7
67-95	0.15			1.6	2	1.67	1.88		1.00		19.4	14.6	0.041	0.041		8.1	8.8
95-105	0.09			1.5	-	1.46	1.54		1.00		25.0	13.6	0.019	0.019		8.3	8.7

Depth (in.)	Extractable bases 5B1a: 6O2a Ca	6N2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 8A1: 6N1b Ca	6O1b Mg	6P1a Na	6Q1a K		6I1a CO_3	6J1a HCO_3	6K1a Cl	6L1a SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0-3	4.8	9.5	12.6	1.8	28.7		28.9		1.2	2.2	61.2	0.7		-	4.1	50.2	6.6	6.6
3-13	3.5	9.6	34.4	0.4	47.9		38.0		0.5	0.8	73.8	0.2		5.4	2.0	35.5	25.6	7.0
13-26	4.7	15.0	38.2	0.3	58.2		33.3		0.4	4.9	136	0.7		-	6.8	64.7	66.3	13.0
26-40	10.2	18.8	21.6	0.3	50.9		29.7		4.4	25.8	170	0.7		-	6.5	65.0	81.8	15.8
40-52	15.5	18.8	5.6	0.5	40.4		25.1		13.2	35.1	49.8	0.4		-	1.9	69.4	15.8	9.4
52-67	18.5	17.7	3.9	0.4	40.5		26.1		10.6	22.8	31.8	0.2		-	2.2	51.8	12.2	6.2
67-95	16.4	16.0	1.4	0.4	34.2		25.1		3.3	5.4	6.4	0.1		-	2.3	10.3	2.5	1.64
95-105	8.8	14.1	0.9	0.4	24.2		22.8		0.4	0.6	2.7	0.1		-	2.6	1.3		0.49

Depth (in.)	8A Water at Saturation Pct.	Exch. bases 5B3b Ca	5B3b Mg	5B1b Na	5D2 Exchangeable Na Pct.	5E SAR	6F1a Gypsum Pct.	Atterberg limits: Plastic limit	Liquid limit	Plastic index		
		meq./100 g.						Pct. of <0.4 mm				
0-3	55.0			9.2	32	47		31	48	17		
3-13	110.6			26.2	69	91	-					
13-26	106.8			17.7	53	84	-	30	56	26		
26-40	67.3			10.2	34	44	-					
40-52	47.7			3.2	13	10	-					
52-67	47.8			2.4	8	8	-					
67-95	44.6			1.2	5	3		18	24	6		
95-105	44.3			0.8	4	4						

PESCADERO CLAY
S64Calif-57-12

Location: Yolo County, California. A pit located about ½ mile east of Rd. 102 in the SE¼ NW¼ NW¼, Sec. 2, T.9N., R.2E. Area located about 2.5 miles east of Woodland. Photo ABB-41T-98. Date of Sampling: October 2, 1964.
Described by: G. J. Staidl. Collectors: R. E. Nelson, B. R. Brasher, G. M. Kennedy, W. F. Andrews, L. A. Bates, G. J. Staidl, C. B. Goudey.
Classification: Aquic Natrixeralf, fine, montmorillonitic, thermic.
Vegetation: Not cultivated, area is in permanent pasture, plants present are pickleweed and saltgrass. Climate: Average annual precipitation is 17.3 inches, mean annual temperature is 61°F. Parent Material: Fine textured alluvium from sedimentary rocks. Topography: Basin; plane (slightly hummocky); less than one percent slope. Elevation: 35 feet. Drainage: Runoff is slow; permeability is slow; drainage is imperfect to poor. Soil Moisture: The profile was moist below 8 inches.
Remarks: (1) Truog soil reaction test and Thymol Blue were used in field pH determination; (2) Paired sample No. 64 Cal. 48-3-1 through 9; (3) Diagnostic horizons-albic or ochric, and natric; (4) Soil temperature at about 100" was 22.5°C.; (5) BPR sample horizons: A2 - 0-3; B22t - 13-26; C1 - 95-105; (6) There is evidence of plant residue in cracks to a depth of 12 inches.

HORIZON	DESCRIPTION
A1 RSL 64443	0 to 3 inches, light gray (2.5Y 7/2) silty clay loam, dark grayish brown (2.5Y 4/2) when moist: weak medium platy structure; very hard, friable, sticky and plastic: plentiful micro random roots; common micro tubular pores; mildly alkaline (pH 7.7) on the immediate surface, moderately alkaline (pH 8.0) about an inch to three inches below the surface; abrupt wavy boundary.
B21t RSL 64444	3 to 13 inches, gray (5Y 5/1) silty clay, very dark gray (5Y 3/1) when moist: strong, very coarse prismatic structure; very hard, friable, sticky and plastic; plentiful micro and abundant medium roots; many micro tubular pores; many moderately thick clay films on ped faces and in pores; strongly alkaline (pH 8.9); gradual wavy boundary.
B22tca RSL 64445	13 to 26 inches, light olive gray (5Y 6/2) silty clay with common fine distinct strong brown (7.5YR 5/6) and gray (N 5/0) mottles, olive (5Y 4/3) with common fine distinct brown to dark brown (7.5YR 4/4) and very dark gray (N 3/0)mottles moist; moderate medium prismatic breaking to moderate medium to coarse angular blocky structure; very hard, firm, sticky and plastic; plentiful micro and abundant medium roots; common micro tubular pores; many moderately thick clay films on ped faces and in pores; slightly effervescent with segregated lime in soft masses; strongly alkaline (pH 8.6); clear wavy boundary.
B23tca RSL 64446	26 to 40 inches, light olive gray (5Y 6/2) silty clay with many fine distinct strong brown (7.5YR 5/6)mottles, olive gray (5Y 4/2) with many fine distinct yellowish red (5YR 4/6) and very dark grayish brown (2.5Y 3/2) mottles when moist; moderate medium prismatic breaking to moderate medium to coarse angular blocky structure; very hard, firm, sticky and plastic; few micro, plentiful medium roots; many micro tubular pores; many moderately thick clay films in pores and continuous moderately thick clay films on ped faces; slightly effervescent segregated lime in seams and soft masses; moderately alkaline (pH 8.1); gradual wavy boundary.
B31ca RSL 64447	40 to 52 inches, light olive gray (5Y 6/2) silty clay loam with many fine distinct strong brown (7.5YR 5/6) mottles, olive gray (5Y 4/2) with many fine distinct yellowish red (5YR 4/6)mottles when moist; moderate medium prismatic breaking to moderate medium to coarse angular blocky structure; hard, firm, sticky and plastic; few micro to fine roots; many micro tubular pores; continuous thin clay films on ped faces and many moderately thick clay films in pores; strongly effervescent with disseminated and segregated lime in seams; moderately alkaline (pH 7.9); gradual wavy boundary.
B32ca RSL 64448	52 to 67 inches, pale brown (10YR 6/3) silty clay loam, with many fine distinct strong brown (7.5YR 5/8)mottles, brown to dark brown (10YR 4/3) with many fine distinct brown to dark brown (7.5YR 4/4) mottles when moist; strong medium prismatic breaking to strong medium to coarse angular blocky structure; hard, friable, sticky and plastic; very few micro roots; many micro tubular pores; continuous thin clay films on ped faces, common thin clay films in pores; violently effervescent with lime segregated in seams; moderately alkaline (pH 8.0); gradual wavy boundary.
C1ca RSL 64449	67 to 95 inches, pale brown (10YR 6/3) clay loam with many fine distinct strong brown (7.5YR 5/8) mottles, brown to dark brown (10YR 4/3) with many fine distinct brown to dark brown (7.5YR 4/4) mottles when moist; moderate medium prismatic breaking to strong coarse angular blocky structure; slightly hard, friable, sticky and plastic; many micro tubular pores; continuous thin clay films on ped faces; violently effervescent with lime segregated in seams; moderately alkaline (pH 8.1); clear wavy boundary.
C2 RSL 64450	95 to 105 inches, very pale brown (10YR 7/4)silt loam, yellowish brown (10YR 5/6) when moist; massive; slightly hard, friable, slightly sticky, slightly plastic; very few fine pores; common micro to very fine tubular and few micro vesicular pores; common thin clay films on cleavage planes and in pores; moderately alkaline (pH 8.3).

CONSECUTIVE PEDON NUMBER C 69 24 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES COMETA TAXADJUNCT SOIL NO. S69 CALI. 31-18 SAMPLE NO. 9 106-9 114 PLACER COUNTY AREA

SOIL FAMILY TYPIC PALEXERALF, FINE-LOAMY, MIXED, THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION <2 MM SAND 2-.05	SILT .05-.002	CLAY LT .002	SANDS VCS 2-1	SANDS CS 1-.5	SANDS MS .5-.25	SANDS FS .25-.10	SANDS VFS .1-.05	SILTS CSI .05-.02	SILTS FSI .02-.002	CLAYS CO. 2-.2U	CLAYS FINE LT .2U	CLAYS CARBONATE 3A1A	INT. COARSE FRAGMENTS II .2-.02	COARSE FRAGMENTS I OF 75-20	COARSE FRAGMENTS II 20-5	COARSE FRAGMENTS III 5-2
			PERCENT OF LESS THAN 2MM													WHOLE SOIL	PCT. OF LT 75		
9 106	0- 20	AP	53.7	36.4	9.9	4.8	8.7	7.9	21.3	11.0	18.5	17.9				41.0	--A	--	--	--
9 107	20- 46	B21T	34.1	25.8	40.1	1.9	4.0	4.4	15.4	8.4	11.1	14.7				29.1	--A	--	--	--
9 108	46- 61	B22T	42.0	24.4	33.6	0.7	2.3	6.1	22.8	10.1	9.7	14.7				32.0	--A	--	--	--
9 109	61- 86	B31T	56.7	20.2	23.1	1.6	6.0	14.3	29.2	5.6	6.8	13.4				24.5	--A	--	--	--
9 110	86-115	B32T	71.7	10.4	17.9	3.0	13.4	23.1	28.6	3.6	3.8	6.6				17.0	--A	--	--	--
9 111	115-140	C1 SI	77.2	6.8	16.0	4.9	10.5	18.9	40.0	2.9	2.1	4.7				16.3	1A	--	--	1
9 112	140-165	C2 SI	79.4	7.8	12.8	9.9	10.6	14.8	42.1	2.0	2.8	5.0				18.4	5A	--	1	4
9 113	165-190	C3	80.7	8.6	10.7	15.8	19.6	16.7	25.0	3.6	4.3	4.3				17.5	17A	--	2	15
9 114	190-205	C4	84.2	6.6	9.2	20.7	30.3	17.3	13.5	2.4	3.8	2.8				11.4	14A	--	2	12

SAMPLE NO.	DEPTH CM.	ORG. CARBON 6A1A -PERCENT--	MATTER NITROGEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	CARBONATE AS CACO3 2-19 6E1B	EXT. IRON FE 6C2B PCT.	ATTERBERG LIMIT LL 4F2 PCT.	ATTERBERG LIMIT PL 4F1 NO.40	BULK DENSITY 1/3 BAR 4A1F	BULK DENSITY DRY 4AH	CM 3B2	WATER CONTENT 1/10 BAR 4B1C	WATER CONTENT 1/3 BAR 4B1C	WATER CONTENT 15 BAR 4B2	EXTENSBLTY LEF 4D1	EXTENSBLTY LE 4D1	PH H2O 1/1 8C1A	PH H2O 1/10 8C1A	PH CACL2 8C1E
									GRAMS PER CC			----PERCENT----			-PERCENT--				
9 106	0- 20	0.46	0.042			0.7			1.79	1.85	1.00		13.7	4.1	1.1	1.1	5.8		5.0
9 107	20- 46	0.25	0.028			1.0			1.48	1.99	1.00		27.5	16.3	10.4	10.4	5.9		5.4
9 108	46- 61	0.16				1.0			1.49	1.83	1.00		25.6	16.7	7.1	7.1	6.4	7.4	6.1
9 109	61- 86	0.06				1.1			1.70	1.81	1.00		17.6	14.4	2.1	2.1	7.0		6.6
9 110	86-115					1.1			1.64	1.71	1.00		16.3	10.9	1.4	1.4	7.1	7.5	6.8
9 111	115-140					0.9			1.51	1.60	1.00		20.1	9.6	1.9	1.9	7.0	7.3	6.6
9 112	140-165					0.9			1.50	1.58	0.98		17.4	8.9	1.7	1.7	6.7	7.4	6.2
9 113	165-190					0.6			1.66	1.75	0.89		12.6	7.1	1.8	1.6	6.7		5.9
9 114	190-205								1.56	1.65	0.92		12.7	5.2	1.9	1.7	6.5		5.7

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6O2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	BASE SAT.	C E C NA- OAC 5A2A	C E C NH4- OAC 5A6A	WATER EXTRACT EC 8A1A	CA 6N1B	MG 6O1B	NA 6P1A	K 6Q1A	CO3 6I1A	SATURATED PASTE HCO3 6J1A	CL 6K1A	SO4 6L1B	B 6T1A	PH SAT. PASTE 8C1B
		----MEQ/100G----					PCT.	-MEQ/100G		MMHO	----MEQ/1000 ML----								PPM	
9 106	0- 20	3.6	2.3	0.1	0.2	6.2	81		7.7											
9 107	20- 46	14.3	11.4	0.5	0.3	26.5	98		27.1											
9 108	46- 61	17.7	15.5	0.8	0.3	34.3	100+		28.4	0.57	1.8	1.9	3.3	0.1		2.5	0.6			6.1
9 109	61- 86	14.5	13.7	0.9	0.2	29.3	100+		27.6	0.43										
9 110	86-115	10.9	11.6	1.1	0.2	23.8	100+		22.0	2.07	5.9	6.9	7.1	0.1	TR	0.5	14.4	4.3		7.0
9 111	115-140	8.9	9.7	1.0	0.1	19.7	100+		16.5	2.85	9.0	10.1	8.6	0.1	TR	0.6	24.6	1.2		6.9
9 112	140-165	8.1	8.7	0.8	0.2	17.8	100+		15.7	2.36	7.2	8.1	6.8	0.1	TR	0.3	20.8			6.7
9 113	165-190	5.9	6.9	0.5	0.1	13.4	100+		11.7											
9 114	190-205	4.7	4.4	0.3	0.1	9.5	100+		8.8											

SAMPLE NO.	DEPTH CM.	WATER AT SAT. 8A PCT.	EXCHANGBLE NA 5B4B MEQ.	EXCHANGBLE NA 5D2 PCT.	SAR 5E	GYPSUM AMT. REQ. 6F1B PCENT	6P3A	CLAY MINERALOGY <0.002 MM LESS THAN 0.002 MM X RAY I 7A2E	X RAY II 7A2E	X RAY III 7A2E	DTA IV 7A2E	DTA 7A3 PCT.	<0.002 MM X RAY I 7A2E	<0.002 MM X RAY II 7A2E	<0.002 MM X RAY III 7A2E
9 106	0- 20		0.1	1				MI 3	KK 3	MT 1					
9 107	20- 46		0.5	2				MI 3	KK 3	MT 2					
9 108	46- 61	47.9	0.6	2	2										
9 109	61- 86		0.9	3											
9 110	86-115	36.8	0.8	4	3	TR									
9 111	115-140	36.8	0.7	4	3	TR									
9 112	140-165	35.5	0.6	4	2			MT 3	MI 3	KK 3	MM 3				
9 113	165-190		0.5	4											
9 114	190-205		0.3	3											

MINERAL CODE	RELATIVE AMOUNT
MI MICA	1 TRACE
KK KAOLINIT	2 SMALL
MT MONTMORT	3 MODERATE
	4 ABUNDANT
MM MT/MICA	5 DOMINANT
	6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

COMETA SANDY LOAM (TAXADJUNCT)* 1/
S69Calif-31-18

Location: Placer County, California. Approximately 2.2 miles southwest of Lincoln; Chris Story ranch. 1,700 feet north of SE corner of sec.20,T.12N.,R.6E. Date of Sampling: 5/8/69.
Description by: L. A. Brittan, T. M. Ryan. Collectors: K. W. Flach, W. D. Nettleton, G. M. Kennedy, T. M. Ryan, L. A. Brittan.
Classification: Typic Palexeralf, fine-loamy, mixed, thermic.
Vegetation: Soft chess, annual rye, rose clover, ripgut brome. Climate: Average annual precipitation 21 inches. Mean annual air temperature 61°F. Parent Material: Granitic sediments. Topography: Gently sloping terrace on a southwest slope of 5 percent. Elevation: 125 feet. Drainage: Moderately well drained; medium runoff; very slow permeability. Soil Moisture: Dry to 18 inches; slightly moist below.
Remarks: Roots stop at top of C1si horizon and are mainly in structural surfaces. Roots in B21t and B22t horizons mainly in cracks between prisms. Some pores in B22t horizon may be root channels. Small gravel occurs in C1si horizon and below. *Has very slightly less than 35 percent clay throughout the upper 50 cm of the argillic horizon and has less montmorillonitic clay than characteristic of the series.

HORIZON	DESCRIPTION
	(0-20 cm.)
Ap RSL 69106	0 to 8 inches, brown (7.5YR 5/4) sandy loam, brown (7.5YR 4/4) moist; many medium distinct pale brown (10YR 6/3) mottles, common fine faint brown (7.5YR 5/4) mottles moist; massive; slightly hard, friable, nonsticky, nonplastic; common very fine vertical roots; common very fine tubular and interstitial pores; medium acid (pH 5.8); abrupt smooth boundary.
	(20-46 cm.)
B21t RSL 69107	8 to 18 inches, brown (10YR 5/3 and 7.5YR 5/4) clay, dark brown (10YR 4/3) moist; strong medium and coarse prismatic structure; very hard, very firm, very sticky, very plastic; common very fine roots in structural planes; few very fine tubular pores; medium acid (pH 6.0); clear wavy boundary.
	(46-61 cm.)
B22t RSL 69108	18 to 24 inches, light yellowish brown (10YR 6/4) clay, dark brown (7.5YR 4/4) moist; few fine distinct yellowish red (5YR 5/6) mottles; moderate medium prismatic structure; very hard, very firm, very sticky, very plastic; few very fine vertical and oblique roots; common very fine tubular pores; common moderately thick clay films line pores; slightly acid (pH 6.5); clear wavy boundary.
	(61-86 cm.)
B31t RSL 69109	24 to 34 inches, light brown (7.5YR 6/4) sandy loam, variegated dark yellowish brown (10YR 4/4) and dark brown (7.5YR 4/4) moist; common medium distinct yellowish red (5YR 5/6) mottles, yellowish red (5YR 4/6) clay films moist; massive; hard, firm, nonsticky, nonplastic; few very fine vertical and oblique roots; many very fine interstitial pores; common moderately thick clay films line pores; mildly alkaline (pH 7.8); gradual wavy boundary.
	(86-115 cm.)
B32t RSL 69110	34 to 46 inches, variegated yellowish red (5YR 5/6), pale brown (10YR 6/3) and light yellowish brown (10YR 6/4) sandy loam, reddish brown (5YR 4/4), brown (7.5YR 5/4) and strong brown (7.5YR 5/6) moist; massive; hard, firm, nonsticky, nonplastic; few very fine vertical and oblique roots; many very fine interstitial pores; many moderately thick clay films bridging and staining mineral grains; moderately alkaline (pH 8.0); clear smooth boundary.
	(115-140 cm.)
C1si RSL 69111	46 to 55 inches, variegated yellowish red (5YR 5/6) light yellowish brown (10YR 6/4) gravelly sandy loam, reddish brown (5YR 4/4), brown (7.5YR 4/4), strong brown (7.5YR 5/6) moist; massive; hard, firm, nonsticky, nonplastic; many very fine interstitial pores; many moderately thick clay films bridging and staining mineral grains; mildly alkaline (pH 7.8); clear smooth boundary.
	(140-165 cm.)
C2si RSL 69112	55 to 64 inches, variegated yellowish brown (10YR 5/8),strong brown (7.5YR 5/6) gravelly sandy loam, dark brown (7.5YR 4/4) moist; massive; hard, firm, nonsticky, nonplastic; many very fine interstitial pores; many moderately thick clay films bridging and staining mineral grains; slightly acid (pH 6.5); clear smooth boundary.
	(165-190 cm.)
C3 RSL 69113	64 to 75 inches, variegated pale brown (10YR 6/3), light yellowish brown (10YR 6/4) gravelly sand, brown (7.5YR 5/4), dark brown (7.5YR 4/4) moist; massive; hard, firm, nonsticky, nonplastic; many very fine interstitial pores; few thin clay films bridging mineral grains; slightly acid (pH 6.5); gradual wavy boundary.
	(190-205 cm.)
C4 RSL 69114	75 to 80 inches, variegated gravelly sand; massive; hard, firm, nonsticky, nonplastic; many very fine interstitial pores; few thin clay films bridging mineral grains; slightly acid (pH 6.5).

1/ **The Cometa series is in a fine, montmorillonitic, thermic family of Typic Palexeralfs. This pedon is in the same subgroup but has less than 35 percent clay in its control section.**

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Palexeralf, fine-loamy, mixed, thermic

SOIL Corning loam (taxadjunct) SOIL Nos. S4557-12 LOCATION Glenn County, California

SOIL SURVEY LABORATORY LAB. Nos.

Depth (In.)	Horizon	7B1b Size class and particle diameter (mm) Total: Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	Int. II (0.2–0.02)	3A1 (2–0.1)	Coarse fragments ≥ 2 Pct.	2 – 19 Pct. of < 76mm	19 – 76 Pct. of < 76mm
		Pct. of < 2 mm														
0-7	Ap	45.6	45.9	8.5	6.9	7.7	5.4	10.7	14.9	18.9	27.0		30.7			
7-13½	A1	43.3	44.7	12.0	5.1	6.0	5.0	12.1	15.1	18.0	26.7		28.2			
13½-21	B21t	36.0	24.5	39.5	1.6	2.7	5.1	16.9	9.7	8.8	15.7		26.3			
21-29	B22t	58.6	14.6	26.8	0.5	1.5	4.8	43.0	8.8	4.5	10.1		49.8			
29-35	IIC1	71.3	6.5	22.2	20.9	17.8	15.8	14.3	2.5	1.4	5.1		68.8			
35-41	IIC2	78.4	3.1	18.5	33.8	20.2	15.0	8.2	1.2	0.6	2.5		77.2			
41-47	IIC3	79.7	3.6	16.7	28.3	19.9	19.1	10.8	1.6	0.7	2.9		78.1			

Depth (In.)	6A2a Organic carbon	6B1a Nitrogen	C/N		Carbonate as $CaCO_3$		Bulk density				Water content				pH	8C1a (1:1)
	Pct.	Pct.			Pct.		g/cc	g/cc	g/cc		Pct.	Pct.	Pct.			
0-7	0.48	0.058														5.7
7-13½	0.22	0.039														5.7
13½-21	0.32	0.058														6.4
21-29	0.14	0.036														7.1
29-35	0.09	0.025														7.6
35-41	0.08	0.024														7.6
41-47	0.08	0.020														7.6

Depth (In.)	Extractable bases 5B1a: Ca 6N2b	Mg 6O2b	Na 1/	K 2/	Sum of bases	6H2a Ext. Acidity	5A3a CEC Sum								Base saturation 5C3 Sum Pct.	Pct
	meq/100 g															
0-7	2.7	1.4	0.06	0.22	4.4	2.8	7.2								61	
7-13½	3.6	3.4	0.05	0.21	7.3	2.4	9.7								75	
13½-21	9.1	15.3	0.14	0.31	24.8	3.5	28.4								88	
21-29	6.1	11.0	0.11	0.33	17.5	1.4	18.9								93	
29-35	4.6	8.1	0.19	0.24	13.1	0.9	14.0								94	
35-41	5.4	7.5	0.19	0.31	13.4	1.0	14.4								93	
41-47	4.1	6.9	0.14	0.29	11.4	0.8	12.2								94	

Depth (In.)

1/ Gravimetrically as sodium uranyl magnesium acetate

2/ Precipitated as potassium sodium cobaltinitrite and titrated as potassium permanganate

CORNING LOAM (taxadjunct) 1/
S4557-12

Location: Glenn County, California. Pit located in the NW¼ NE¼, Sec. 2, T22N, R3W, MDB&M, 0.6 miles east of the NW section corner. Date of Sampling: April 5, 1945.

Description by: R. C. Roberts and R. A. Gardner. Collectors: R. C. Roberts, F. O. Youngs, R. A. Gardner, L. T. Alexander, H. Jenny and R. E. Storie.

Classification: Typic Palexeralf, fine-loamy, mixed, thermic.

Vegetation: Sheep pasture--formerly cultivated. Cover consists of fairly dense stand of short annual grasses and associated herbaceous plants. Climate: Average annual precipitation is 18 inches. Average annual temperature is 63°F., January 45°F., and July 82°F. Parent Material: Mixed alluvium, mainly sedimentary. Topography: Nearly level older terrace. Elevation: 230 feet. Drainage: Well drained, slow permeability, slow runoff. Soil Moisture: Moist.

Remarks: This is a very good example of a soil that is only slightly gravelly in the upper part of the profile but very gravelly in the lower part. The outstanding characteristics of this soil are: (1) The abrupt boundary between the surface and subsoil; (2) the very compact subsoil; (3) the slight mottling probably due to imperfect drainage caused by occasional high water table in the lower part of the profile; (4) gravelly and rather friable condition of the profile below a depth of 30 inches.

Relief, climate, and land use of this site are very similar to those of profile S4557-13 of Corning loam. Vegetation and carrying capacity are much better here than at the site of profile S4557-3 of Corning loam.

HORIZON	DESCRIPTION
Ap	0 to 7 inches, reddish yellow (7.5YR 6/6) gravelly light loam containing a slight amount of gravel, reddish brown (5YR 4/4) moist; weak granular structure; slightly hard, very friable, slightly plastic; abundant small roots; medium acid (pH 5.7); distinct smooth boundary.
A1	7 to 13.5 inches, reddish yellow (7.5YR 6/6) loam containing a slight amount of gravel, reddish brown (5YR 4/4) moist; weak granular structure; hard, friable, slightly plastic; plentiful small roots; medium acid (pH 5.7); abrupt smooth boundary.
B21t	13.5 to 21 inches, yellowish red (5YR 5/6) heavy clay loam (near clay) containing a slight amount of gravel, red (2.5YR 4/6) moist; coarse blocky structure; very compact; extremely hard, extremely firm, very plastic; few roots; slightly acid (pH 6.4); distinct wavy boundary.
B22t	21 to 29 inches, reddish brown (5YR 5/4) sandy clay loam, reddish brown (5YR 4/3) moist; considerable variation in color from highly weathered gravel; massive; compact; very hard, firm, plastic; very few roots; neutral (pH 7.1); abrupt wavy boundary.
IIC1	29 to 35 inches, reddish brown (5YR 5/4) very gravelly sandy clay loam, reddish brown (5YR 4/4) moist, slightly mottled; massive; slightly hard, friable to firm, slightly to moderately plastic; very few roots; gravel dark colored basaltic; some quartzite gravel; mildly alkaline (pH 7.6); very gradual boundary.
IIC2	35 to 41 inches, red (2.5YR 4/6) very gravelly coarse sandy loam, yellowish red (5YR 4/6) moist, slightly mottled; massive; slightly hard, friable to firm, slightly plastic to plastic; very few roots; mildly alkaline (pH 7.6); distinct boundary.
IIC3	41 to 47 inches, red (2.5YR 4/6) very gravelly coarse sandy loam, yellowish red (5YR 4/6) moist, slightly mottled; massive; slightly hard, friable to firm, slightly plastic to plastic; very few roots; mildly alkaline (pH 7.6).

1/ The Corning series is in a fine, montmorillonitic, thermic family of Typic Palexeralfs. This pedon has less than 35 percent clay in its argillic horizon.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Palexeralf, fine, montmorillonitic, thermic

SOIL Corning loam SOIL Nos. 84557-3 LOCATION Tehama County, California

SOIL SURVEY LABORATORY LAB. Nos.

Depth (In.)	Horizon	1B1b Total: Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Size class and particle diameter (mm) Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)	Coarse fragments: > 2 Pct.	2 – 19 Pct. of < 2mm	19 – 76 Pct. of < 76mm
		Pct. of < 2 mm														
0-7	Ap	43.8	46.9	9.3	3.8	4.9	4.4	12.1	18.6	23.1	23.8		25.2			
7-13	A11	43.5	45.9	10.6	4.6	4.8	4.3	11.9	17.9	22.3	23.6		25.6			
13-19	A12	43.4	43.8	12.8	7.3	5.2	4.4	11.1	16.2	21.2	22.6		27.2			
19-27½	B21t	38.8	19.3	41.9	5.8	4.8	6.8	14.1	7.3	6.4	12.9		31.5			
27½-35	B22t	31.3	24.3	44.4	6.8	5.1	4.5	7.6	7.3	9.7	14.6		24.0			
35-48	B23t	35.8	20.5	43.7	11.5	7.8	3.9	6.3	6.3	7.6	12.9		29.5			

Depth (In.)	6A2a Organic carbon	6B1a Nitrogen	C/N		Carbonate as $CaCO_3$		Bulk density			Water content					pH	8C1a (1:1)
	Pct.	Pct.			Pct.		g/cc	g/cc	g/cc	Pct.	Pct.	Pct.				
0-7	0.53	0.056														5.7
7-13	0.28	0.038														6.1
13-19	0.18	0.029														6.5
19-27½	0.28	0.052														7.0
27½-35	0.12	0.030														7.6
35-48	0.08	0.024														7.8

Depth (In.)	Extractable bases: Ca 6N2b	Mg 602b	Na 1/	5B1a K 2/	Sum of bases	6H2a Ext. Acidity	5A3a CEC Sum	Base saturation: 5C3 Sum Pct.	Pct.
	meq/100 g								
0-7	3.9	1.9	0.03	0.14	6.0	2.9	8.9	67	
7-13	4.4	2.5	0.02	0.09	7.0	2.4	9.4	75	
13-19	4.5	4.4	0.15	0.03	9.1	2.2	11.3	80	
19-27½	11.1	17.4	0.72	0.20	29.4	3.4	32.8	90	
27½-35	10.5	18.4	0.51	0.25	29.7	1.8	31.5	94	
35-48	10.1	17.5	0.46	0.25	28.3	1.7	30.0	94	

Depth (In.)

1/ Gravimetrically as sodium uranyl magnesium acetate

2/ Precipitated as potassium sodium cobaltinitrite and titrated as potassium permanganate

CORNING LOAM
S4557-3

Location: Tehama County, California. Pit located 0.05 miles south of the center of Sec. 29, T25N, R3W, MDB&M. Date of Sampling: April 1, 1945.

Description by: R. C. Roberts and R. A. Gardner. Collectors: R. C. Roberts, F. O. Youngs, R. A. Gardner, L. T. Alexander, H. Jenny and R. E. Storie.

Classification: Typic Palexeralf, fine, montmorillonitic, thermic.

Vegetation: Pasture--formerly cultivated. Vegetation is short annual grasses and weeds. Climate: Average annual precipitation is 19 inches. Average annual temperature is 62°F., January is about 45°F., and July about 82°F. Parent Material: Mixed alluvium (mainly sedimentary rocks). Topography: Nearly level older terrace on slope of about 1 percent. Elevation: 315 feet. Drainage: Well drained, slow permeability, slow runoff. Soil Moisture: Moist.

Remarks: These samples were collected a little more than 1/2 mile north of Hanford gravelly sandy loam, profile No. S4557-2, and just about 1/2 mile south of Monserate loam, profile No. S4557-9. The Hanford soils have a slightly lower position than this soil, which is of similar or slightly lower position than Redding gravelly loam. These soils all appear to be from similar types of material, but profile development is different for each one. It was observed at the pit that grass roots are fairly numerous in the soil above the claypan, but that there are very few roots below the claypan. The claypan developed distinct vertical cracks after a few hours of exposure to the sun. It is slightly columnar and the surfaces of the structural units are distinctly colloidal coated. This profile appears to be in an advanced stage of soil development as indicated by the abrupt change in texture, color, structure, and compaction between the surface and subsoil and by the very weak cementing of the underlying material.

HORIZON	DESCRIPTION
Ap	0 to 7 inches, yellowish red (5YR 5/6) light loam containing a slight amount of gravel, reddish brown (5YR 4/4) moist; weak granular structure; moderately to slightly hard, friable, slightly plastic; plentiful small roots; medium acid (pH 5.7); abrupt smooth boundary.
A11	7 to 13 inches, yellowish red (5YR 5/6) gravelly loam, reddish brown (5YR 4/4) moist; weak blocky structure; moderately to slightly hard, friable, slightly plastic; plentiful small roots; slightly acid (pH 6.1); very gradual boundary.
A12	13 to 19 inches, reddish yellow (5YR 6/7) loam containing a slight amount of gravel, yellowish red (5YR 4/6) moist; weak blocky structure; hard, friable, slightly plastic; slightly acid (pH 6.5); abrupt wavy boundary.
B21t	19 to 27.5 inches, reddish brown (5YR 4/4) light clay (near sandy clay) containing a slight amount of gravel, yellowish red (5YR 4/6) moist; strong coarse blocky structure; very compact; very hard, very firm, very plastic; very few roots; neutral (pH 7.0); distinct wavy boundary.
B22t	27.5 to 35 inches, reddish brown (5YR 4/4) gravelly clay, yellowish red (5YR 4/6) moist; color of colloidal glazing on surface of moist aggregates dark red (10R 3/6); strong coarse blocky structure; very compact; extremely hard, extremely firm, very plastic; considerable glazing on surface of aggregates; very few roots; mildly alkaline (pH 7.6); abrupt wavy boundary.
B23t	35 to 48 inches, reddish brown (5YR 4/4) very gravelly clay, yellowish red (5YR 4/6) moist; massive; tough and compact in places; very hard, firm, plastic; possibly some weak cementation; some decomposed gravel; very few roots; mildly alkaline (pH 7.8).

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Palexeralf, fine, montmorillonitic, thermic
SOIL Corning loam SOIL Nos. 84557-13 LOCATION Glenn County, California

SOIL SURVEY LABORATORY LAB. Nos.

Depth (in.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Size class and particle diameter (mm) Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)			Coarse fragments: > 2 Pct.	Coarse fragments: 2 – 19 Pct. of < 76mm	Coarse fragments: 19 – 76 Pct. of < 76mm
		Pct. of < 2 mm																
0-6	Ap	48.6	41.6	9.8	5.2	7.0	5.5	13.8	17.1	17.7	23.9		31.5					
6-12	A1	46.1	41.5	12.4	4.9	7.2	5.1	13.3	15.6	16.8	24.7		30.5					
12-18½	B21t	29.6	26.9	43.5	1.4	2.4	2.7	11.3	11.8	10.3	16.6		17.8					
18½-24	B22t	32.1	27.2	40.7	0.7	1.8	2.6	12.7	14.3	10.7	16.5		17.8					
24-35	B3	40.5	32.9	26.6	0.7	1.5	1.8	14.2	22.3	15.1	17.8		18.2					
35-44	C1	54.2	23.8	22.0	5.8	10.5	7.5	14.7	15.7	9.8	14.0		38.5					
44-54	C2	52.1	26.0	21.9	3.4	7.5	6.1	14.7	20.4	12.2	13.8		31.7					
54-70	IIC3	85.5	5.2	9.3	13.8	29.8	22.0	17.0	2.9	1.3	3.9		82.6					

Depth (in.)	6A2a Organic carbon	6B1a Nitrogen	C/N		Carbonate as $CaCO_3$		Bulk density				Water content					pH	8C1a (1:1)
	Pct.	Pct.			Pct.		g/cc	g/cc	g/cc		Pct.	Pct.	Pct				
0-6	0.39	0.048															6.0
6-12	0.24	0.040															6.3
12-18½	0.30	0.046															6.9
18½-24	0.22	0.052															7.6
24-35	0.08	0.036															8.2
35-44	0.08	0.030															7.7
44-54	0.08	0.032															7.8
54-70	0.06	0.020															7.6

Depth (in.)	Extractable bases 5B1a: Ca 6N2b	Mg 6Q2b	Na 1/	K 2/	Sum of bases	6H2a Ext. Acidity	5A3a CEC Sum	Base saturation 5C3 Sum
	meq/100 g							Pct.
0-6	3.2	2.1	0.06	0.30	5.7	2.3	8.0	71
6-12	4.4	3.5	0.05	0.18	8.1	2.0	10.1	80
12-18½	11.1	16.4	0.21	0.37	28.1	3.5	31.6	89
18½-24	9.8	15.3	0.16	0.46	25.7	1.5	27.2	95
24-35	7.1	10.9	0.14	0.41	18.5	0.6	19.2	97
35-44	5.2	8.4	0.08	0.35	14.0	0.7	14.7	95
44-54	5.6	8.7	0.19	0.35	14.8	0.8	15.6	95
54-70	2.4	3.5	0.03	0.17	6.1	0.6	6.7	91

Depth (in.)

1/ Gravimetrically as sodium uranyl magnesium acetate

2/ Precipitated as potassium sodium cobaltinitrite and titrated as potassium permanganate

CORNING LOAM
S4557-13

Location: Glenn County, California. NW¼ SW¼ Sec. 2, T22N, R3W, MDB&M, 0.55 mile south of the section corner near Malton. Date of Sampling: April 5, 1945. Description by: R. C. Roberts and R. A. Gardner. Collectors: R. C. Roberts, F. O. Youngs, R. A. Gardner, L. T. Alexander, H. Jenny and R. E. Storie. Classification: Typic Palexeralf, fine, montmorillonitic, thermic. Vegetation: Used for pasture. Cover consists of annual grasses and associated herbaceous plants. Climate: Average annual precipitation is 18 inches. Average annual temperature is 63°F., January 45°F., July 82°F. Parent Material: Mixed alluvium, mainly sedimentary. Topography: Nearly level older terrace on slope of about 1 percent. Elevation: 250 feet. Drainage: Well drained, slow permeability, slow runoff. Soil Moisture: Moist.

Remarks: This is a representative profile of areas where the soils of the old terraces gradually grade into the soils of the basins. This soil probably has been influenced in the past by fluctuating ground-water table, and the higher pH of the lower part of the profile may be due to some deposition of calcium carbonate from the ground water. There appears to be some "greenish" or olive-colored mottling at depths between 2 and 3.5 feet.

HORIZON	DESCRIPTION
Ap	0 to 6 inches, strong brown (7.5YR 5/5) light loam containing a slight amount of gravel, reddish brown (5YR 4/3) moist; weak granular structure; slightly hard, friable, slightly plastic; abundant small roots; medium acid (pH 6.0); distinct smooth boundary.
A1	6 to 12 inches, strong brown (7.5YR 5/5) loam containing a slight amount of gravel; dark reddish brown (5YR 3/4) moist; structure and consistence similar to layer above; abundant small roots; slightly acid (pH 6.3); abrupt wavy boundary.
B21t	12 to 18.5 inches, yellowish red (5YR 5/6) clay, color of surface of dry aggregate red (2.5YR 5/6), red (2.5YR 4/6) moist; strong coarse blocky structure; very compact; extremely hard, extremely firm, very plastic; few roots; neutral (pH 6.9); gradual boundary.
B22t	18.5 to 24 inches, strong brown (7.5YR 5/5) light clay, yellowish red (5YR 4/5) moist; weak coarse blocky structure; compact; very hard, very firm, moderately to very plastic; very few roots; mildly alkaline (pH 7.6); distinct wavy boundary.
B3	24 to 35 inches, light yellowish brown (10YR 6/4) heavy loam, brown (10YR 5/3) moist; considerable rust brown mottling; massive; slightly compact; hard, firm, slightly plastic; very few roots; moderately alkaline (pH 8.2); gradual boundary.
C1	35 to 44 inches, light yellowish brown (10YR 6/4) gravelly light sandy clay loam; color dry and moist, structure and consistence similar to layer above, considerable rust brown mottling; very few roots; mildly alkaline (pH 7.7); gradual boundary.
C2	44 to 54 inches, light yellowish brown (10YR 6/4) light sandy clay loam (near loam) containing a slight amount of gravel, brown (7.5YR 5/5) moist; considerable rust brown mottling; massive; slightly hard, friable, slightly plastic; very few roots; mildly alkaline (pH 7.8); abrupt boundary.
IIC3	54 to 70 inches, light yellowish brown (10YR 6/4) gravelly loamy coarse sand, brown (10YR 4/3) moist, some rust brown mottling; massive; loose moist and dry, nonplastic; very few roots; mildly alkaline (pH 7.6).

U. S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Palexeralf, fine, montmorillonitic, thermic

SOIL Corning loam SOIL Nos. S4557-14 LOCATION Tehama County, California

SOIL SURVEY LABORATORY LAB. Nos.

Depth (In.)	Horizon	1B1b Size class and particle diameter (mm) Total Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	Int. II (0.2–0.02)	3A1 (2–0.1)			Coarse fragments ≥ 2 Pct.	2 – 19 Pct. of < 76mm	19 – 76 Pct. of < 76mm
		Pct. of < 2 mm																
0-8	Ap	47.5	42.3	10.2	10.5	9.4	5.6	9.5	12.5	19.7	22.6		35.0					
8-15	A11	45.9	41.5	12.6	8.4	8.9	5.3	10.0	13.3	19.4	22.1		32.6					
15-21	A12	43.8	41.8	14.4	7.9	8.4	5.2	9.5	12.8	19.6	22.2		31.0					
21-29	B21t	21.6	26.7	51.7	5.4	3.6	2.2	4.4	6.0	8.6	18.1		15.6					
29-36	B22t	36.8	28.6	34.6	9.9	6.8	3.8	7.9	8.4	7.2	21.4		28.4					
36-45	IIC1	56.1	20.9	23.0	16.8	15.9	5.6	9.0	8.8	4.3	16.6		47.3					
45-54	IIC2	51.8	15.3	32.9	17.2	16.8	7.1	6.1	4.6	3.6	11.7		47.2					

Depth (In.)	6A2a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct.		Bulk density g/cc	g/cc	g/cc		Water content Pct.	Pct.	Pct.			pH 8C1a (1:1)
0-8	0.22	0.033														5.5
8-15	0.10	0.025														5.7
15-21	0.09	0.023														5.4
21-29	0.14	0.032														5.2
29-36	0.08	0.020														5.2
36-45	0.04	0.018														5.2
45-54	0.06	0.020														5.2

Depth (In.)	Extractable bases Ca. 6N2b	Mg 6O2b	Na 1/	5B1a K 2/	Sum of bases	6H2a Ext. Acidity	5A3a CEC Sum									Base saturation 5C3 Sum Pct.	Pct
	meq/100 g																
0-8	1.2	1.1	<0.01	0.46	2.8	2.3	5.1									54	
8-15	1.4	1.9	<0.01	0.23	3.5	2.0	5.5									64	
15-21	1.6	2.6	tr.	0.17	4.4	2.3	6.7									65	
21-29	5.6	13.5	0.47	0.36	19.9	5.6	25.5									78	
29-36	8.0	18.6	0.64	0.27	27.5	6.1	33.6									82	
36-45	7.2	16.4	0.63	0.35	24.6	5.4	30.0									82	
45-54	7.4	16.7	0.51	0.37	25.0	5.0	30.0									83	

Depth (In.)					

1/ Gravimetrically as sodium uranyl magnesium acetate

2/ Precipitated as potassium sodium cobaltinitrite and titrated as potassium permanganate

CORNING LOAM
S4557-14

Location: Tehama County, California. Pit located just east of U. S. Highway 99W, in the SW¼ NW¼, Sec. 22, T23N, R3W, MDB&M. Date of Sampling: April 5, 1945.

Described by: R. C. Roberts and R. A. Gardner. Collectors: R. C. Roberts, F. O. Youngs, R. A. Gardner, L. T. Alexander, H. Jenny and R. E. Storie.

Classification: Typic Palexeralf, fine, montmorillonitic, thermic.

Vegetation: Used for sheep range. Vegetation is short annual grasses and associated herbaceous plants. Climate: Average annual precipitation is about 19 inches. Mean annual temperature is about 62°F., mean January temperature is about 45°F., and mean July temperature is about 82°F. Parent Material: Terrace alluvium. Topography: Older terrace on slope of about 2 percent. Elevation: 270 feet. Drainage: Well drained, very slow permeability, slow runoff. Soil Moisture: Moist throughout.

Remarks: This soil as observed in the pit and in nearby roadside cuts is very similar to the profile of Corning gravelly loam. One noticeable characteristic that is different is that this profile has little if any evidence of cementation below the claypan, and in this respect it is more typical of the Corning soils. Another difference is the rather abnormally low pH of the lower subsoil. There is evidence of more rodent activity throughout this profile than in the other Corning profile, and much of the rodent activity appears recent. It was quite evident that grass was higher and denser above areas where rodents or insects had buried, at shallow depths, an assortment of grass, leaves, sticks, etc.

HORIZON	DESCRIPTION
Ap	0 to 8 inches, yellowish red (5YR 5/6) gravelly loam, yellowish red (5YR 4/6) moist; weak granular structure; hard, friable, slightly plastic; many small roots; strongly acid (pH 5.5); gradual boundary.
A11	8 to 15 inches, yellowish red (5YR 5/6) loam, red (2.5YR 4/6) moist; weak medium and fine blocky structure; hard, friable, slightly plastic; plentiful small roots; medium acid (pH 5.7); gradual boundary.
A12	15 to 21 inches, yellowish red (5YR 5/6) gravelly loam, red (2.5YR 4/6) moist; weak medium and fine blocky structure; hard, friable, slightly plastic; plentiful small roots; strongly acid (pH 5.4); boundary contains a very thin "bleached" layer just above the claypan that was not sampled. Abrupt wavy boundary.
B21t	21 to 29 inches, red (2.5YR 5/6) clay containing a slight amount of gravel; color of dry surface of aggregate is red (2.5YR 4/6), red (2.5YR 4/6) moist; strong coarse blocky structure; very compact; extremely hard, extremely firm, very plastic; very few roots; strongly acid (pH 5.2); distinct wavy boundary.
B22t	29 to 36 inches, yellowish red (5YR 5/6) gravelly clay loam, red (2.5YR 4/6) moist; weak blocky structure; compact; very hard, very firm, plastic; very few roots; strongly acid (pH 5.2); distinct wavy boundary.
IIC1	36 to 45 inches, yellowish red (5YR 5/6) very gravelly sandy clay loam, red (2.5YR 4/6) moist; massive; compact; hard, firm, plastic; very few roots; strongly acid (pH 5.2); very gradual boundary.
IIC2	45 to 54 inches, yellowish red (5YR 5/6) very gravelly sandy clay loam, red (2.5YR 4/6) moist; structure and consistence similar to layer above; very few roots; strongly acid (pH 5.2).

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Palexeralf, fine, montmorillonitic, thermic

SOIL San Ysidro fine sandy loam SOIL Nos. S64Calif-48-1 LOCATION Solano County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64528 - 64536

Depth (cm)	Horizon	1B1b Total Sand (2-0.05)	Total Silt (0.05-0.002)	Total Clay (<0.002)	Sand Very coarse (2-1)	Sand Coarse (1-0.5)	Sand Medium (0.5-0.25)	Sand Fine (0.25-0.1)	Sand Very fine (0.1-0.05)	Silt (0.05-0.02)	Silt Int. III (0.02-0.002)	Silt Int. II (0.2-0.02)	2-0.1			Coarse fragments 1A2a > 2 Pct. of whole soil	Coarse fragments 2-19 Pct. of <76mm	Coarse fragments 19-76 Pct. of <76mm
		Pct. of <2 mm																
0-18	Ap	55.8	33.8	10.4	0.6	3.7	8.5	26.1	16.9	16.6	15.2	50.6	38.9			0		
18-36	A12	56.1	32.4	11.5	0.4	3.3	8.6	26.0	17.8	17.5	14.9	50.5	38.3			0		
36-71	B21t	38.6	24.2	37.2	0.3	1.5	5.2	19.3	12.3	13.0	11.2	37.0	26.3			0		
71-100	B22t	47.1	22.3	30.6	tr.	0.8	3.9	27.0	15.4	12.4	9.9	45.0	31.7			0		
100-135	B23t	55.1	21.5	23.4	0.2	1.3	5.2	30.0	18.4	12.4	9.1	49.8	36.7			0		
135-175	IIB24t	28.7	43.2	28.1	tr.	0.5	1.9	10.6	15.7	19.5	23.7	42.6	13.0			0		
175-200	IIB3t	61.8	19.6	18.6	0.1	6.3	17.8	26.9	10.7	10.0	9.6	32.8	51.1			0		
200-215	IIIB2tb	23.5	44.9	31.6	tr.	0.7	1.9	8.5	12.4	18.4	26.5	36.6	11.1			0		
260-290		32.9	34.7	32.4	0.1	2.0	5.0	13.8	12.0	15.1	19.6	35.1	20.9			0		

Depth (cm)	6A1a Organic carbon a/ Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. iron as Fe Pct.	Carbonate as $CaCO_3$ 6E1b <2 mm Pct.	Carbonate as $CaCO_3$ 3A1a <0.002 mm Pct.	Bulk density 4A1f 1/3 bar g/cc	Bulk density 4A1h Oven dry g/cc	Bulk density g/cc	3B2 Cm	Water content 4B1c 1/3 bar Pct.	Water content 4B2 15 bar Pct.	Water content 4C1 1/3 to 15 bar cm/cm	4D1 Extensibility COLE cm/cm	4D1 Extensibility COLE cm/cm	pH 8C1b Saturated paste	pH 8C1a H_2O 1:1	pH 8C1a H_2O 1:10
0-18	0.69	0.064	11	0.6	-		1.59	1.70		1.00	13.6	4.3		0.022	0.022		6.4	6.6
18-36	0.36	0.045	8	0.6	-		1.66	1.71		1.00	12.3	4.6		0.010	0.010		5.7	6.3
36-71	0.32	0.052	6	1.2	-		1.54	1.88		1.00	22.8	15.2		0.064	0.064		6.6	7.2
71-100	0.14			1.3	-		1.62	1.90		1.00	21.0	13.9		0.053	0.053		7.0	7.7
100-135	0.07			1.1	-		1.69	1.83		1.00	17.7	10.9		0.027	0.027		7.2	7.8
135-175	0.07			1.3	-		1.65	1.83		1.00	20.1	14.8		0.036	0.036		7.4	8.1
175-200	0.03			0.8	-		1.79	1.88		1.00	13.2	8.9		0.016	0.016		7.7	8.1
200-215	0.03			1.2	-		1.69	1.89		1.00	18.7	15.1		0.038	0.038		7.8	8.3
260-290	0.05			1.2	-							12.9					7.5	8.0

Depth (cm)	Extractable bases 6N2a Ca	6O2a Mg	6P2a Na	5B1a 6Q2a K	6H2a Ext. acidity	5A2a CEC Na OAc	5D2 Exchangeable Sodium Pct.	5E Sodium adsorption ratio	8A Water at saturation Pct.	Water extract from saturated paste 8A1 6N1b Ca	6O1b Mg	6P1a Na	6Q1a K	6I1a CO_3	6J1a HCO_3	6K1a Cl	6L1a SO_4	8A1a Electrical conductivity mmho/cm
	meq/100g									meq/liter								
0-18	4.0	2.5	0.2	0.5	1.9	9.8	1	1	32.6	1.0	0.6	1.3	0.3	-	0.4	1.2		0.35
18-36	4.7	1.8	0.2	0.2	3.0	9.5	-	2	29.5	0.3	0.4	9.5	tr.	-	0.2	0.8		1.52
36-71	13.9	9.5	1.0	0.4	2.4	25.3	-	6	49.8	11.4	12.4	21.9	1.1	-	0.5	10.1	36.9	4.02
71-100	12.8	8.8	1.4	0.3		23.8	5	5	50.5	0.7	0.6	3.9	0.1	-	0.6	3.0		0.59
100-135	10.6	7.9	1.8	0.2		26.7	7	6	48.3	0.5	0.5	4.3	tr.	-	0.5	3.1		0.59
135-175	16.5	11.8	2.9	0.2		32.4	9	7	55.1	2.0	1.6	8.8	0.1	-	0.6	10.5		1.41
175-200	10.2	6.9	1.6	0.2		19.5	7	5	40.1	1.0	1.6	6.1	0.1	-	0.6	7.9		1.00
200-215	16.9	11.8	2.2	0.4		31.4	6	5	55.4	2.7	2.3	8.2	0.1	-	1.1	11.0		1.46
260-290	14.6	9.6	1.4	0.3		25.9	5	4	45.8	0.8	0.7	3.7	0.2	-	0.7	4.2		0.62

Depth (cm)	Ratios to clay 8D1 CEC / Na OAc	Ratios to clay 8D1 Ext. iron	Ratios to clay 8D1 15 bar water	Salt Pct.	6F1a Gypsum Pct.	Clay fraction mineralogy 7A1 7A2 X-ray b/	Atterberg limits Plastic limit	Atterberg limits Liquid limit	Atterberg limits Plastic index
							Pct. of <0.4 mm.		
0-18	0.94	0.06	0.41				N.P.	18	N.P.
18-36	0.83	0.05	0.40			VR3, MI3, KK2			
36-71	0.68	0.03	0.41		-		15	40	25
71-100	0.78	0.04	0.45			MT5, KK2			
100-135	1.14	0.05	0.47				16	33	17
135-175	1.15	0.05	0.52		-	MT5, KK2			
175-200	1.05	0.04	0.48						
200-215	0.99	0.04	0.48		-	MT5, KK2			
260-290	0.80	0.04	0.40						

a/ 5.4 kg of organic carbon per square meter to a depth of 1 meter

b/ Mineral code
- MT = montmorillonite
- VR = vermiculite
- MI = mica
- KK = kaolinite

Approximate weight fraction (X-ray)
- 5 = more than half
- 3 = one-fifth to one-third
- 2 = one-twentieth to one-fifth

SAN YSIDRO FINE SANDY LOAM
S64Calif-48-1

Location: Solano County, California. 3½ miles west and 1 mile south of Dixon on Forsgren Ranch, a pit located 300 yards south, 100 yards west of NE corner of NW1/4 sec. 29, T. 7 N., R. 1 E.
Date of Sampling: October 5, 1964.
Description by: Grant Kennedy, Sam Johnson, and Wells Andrews. Collectors: Reuben E. Nelson, Ben R. Brasher, Leland Bates, Sam Johnson, Grant Kennedy, and Wells Andrews.
Classification: Typic Palexeralf, fine, montmorillonitic, thermic.
Vegetation: Fallow. Climate: 22 inches of rainfall, 60° F. mean annual temperature. Parent Material: Alluvium *from sedimentary rocks*. Topography: Level. Physiography: Old terrace. Elevation: 77 feet. Drainage: Moderately well drained; slow runoff; very slow permeability. No water table encountered within 114 inches of the surface. Soil Moisture: Dry 0-14 inches, slightly moist below 14 inches.
Remarks: pH determined by Hellige-Truog. Sample number of paired profile S64Calif-48-8. Diagnostic horizons are ochric and argillic. An A2 horizon rests on the B21t horizon and varies in thickness from zero to about 2 or 3 inches.

HORIZON	DESCRIPTION
Ap RSL No. 64528	0-7 inches (0-18 cm.), light brownish gray (10YR 6/2) fine sandy loam with few fine distinct mottles of brownish yellow (10YR 6/6), dark brown (10YR 3/3) moist; massive; hard (dry), friable (moist), nonsticky and slightly plastic (wet); abundant micro, plentiful fine and medium random roots; common very fine tubular and interstitial pores; clear smooth boundary.
A12 RSL No. 64529	7-14 inches (18-36 cm.), light brownish gray (10YR 6/2) fine sandy loam with few fine distinct mottles of brownish yellow (10YR 6/6), dark brown (10YR 3/3) moist; massive; hard (dry), friable (moist), nonsticky and slightly plastic (wet); abundant micro, plentiful fine and medium random roots; common micro, few very fine tubular pores; abrupt smooth boundary.
B21t RSL No. 64530	14-28 inches (36-71 cm.), dark yellowish brown (10YR 4/4) heavy clay loam, dark brown (7.5YR 4/4) moist; strong coarse prismatic structure; extremely hard (dry), very firm (moist), sticky and plastic (wet); few very fine and fine roots; common micro tubular pores; many stress cutans are on ped faces and in pores; iron and manganese concretions; gradual smooth boundary.
B22t RSL No. 64531	28-40 inches (71-100 cm.), yellowish brown (10YR 5/6) heavy sandy clay loam, dark yellowish brown (10YR 4/4) with dark brown (7.5YR 4/4) coatings moist; strong medium prismatic structure; extremely hard (dry), very firm (moist), sticky and plastic (wet); few very fine and fine exped roots; common micro tubular pores; many stress cutans are on ped faces and in pores; iron and manganese concretions; gradual smooth boundary.
B23t RSL No. 64532	40-54 inches (100-135 cm.), yellowish brown (10YR 5/4) light sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium prismatic structure; extremely hard (dry), very firm (moist), sticky and plastic (wet); few very fine exped roots; common micro tubular pores; many stress cutans are on ped faces and in pores; iron and manganese concretions; gradual wavy boundary.
IIB24t RSL No. 64533	54-68 inches (135-175 cm.), light yellowish brown (10YR 6/4) light clay loam, dark yellowish brown (10YR 4/4) with brown (7.5YR 4/4) coatings moist; strong medium prismatic structure; hard (dry), firm (moist), sticky and plastic (wet); few very fine exped roots; common micro tubular pores; continuous stress cutans are on ped faces and in pores; clear wavy boundary.
IIB3t RSL No. 64534	68-78 inches (175-200 cm.), yellowish brown (10YR 5/4) heavy sandy loam, dark yellowish brown (10YR 4/4) with brown (7.5YR 4/4) coatings moist; weak coarse prismatic structure; hard (dry), friable (moist), slightly sticky and plastic (wet); very few very fine roots; common micro and few very fine tubular pores; many stress cutans in pores; clear wavy boundary.
IIIB2tb RSL No. 64535	78-84 inches (200-215 cm.), light yellowish brown (10YR 6/4) light clay loam, dark yellowish brown (10YR 4/4) with brown (7.5YR 4/4) coatings moist; weak coarse prismatic structure; hard (dry), very firm (moist), sticky and plastic (wet); many stress cutans on ped faces and in pores.
 RSL No. 64536	84-102 inches (215-265 cm.), no sample taken and no description made. 102-114 inches (260-290 cm.), composite sample of which no description was made.

Samples taken for Bureau of Public Roads Ap, B21 and B23.

CONSECUTIVE PEDON NUMBER C 68110 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES SECCA TAXADJUNCT SOIL NO. S68 CALI. 29- 5 SAMPLE NO. 8 825-8 831 NEVADA COUNTY AREA

SOIL FAMILY MOLLIC PALEXERALF FINE,MIXED MESIC RIVERSIDE SOIL SURVEY LABORATORY

SAMPLE NO.	DEPTH CM.	HORZ.	SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2- .05	SILT .05- .002	CLAY LT .002	SANDS VCS 2-1	CS 1- .05	MS .5- .25	FS .25- .10	VFS .1- .05	SILTS CSI .05- .02	FSI .02- .002	CLAYS CO. 2- .2U	FINE LT .2U	CARBONATE 3A1A	1A2A INT. II .2-.02	COARSE FRAGMENTS PCT. OF WHOLE SOIL	I 75- 20 PCT.	II 20-5 OF LT 75	III 5-2
			PERCENT OF LESS THAN 2MM																	
8 825	0- 8	A1	37.1	49.5	13.4	6.9	7.7	4.7	8.9	8.9	24.2	25.3				38.1	43*	8	26	4
8 826	8- 23	A3	31.6	50.8	17.6	4.6	6.4	3.9	7.8	8.9	23.2	27.6				36.7	29*	7	10Z	N
8 827	0- 0	B21T	18.6	30.2	51.2	2.7	3.0	2.1	5.1	5.7	12.4	17.8				21.2	4A	--	4Z	N
8 828	58- 94	B22T	14.3	35.0	50.7	1.2	2.3	1.8	4.3	4.7	11.6	23.4				18.8	1A	--	TR	1
8 829	94-110	B3 T	16.1	40.8	43.1	1.0	2.7	1.9	4.7	5.8	10.2	30.6				18.8	4A	--	TR	4
8 830	110-125	C	35.5	47.0	17.5	4.5	8.8	4.7	9.4	8.1	12.6	34.4				25.9	40A	--	36	4
8 831	0- 8	A1															41A	--	33	8

SAMPLE NO.	DEPTH CM.	ORG.MATTER CAR- BON 6A1A	NITRO GEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B	2-20 6E1B	SESQUIOXIDES DI-CIT FE 6C2B	EXT AL 6G7A	PYROP FE 6C5A	EXT AL 6G5A	ATTERBERG LIMIT EST. LL 4F2	PL 4F1	BULK DENSITY 1/3 BAR 4A1F	DRY 4A1H	CM 3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2	EXTNSBLTY LEF 4D1	LE 4D1
		PERCENT		PERCENT		PERCENT				PCT.	NO.40	GRAMS PER CC			PERCENT			PERCENT	
8 825	0- 8	2.24	0.086			3.9	0.3			30	27	1.51	1.56	0.70		21.8	10.1	1.1	0.8
8 826	8- 23	1.02	0.048			4.3	0.3					1.50		0.81			9.7		
8 827	0- 0	0.32	0.022			4.2	0.3			57	37	1.45		0.98			18.1		
8 828	58- 94	0.21				3.0	0.2			56	26		1.44	1.82	0.99	29.1	21.3	8.1	8.0
8 829	94-110					0.9	0.1					1.38		0.98			22.7		
8 830	110-125		0.079			0.8	0.1			47	33		1.33	1.46	0.75	33.6	18.2	3.2	2.3
8 831	0- 8	1.58	0.090									1.51			0.71		8.6		

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6Q2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACI- DITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 5A3A	NH4- OAC 5A6A	BASE SATURATION SUM+ ACI- DITY	SUM+ AL	NH4- OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA- CL2 8C1E
		MEQ/100G									PERCENT					
8 825	0- 8	8.5	7.7	0.1	0.2	16.5	7.8		24.3	20.0	68		82		5.9	5.5
8 826	8- 23	6.5	7.2	0.1	0.1	13.9	6.4		20.3	17.7	68		79		5.9	5.3
8 827	0- 0	12.3	15.8	0.1	0.1	28.3			28.3	26.4	100+		100+		6.7	6.2
8 828	58- 94	11.1	22.5	0.2	0.1	33.9			33.9	32.3	100+		100+		6.9	6.7
8 829	94-110	12.3	26.8	0.3	0.1	39.5			39.5	37.6	100+		100+		7.1	6.7
8 830	110-125	11.6	24.0	0.3	0.1	36.0			36.0	36.2	100+		99		6.9	6.5
8 831	0- 8														6.0	5.6

SAMPLE NO	DEPTH CM.	CLAY MINERALOGY LESS THAN 0.002 MM X RAY DTA 7A2E I	7A2E II	7A2E III	7A2E IV	7A3 -PERCENT-	7A3	L.T. 0.0002 MM X RAY 7A2E I	7A2E II	7A2E III	MINERAL CODE	RELATIVE AMOUNT
8 825	0- 8	KK 4	VR 3								KK KAOLINIT	1 TRACE
8 826	8- 23										VR VERMICLT	2 SMALL
8 827	0- 0											3 MODERATE
8 828	58- 94	KK 4	MC 3								MC MT/CHLOR	4 ABUNDANT
8 829	94-110										MT MONTMORT	5 DOMINANT
8 830	110-125	MT 4	KK 3									6 INDETER.
8 831	0- 8											

SAMPLE PREPARATION CODES
*=THE 75-250MM FRACTION IS INCLUDED.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.
A=STANDARD PREPARATION.

SECCA GRAVELLY LOAM (TAXADJUNCT) 1/
S68Calif-29-5

Location: Nevada County, California; 300 yards north of SW corner of SE¼ corner of sec. 4, T. 15 N., R. 8 E., 4 miles SW of Grass Valley, California; 300 yards north of intersection of McCourtney and Wolf Creek Mountain Lookout Roads, 90 feet west of McCourtney Road. Date of Sampling: September 3, 1968.
Description by: G. M. Kennedy, T. M. Ryan, G. Staidl. Collectors: G. M. Kennedy, L. A. Brittan, G. Staidl, C. B. Goudey, T. M. Ryan.
Classification: Mollic Palexeralf, fine, mixed, mesic.
Vegetation: Manzanita, squirrel tail, igger pine, ceanothus. Not cultivated. Climate: Annual average precipitation 46 inches. Mean annual temperature 59°F. Parent Material: Amphibolite. Metabasic rock similar to diabase. These soils also occur in areas suggesting ultrabasic rock. Parent material at this site feels somewhat like talc. Possibly ultrabasic. Topography: Moderately sloping, plain slope, 8 percent near crest of slope. Southeast aspect. Elevation: 2,300 feet. Drainage: Well drained; runoff is medium; permeability is very slow. Soil Moisture: Profile dry to 9 inches, very slightly moist, 9 inches to bottom of profile.
Remarks: pH taken with Hellige kit. Sample S68Calif-29-7 and S68Calif-29-35 were also sampled as Secca soils. Thickness of clay varies from 14 to 34 inches. Reaction of Bt horizons varies from slightly acid to mildly alkaline. Reaction of surface seems uniform. Usually 10 to 25 percent of the surface is covered by stone fragments. Secca soils can occur under brush as well as grass cover. Eroded and open areas have gravel of 5 to 30 millimeters in diameter on surface. This layer is about 1/2 inch thick and covers 60 percent of the surface under the manzanita brush. The A1 horizon contains 3 to 5 percent gravel. There are 10 percent cobble-sized fragments in the A1 and A3 horizons. The A3 horizon contains 25 percent by weight fragments 3 to 10 inches in diameter. The A1 horizon (0-3"), B21t and B22t (9-23 and 23-37 combined) and C1 (43-50) were sampled for the California Division of Highways.

HORIZON	DESCRIPTION
O1	1/4 to 0 inches, manzanita leaves and bark. (0-8 cm.)
A1 RSL 68825	0 to 3 inches, brown (7.5YR 5/4) gravelly loam, dark reddish brown (5YR 3/3) moist; strong medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine random roots; many very fine interstitial pores; medium acid (pH 6.0); abrupt smooth boundary. (8-23 cm.)
A3 RSL 68826	3 to 9 inches, brown (7.5YR 5/4) gravelly loam, dark reddish brown (5YR 3/4) moist; moderate medium subangular blocky structure; hard, friable, sticky, plastic; common very fine and fine oblique and common medium and coarse oblique roots; common very fine interstitial pores; medium acid (pH 5.8); clear wavy boundary. (23-58 cm.)
B21t RSL 68827	9 to 23 inches, brown (7.5YR 5/4) clay, brown and dark brown (7.5YR 4/4) moist; moderate coarse prismatic structure; hard, firm, sticky, very plastic; few very fine and fine oblique and few medium vertical roots; common very fine tubular pores; common moderately thick clay films on faces of peds and lining pores; few fine shot; mildly alkaline (pH 7.5); gradual wavy boundary. (58-94 cm.)
B22t RSL 68828	23 to 37 inches, brown (7.5YR 5/4) clay, brown and dark brown (7.5YR 4/4) moist; weak coarse prismatic structure; very hard, firm, sticky, very plastic; few very fine random and medium vertical roots; few very fine tubular pores; common moderately thick clay films on faces of peds and lining pores; pressure faces evident; mildly alkaline (pH 7.5); clear irregular boundary. (94-110 cm.)
B3t RSL 68829	37 to 43 inches, pale brown (10YR 6/3) clay, light olive brown (2.5Y 5/4) moist; massive; hard, firm, sticky, very plastic; few very fine tubular pores; continuous moderately thick reddish brown (5YR 4/4) clay films line pores; mildly alkaline (pH 7.5); clear wavy boundary. (110-125 cm.)
C RSL 68830	43 to 50 inches, white (5Y 8/1) gravelly loam, pink (5YR 7/4) moist; massive; very hard, very firm, slightly sticky, plastic; many moderately thick reddish yellow (5YR 6/6) clay films in fractures, red (2.5YR 4/8, 5/6) moist; neutral (pH 7.0).

1/ The Secca series is in a fine, mixed, mesic family of Mollic Haploxeralfs. This pedon has an absolute clay increase of more than 20 percent within 3 inches of the top of the B horizon.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Millsap loam (taxadjunct) **LOCATION** San Luis Obispo County, California

SOIL FAMILY: Mollic Palexeralf, fin , montmorillonitic, thermic.

SOIL NOS. S55Ca1. 40-4 **LAB. NOS.** 55465-470

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0- 5	A_{1p}	0.9	3.2	5.6	16.1	13.5	42.1	18.6	42.9	23.5	1	1
5-11	A_{12}	0.7	3.3	5.0	15.3	13.2	42.0	20.5	42.7	22.4	1	1
11-18	A_{13}	0.6	3.4	5.3	15.8	13.3	41.8	19.8	42.9	22.5	1	1
18-26	B_{21}	0.5	1.7	2.8	9.1	8.8	31.1	46.0	27.0	18.9	1	c
26-34	B_{22}	0.7	2.1	3.0	10.1	9.5	32.7	41.9	31.2	17.7	2	c
34-40	B_{23}	0.3	2.4	3.6	9.4	8.0	36.6	39.7	27.8	22.7	6	c1

8C1b pH SATURATED PASTE 1:1	8C1a pH 1:5	8C1a pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	6A1c Elec. Condc. EC×10³ MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	6F1a GYPSUM me./100g. SOIL	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
5.8		6.5	1.95	0.154	12.7							11.4
6.0		6.8	1.34	0.109	12.3							11.8
6.1		7.2	0.74	0.070	10.6							10.8
7.1		8.7	0.62									22.5
7.8		9.1	0.45					<0.2				20.1
7.9		9.3	0.30					<0.2				18.8

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Na 6P2a	K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE Na	K	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil						milliequivalents per liter		
22.4	10.2	4.8	6.8	0.3	0.7	70			
21.5	11.8	5.2	5.5	0.6	0.2	76			
20.8	11.3	5.9	4.8	0.4	0.2	79			
38.6	20.4	15.6	3.2	2.3	0.4	92			
32.2	17.6	14.1	1.8	2.5	0.4	95			
31.7	17.7	14.2	1.4	2.9	0.4	96			

MILLSAP LOAM (taxadjunct) 1/
S55Calif-40-4

Location: San Luis Obispo County, California. On Maino Ranch, about 3/8 mile northwest of San Bernardino Creek Road, 2.6 miles northeast of junction of Highway 101 and San Bernardino Creek Road. Date of Sampling: September 8, 1955.
Description by: J. M. Williams and Rudolph Ulrich. Collectors: W. M. Johnson, Rudolph Ulrich, Lewis Leifer, W. G. Harper, L. R. Wohletz, and J. M. Williams.
Classification: Mollic Palexeralf, fine, montmorillonitic, thermic.
Vegetation: Cultivated field, not irrigated. In barley stubble at time of sampling. Parent Material: Weathered, fractured, metamorphosed shale of the San Luis Obispo formation. Relief: Hilly, erosional, residual upland. Slope about 11 percent, slightly convex, toward the east. Elevation: About 300 feet. Drainage: Well drained. Runoff is moderately rapid; permeability is slow.

HORIZON		DESCRIPTION
A_{1p}	0-5"	Very dark grayish brown to grayish brown (10YR 5/2; 3/2 moist) loam, very hard, friable, very slightly plastic, nonsticky; essentially massive structure with weak coarse prismatic breakage due to extreme drying, probably weak very fine granular when moist, numerous fine roots and elongated porous openings due to fine root hairs, pH 6.0 (Truog). Abrupt, smooth lower boundary.
A_{12}	5-11"	Similarly colored loam, similar consistence, essentially massive with weak coarse prismatic breakage extending downward from surface above, numerous fine roots and elongated tubules due to root hair action. pH 6.2. Clear, smooth lower boundary.
A_{13}	11-18"	Very dark grayish brown (10YR 3/2, moist) loam; very hard; friable, very slightly plastic, nonsticky; essentially massive with very weak coarse prismatic breakage penetrating horizon from above, very numerous elongated fine pinhole openings or tubules due to fine root hair action (these openings have been described in numerous California reports as being vesicular, especially the lower surface or A_2 horizons of Planosolic profiles like Watsonville, Tierra, etc.), common fine root hairs. pH 6.8. Abrupt smooth lower boundary.
B_{21}	18-26"	Very dark grayish brown (2.5Y 3/2, moist) clay; extremely hard, very firm moist, plastic, sticky, moderate coarse and very coarse prismatic breaking to medium and coarse blocky; thin patches of clay skins on vertical faces, numerous slickensides on vertical and transverse faces; roots fine, few, and only along structural planes; few fine manganese shot and very few angular (gravel-size) hard shale fragments. pH 6.8. Clear, smooth lower boundary.
B_{22}	26-34"	Similar colored or slightly more olive brown; clay; extremely hard, extremely firm, plastic, sticky; moderate coarse blocky, thin patchy clay skins, very few fine roots. Common fine manganese shot, more numerous shale fragments. pH 7.3. Clear smooth lower boundary.
B_{23}	34-40"	Dark grayish brown (2.5Y 4/2, moist) clay; extremely hard, extremely firm, plastic, sticky; weak medium blocky; very fine roots; few fine manganese shot and common shale fragments. pH 7.5. Abrupt wavy lower boundary.
D_r	40"+	Shattered, hard, metamorphosed shale with some weathered material between the fragments but essentially unaltered within an inch or two (San Luis Obispo formation).

1/ The Millsap series is in a fine, vermiculitic, thermic family of Typic Palexeralfs. This pedon is montmorillonitic and has an ochric epipedon with greater than 0.7 percent organic carbon and has a color value of less than 3.5 when moist.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Positas gravelly loam **LOCATION** Alameda County, California

SOIL FAMILY: Mollic Palexeralf, fine, montmorillonitic, thermic

SOIL NOS. 59Calif-01-1 **LAB. NOS.** 59204 thru 59210

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0-8	A_p	3.1	4.1	3.6	9.7	10.3	53.2	16.0	47.7	21.9	21	sil
8-11	A_3	3.6	3.8	3.4	9.4	10.0	53.4	16.4	45.5	24.0	10	sil
11-20	B_{21}	1.9	2.3	1.8	5.3	5.8	29.9	53.0	25.3	13.8	14	c
20-29	B_{22}	2.5	2.9	2.9	10.9	3.7	34.4	42.7	27.7	16.5	4	c
29-39	B_{31}	2.9	4.3	4.6	15.4	11.0	34.9	26.9	38.2	17.3	8	l-cl
39-54	B_{32}	2.9	3.5	6.8	21.4	12.3	29.7	23.4	41.3	13.7	14	l
54-64+	C_1	13.8	10.8	9.6	18.4	8.2	18.1	21.1	27.4	8.9	40	scl

pH		Organic Matter			6E1b $CaCO_3$ Equivalent	8A1a Elec. Conduc. mmhos/cm. at 25°C.					4B2 Soil water 15 atmos.
8C1b Saturated Paste 1:1	8C1a 1:10	6A1a Organic Carbon Pct.	6B1a Nitrogen Pct.	C/N	Pct.						Pct.
5.9	6.6	1.07	0.080	13.4		0.3					5.8
5.8	6.8	0.54	0.049	11.0		0.3					6.4
6.0	7.4	0.56	0.060	9.3		0.3					23.1
7.4	8.5	0.34	0.045	7.6		0.6					18.4
7.9	9.0	0.04			Tr	1.3					10.8
8.0	8.9	0.03			Tr	1.8					9.7
7.7	8.6	0.03				2.2					8.9

5A2a	EXTRACTABLE CATIONS 5B					BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1					8A
CATION EXCHANGE CAPACITY (+(Na))	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a		6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	MOISTURE AT SATURATION
	milliequivalents per 100g. soil →						← milliequivalents per liter →					%
15.5	5.5	4.8	4.0	0.3	0.2	73	1.8	0.1				29.2
16.8	5.8	6.0	4.7	0.5	0.2	73	1.9	<0.1				23.4
42.3	20.7	8.7	7.5	2.1	0.5	81	2.3	<0.1				64.3
34.4	20.7	9.9	3.8	2.2	0.4	90	4.7	<0.1				63.8
24.4	10.0	13.7	0.8	1.9	0.4	97	9.3	0.1				35.9
19.1	7.4	13.0	1.2	2.3	0.4	95	13.3	0.1				39.7
23.2	6.5	11.9	1.6	2.7	0.3	93	16.0	0.1				31.5

1/ Percent of whole soil except for 54-64" horizon; in this horizon about 25 percent stones and gravels >1" diameter were discarded at time of sampling and are not included in the >2 percentage.

POSITAS GRAVELLY-LOAM
S59Calif-01-1

Location: Alameda County, California. 216 feet east of Greenville Road and 168 feet south of the northeast corner of Sec. 25, T. 3 S., R. 2 E. about 3 miles southeast of Livermore. Date of Sampling: May 4, 1959.
Description by: L. E. Welch. Collectors: R. G. Huff, L. E. Welch, L. H. Grant, and J. E. McClelland.
Classification: Mollic Palexeralf, fine, montmorillonitic, thermic.
Vegetation: Annual grasses including soft chess, filaree, and wild oats. Land Use: Not cultivated for about 5 years. Climate: About 15 inches rainfall. Parent Material: Old terrace deposits of mixed mineralogical origin from the Franciscan formation, probably of Livermore age. Relief: Gently sloping terrace, on a 4 percent southwest-facing slope. Elevation: About 600 feet. Drainage: Well drained, moderate runoff, very slow permeability.
Remarks: The soil is a maximal Noncalcic Brown with some stones and cobbles throughout the profile. The A3 horizon may be an A2, being slightly grayer (less than 1/2 chip) than the A1. Prisms have gray coatings on top and have slightly rounded edges, but have essentially flat upper faces. The A3 or A2 looks like degraded B2 in places with some clay films on small angular blocks. Few worm holes in surface.

HORIZON		DESCRIPTION
A_p	0-8"	Brown (10YR 5/3) gravelly loam, (7.5YR 3/2) when moist; essentially massive although surface few inches have weak horizontal cleavage; hard when dry, friable when moist; abundant fine roots; many fine pores; medium acid, pH 6.0; abrupt, smooth lower boundary.
A_3	8-11"	Similar to above in all respects except color values are nearly 1/2 chip higher; abrupt, smooth boundary.
B_{21}	11-20"	Dark reddish gray (5YR 4/2) clay, dark reddish brown (5YR 3/3) when moist; strong coarse prismatic structure; extremely hard when dry, extremely firm when moist, very plastic and sticky when wet; few fine roots along structure faces; few fine tubular pores; thick, continuous clay films on ped faces but colloid nearly fills pores; common slickensides; slightly acid, pH 6.5; gradual, smooth lower boundary.
B_{22}	20-29"	Reddish brown (5YR 4/4) dry and moist, clay; strong coarse prismatic structure; similar to B_{21} except has a little less clay; moderately alkaline, pH 8.0; abrupt, smooth lower boundary.
B_{31}	29-39"	Brown (7.5YR 5/5) heavy clay loam with many yellowish red (5YR 5/5) coatings and common fine (1 to 2 mm.) black stains, brown (7.5YR 4/4) and yellowish red (5YR 4/6) when moist; strong medium angular blocky structure; very hard when dry, firm when moist, plastic and sticky when wet; few fine roots; few fine tubular pores; moderately thick continuous clay films on peds and in pores; moderately alkaline, pH 8.0; very weakly calcareous; gradual, smooth lower boundary.
B_{32}	39-54"	Light yellowish brown (10YR 6/5) clay loam with few yellowish red (5YR 4/6) coatings and common fine black stains, brown (10YR 5/4) and yellowish red (5YR 4/6) when moist; strong medium angular blocky structure; very hard when dry, firm when moist, sticky and slightly plastic when wet; few fine roots; few fine tubular pores; moderately thick, continuous clay films on peds and in pores; moderately alkaline, pH 8.0; very weakly calcareous; gradual, smooth lower boundary.
C_1	54-64"+	Light yellowish brown (10YR 6/5) gravelly sandy loam with a few yellowish red (5YR 4/6) coatings, yellowish-brown (10YR 5/4) with yellowish red (5YR 4/6) coatings when moist; massive; slightly hard when dry, friable when moist; about 1 percent by volume of rocks over 3 feet in diameter and about 15 percent 1 to 3 inches in diameter, moderately alkaline, pH 8.0+.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Positas loam **LOCATION** Alameda County, California

SOIL FAMILY: Mollic Palexeralf, fine, montmorillonitic, thermic

SOIL NOS. 59Calif-01-2 **LAB. NOS.** 59211 thru 59217

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0-8	A_{1p}	6.4	7.2	6.1	12.7	10.3	43.4	13.9	41.4	20.0	16	l
8-11	A_{12}	4.6	6.0	5.4	12.0	11.0	44.3	16.7	42.0	20.5	7	l
11-18	B_{21}	2.6	3.5	3.0	7.1	6.2	27.7	49.9	24.6	13.6	21	c
18-24	B_{22}	6.1	5.0	3.1	7.3	7.0	29.5	42.0	26.3	14.7	12	c
24-35	B_{31}	10.2	11.8	5.3	9.7	8.1	33.9	21.0	26.7	21.0	38	l
35-50	B_{32}	23.1	15.7	3.5	4.1	3.0	23.1	27.5	11.0	17.3	71	scl
50+	C_1	13.1	12.0	7.6	12.1	6.3	21.5	27.4	21.8	12.4	71	scl

pH		Organic Matter			6E1b	8A1a					4B2
8C1b Saturated Paste 1:1	8C1a 1:10	6A1a Organic Carbon Pct.	6B1a Nitrogen Pct.	C/N	$CaCO_3$ Equivalent Pct.	Elec. Conduc. mmhos/cm. at 25°C.					Soil water 15 atmos. Pct.
6.2	6.6	1.15	0.092	12.5		0.4					6.3
6.0	6.6	0.50	0.051	9.8		0.3					6.9
5.7	7.0	0.56	0.063	8.9		0.2					21.5
6.5	7.6	0.37	0.047	7.9		0.3					18.2
7.5	8.5	0.08				0.6					13.1
7.9	8.9	0.03				0.6					17.3
7.9	8.9	0.03				0.8					13.3

5A2a	EXTRACTABLE CATIONS 5B					BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1					8A
CATION EXCHANGE CAPACITY ←(Na)	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a		6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	MOISTURE AT SATURATION
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
16.4	7.2	5.3	4.6	0.2	0.3	74	1.0	<0.1				28.5
17.3	6.6	6.0	4.6	0.3	0.2	74	1.4	<0.1				25.8
39.3	18.7	12.8	7.2	1.0	0.5	82	1.5	<0.1				57.4
38.4	20.2	12.1	4.4	1.2	0.4	89	2.4	<0.1				52.1
41.8	26.8	10.1	3.1	1.9	0.4	93	4.7	<0.1				41.2
44.3	26.8	11.4	2.3	3.6	0.6	95	5.1	<0.1				47.4
32.8	14.4	11.9	2.1	3.3	0.4	94	6.5	<0.1				41.3

1/ Stones and gravel >1" diameter discarded at time of sampling as follows:

Horizon B_{31} - 15%
Horizon B_{32} - 15%
Horizon C_1 - 20%

POSITAS LOAM
S59Calif-01-2

Location: Land grant - 169° east of true north of BM 448, 122° east of true north of BM 478, about 4 miles south of the center of Livermore in the Crowhare Ranch in Alameda County, California. Date of Sampling: May 4, 1959.
Description by: L. E. Welch. Collectors: R. C. Huff, L. E. Welch, L. H. Grant, and J. E. McClelland.
Classification: Mollic Palexeralf, fine, montmorillonitic, thermic.
Vegetation: Annual grasses and forbs, soft chess, filaree, wild oats, and clover. Land Use: Cultivated pasture. Climate: 15 inches rainfall. Parent Material: Old terrace deposits of the Livermore formation consisting of sediments of mixed mineralogical origin from the Franciscan formation. Relief: Gently sloping old terrace, slope 5 percent to the southwest. Elevation: 640 feet. Drainage: Well drained, moderate runoff, very slowly permeable.
Remarks: This is a maximal Noncalcic Brown soil with considerable gravel, cobbles and stones below the B22, few above. Very little indication of worm activity.

HORIZON		DESCRIPTION
A_{1p}	0-8"	Brown (10YR 5/3) heavy loam, dark brown (10YR 3/3); massive; very hard when dry, friable when moist; abundant fine roots; many fine tubular pores; medium acid, pH 6.0; clear, smooth lower boundary.
A_{12}	8-11"	Similar to above; abrupt, smooth lower boundary.
B_{21}	11-18"	Reddish brown (5YR 4/3) clay, dark reddish brown (5YR 3/4) when moist; strong coarse prismatic structure, nearly massive when moist; extremely hard when dry, extremely firm when moist, very plastic and sticky when wet; few fine roots along prism faces, very few in peds; nonporous except for cracks along ped faces; thick, continuous clay films on ped faces, colloid nearly fills all pores; slightly acid, pH 6.2; clear, smooth lower boundary.
B_{22}	18-24"	Brown (7.5YR 4/3) clay, brown (7.5YR 4/4) when moist; otherwise similar to B_{21} except pH 6.5; abrupt, irregular lower boundary.
B_{31}	24-35"	Strong brown (7.5YR 5/6) gravelly clay loam with many fine, black stains, brown (7.5YR 4/4) when moist; massive; very hard when dry, firm when moist, plastic and sticky when wet; very few fine roots; very few fine tubular pores; moderately thick, continuous clay films in pores and bridges; moderately alkaline, pH 8.0; gradual, smooth lower boundary.
B_{32}	35-50"	Colors as above; stratified gravelly clay loam and very gravelly loam; massive; hard when dry, friable when moist; clay films as above; moderately alkaline, pH 8.0; gradual, smooth lower boundary.
C_1	50"+	Yellowish brown (10YR 5/6) stratified gravelly loam with strong brown (7.5YR 5/6) coatings, brown (7.5YR 4/4) when moist; massive; hard when dry, friable when moist; fewer and thinner clay films than in B_{22}; very few fine roots; very few fine tubular pores; moderately alkaline, pH 8.0.

U S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Natric Palexeralf, fine, montmorillonitic, thermic.
SOIL Bonsall sandy loam **SOIL Nos.** S64Calif-37-3 **LOCATION** San Diego County, California
SOIL SURVEY LABORATORY Riverside, California **LAB. Nos.** 6430 - 6439

Depth (In.)	Horizon	1B1b Total Sand (2–0 05)	Total Silt (0 05–0.002)	Total Clay (< 0 002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0 25–0 1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1 * Clay <.002	3A1 ** Clay <.002	1/ Coarse fragments 1A2a ≥ 2	2 – 19	19 –76
		Pct. of < 2 mm														Pct.	Pct. of < 76 mm	
0- 6	A1	68.0	23.3	8.7	11.0	15.0	9.8	19.4	12.8	13.3	10.0	36.2	55.2	8.4	8.1	4	4	0
6-10	A2	62.9	24.7	12.4	9.3	13.6	9.0	18.6	12.4	13.9	10.8	36.2	50.5	11.0	10.7	3	3	0
10-14	B1	42.4	18.7	38.9	6.0	8.3	5.9	13.0	9.2	10.4	8.3	27.0	33.2	40.5	38.9	4	4	0
14-27	B21t	40.6	21.1	38.3	2.8	6.1	5.1	15.0	11.6	11.9	9.2	32.5	29.0	36.3	35.7	2	2	0
27-38	B22tca	48.2	23.3	28.5	2.0	4.1	5.5	20.8	15.8	13.8	9.5	42.3	32.4	29.0	28.1	3	3	0
38-48	B31	64.3	17.2	18.5	1.6	7.4	10.3	28.7	16.3	9.8	7.4	42.4	48.0	18.0	17.9	1	1	0
48-60	B32	69.8	10.8	19.4	3.3	14.1	16.4	27.9	8.1	7.2	3.6	29.0	61.7	19.6	19.1	2	2	0
60-89	C1	52.2	26.5	21.3	5.5	8.9	8.6	18.5	10.7	16.7	9.8	37.9	41.5	21.6	20.2	7	7	0
89-110	IIC2	56.5	29.3	14.2	12.8	12.1	6.9	13.8	10.9	12.6	16.7	30.8	45.6	20.4	12.0	31	31	0
110-120+	IIC3	50.5	32.5	17.0	3.3	10.8	8.0	16.2	12.2	12.7	19.8	33.8	38.3	18.4	17.2	7	7	0

Depth (In.)	6A1a * Organic carbon	6B1a * Nitrogen	C/N	*6C2a Ext. Iron as Fe	6E1b ** Carbonate as $CaCO_3$	Bulk density 4A1f 1/3 bar	Bulk density 4A1h Oven dry	3B2 C'	Water content 4B1c 1/3 bar	Water content 4B2* 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH 8C1b Saturated Paste	pH 8C1a H_2O 1:1	pH 8C1a H_2O 1:10
	Pct.	Pct.		Pct.	Pct.	g/cc	g/cc		Pct.	Pct.	in./in.	in./in.			
0- 6	0.70	0.054	13	0.7		1.51	1.54	0.98	10.6	4.2	0.006	0.006	6.5	6.6	
6-10	0.28	0.033	8	0.8		1.76	1.78	0.98	9.5	4.5	0.003	0.003	6.4	6.8	
10-14	0.47	0.047	10	1.6		1.60	1.85	0.98	20.1	13.9	0.049	0.048	6.5	6.8	
14-27	0.21			1.0		1.73	1.99	0.99	17.7	13.1	0.047	0.047	7.6	8.0	
27-38	0.11			0.9	3					12.6			7.8	8.1	
38-48	0.02			1.3		1.60	1.78	0.99	20.2	10.6	0.036	0.036	7.7	8.0	
48-60	0.02			1.2						9.4			7.6	8.0	
60-89	0.02			1.2		1.67	1.76	0.95	15.4	11.7	0.018	0.017	7.7	8.0	
89-110	<0.01			1.4						13.3			7.9	8.3	
110-120+	<0.01			1.3		1.59	1.69	0.96	20.8	15.0	0.021	0.020	7.7	8.1	

Depth (In.)	Extractable bases 6N2a * Ca	6O2a * Mg	6P2a * Na	6Q2a * K	5B1a Sum * of bases	6H2a * Ext. Acidity	Cation Exch. Capacity 5A2a * NaOAc	5A3a * Sum	Water extract from saturated paste 8A1 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K	6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter								mmho/cm
0- 6	4.3	1.7	0.3	0.2	6.5	1.8	8.7	8.3	2.7	2.2	1.6	0.2	-	4.8	0.6		0.57
6-10	4.7	2.4	0.6	0.1	7.8	1.8	10.2	9.6	0.7	1.0	2.4	0.1	-	1.8	0.6		0.34
10-14	11.2	8.8	2.1	0.2	22.3	3.1	25.6	25.4	0.9	0.6	5.0	0.1	-	1.4	3.0		0.66
14-27	13.8	8.2	3.5	0.2	25.7	0.6	24.7	26.3	2.1	2.9	15.3	0.2	-	2.2	14.3		2.16
27-38	20.2	10.1	6.7	0.2	37.2	0.2	26.8	37.4	5.4	6.4	33.8	0.2	-	2.2	38.5		4.80
38-48	10.2	7.5	6.3	0.1	24.1	0.6	23.0	24.7	5.5	6.6	39.8	0.1	-	1.5	46.4		5.65
48-60	8.5	6.2	5.1	0.1	19.9	0.8	20.1	20.7	3.5	3.5	30.2	0.1	-	1.0	33.9		4.07
60-89	10.6	7.4	5.9	0.1	24.0	0.8	24.6	24.8	2.1	2.9	27.5	0.1	-	0.9	29.2		3.56
89-110	18.1	8.4	7.1	0.1	33.7	1.3	36.7	35.0	1.0	0.8	13.2	0.1	-	2.6	11.7		1.79
110-120+	14.1	8.6	5.9	0.1	28.7	1.3	31.0	30.0	1.0	0.8	12.8	0.1	-	1.0	13.1		1.74

Depth (In.)	8A Water at Saturation	5D2 Exchangeable Na	5F SAR	Base Sat. Cations	Base Sat. NaOAc CEC	Clay mineralogy (<0.002 mm) 7A Relative abundance based on height of diagnostic X-ray peak: Mont.	Verm.	Hydrobiotite	Mica	Kaol.	% Kaol. (DTA) 7A3	% Kaol. in ground whole soil (DTA)
	Pct.	Pct.		Pct.	Pct.	X-ray						
0- 6	25.8	2	1	78	73	-	t	t	xxxx	xx	15	1
6-10	19.8	5	3	83	77	xx	t	xx	x	xx		
10-14	44.7	7	6	88	86	xx	x	t	t	xxx		
14-27	50.8	11	10	98	101	xxx	t	t	t	xxx	26	14
27-38	49.6	19	14	99	133							
38-48	38.7	20	16	97	98	xxx	-	t	t	xx	20	10
48-60	33.9	20	16	96	94							
60-89	39.4	20	17	97	93						11	10
89-110	47.1	18	14	95	90							
110-120+	47.2	17	14	96	91						5	7

1/ From characterization sample; determined by shaking overnight in a sodium hexametaphosphate solution.

* Analysis of ground whole soil; results expressed on <2-mm basis

** Analysis of ground whole soil; results expressed on whole-soil basis.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

BONSALL SANDY LOAM
S64Calif-37-3

Location: San Diego County, California. A soil profile pit located 2-1/4 miles south, 3/4 mile east of Fallbrook in the NE1/4 of the SW1/4 of section 31, T. 9 S., R. 3 W. Date of Sampling: February 18, 1964.
Description By: David C. Estrada and Gerald Kester. Collectors: Klaus Flach, George Borst, Gerald Kester, David C. Estrada and Leo Klameth.
Classification: Natric Palexeralf, fine, montmorillonitic, thermic.
Vegetation: Annual grasses and annual weeds. Climate: This soil occurs under 15 inches of rainfall. The mean annual temperature is 60° F., the mean January temperature 54° F., and the mean July temperature 70° F. Parent Material: Tonalite grus. Topography: South-facing, smooth 8 percent slopes in lower backslope positions on rolling upland. Elevation: 545 feet above sea level. Drainage: Moderately well drained; very slowly permeable. Soil Moisture: Profile moist to about 15 inches.
Remarks: The texture of the C1 horizon is finer than the IIC2 or IIC3 horizons. This may reflect variation in grain size of the grus, differences in weathering of the horizons, or soil creep. This pedon could be classified as a Mollic Palexeralf.

HORIZON	DESCRIPTION
A1 RSL No. 6430	0 to 6 inches, brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; moderate fine to medium crumb structure; hard, friable, slightly sticky and nonplastic; abundant very fine and fine, and few medium roots; many very fine and fine tubular pores; slightly acid (pH 6.2); abrupt smooth boundary.
A2 RSL No. 6431	6 to 10 inches, same as above except the horizon is massive, roots are plentiful, and pores common; abrupt smooth boundary.
B1 RSL No. 6432	10 to 14 inches, brown (7.5YR 5/4) heavy clay loam, dark brown (7.5YR 4/4) moist; moderate medium angular blocky structure; very hard, firm, sticky, and plastic; plentiful very fine and fine, and few medium roots; few fine and medium tubular pores; slightly acid (pH 6.5); clear smooth boundary.
B21t * RSL No. 6433	14 to 27 inches, yellowish brown (10YR 5/4) light clay, dark yellowish brown (10YR 4/4) moist; strong coarse prismatic structure; extremely hard, very firm, sticky and plastic; few very fine, fine and medium roots; few fine and medium tubular pores; many moderately thick clay skins on ped faces; mildly alkaline (pH 7.8); slightly effervescent; clear smooth boundary.
B22tca RSL No. 6434	27 to 38 inches, light yellowish brown (10YR 6/4) light clay, yellowish brown (10YR 5/4) moist; structure, consistence, roots, pores, clay skins and boundary same as above; moderately alkaline (pH 8.0); strongly effervescent; clear smooth boundary.
B31m RSL No. 6435	38 to 48 inches, brown (7.5YR 5/4) and reddish brown (2.5YR 5/4) sandy loam, dark brown (7.5YR 4/4) and reddish brown (2.5YR 4/4) moist; massive; very hard, firm, nonsticky and slightly plastic; few medium roots; few medium tubular pores; mildly alkaline (pH 7.8); clear smooth boundary.
B32 * RSL No. 6436	48 to 60 inches, same as above except this horizon is brown (7.5YR 4/4) when dry or moist.
C1 RSL No. 6437	60 to 89 inches, light brown (7.5YR 6/4) sandy clay loam, brown (7.5YR 5/4) moist; massive; very hard, friable, slightly sticky and slightly plastic; very few medium roots; few medium tubular pores; mildly alkaline (pH 7.8); clear smooth boundary.
IIC2 RSL No. 6438	89 to 110 inches, very pale brown (10YR 8/3), light yellowish brown (10YR 6/4) and very dark gray (10YR 3/1) tonalite grus of loamy coarse sand texture; mildly alkaline (pH 7.5); clear smooth boundary.
IIC3 RSL No. 6439	110 to 120 inches +, pale yellow (2.5Y 7/4-8/4) tonalite grus, loamy coarse sand in texture; neutral (pH 7.0); slightly less coherent than the IIC2 horizon.

* Soil horizons sampled for BPR

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Sites gravelly loam (taxadjunct) **LOCATION** Amador County, California

SOIL FAMILY: Ultic Palexeralf, fine, kaolinitic, mesic

SOIL NOS. 59Calif-3-3 **LAB. NOS.** 59278 - 59285

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
1/2-0	A_{oo}	Not sampled										
0-8	A_{11p}	2.5	3.4	2.2	10.1	14.6	42.8	24.4	41.2	24.0	28	1
8-15	A_{12}	1.4	2.1	1.7	9.8	15.3	42.0	27.7	42.2	22.8	28	cl- 1
15-27	B_{11}	1.3	2.1	1.4	8.6	14.5	43.4	28.7	43.7	21.1	27	cl
27-35	B_{12}	1.5	2.2	1.4	8.1	13.8	40.7	32.3	40.2	20.8	35	cl
35-45	B_{21}	1.4	1.8	1.0	6.8	12.5	34.8	41.7	36.4	16.5	32	c
45-55	B_{22}	1.5	1.4	0.9	7.0	12.3	31.6	45.3	35.0	14.6	45	c
55-67	B_3	1.2	1.6	1.1	7.4	13.1	34.5	41.1	38.8	14.9	45	c
67-72	C_1	1.8	2.6	1.5	10.0	20.5	45.0	18.6	57.2	16.3	40	1
72+	D_r	Not sampled										

pH 8C1a H_2O 1:1	pH 8C1c KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6C1b "Free" Fe_2O_3 %	ELECTRICAL CONDUCTIVITY EC·10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	Bulk Density 4A3a g/cc	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
6.3	5.1	2.43	0.120	20.3	5.2			1.13			13.6
6.3	5.1	1.22	0.074	16.5	5.3			1.32			14.2
6.4	5.2	0.63	0.045	14.0	5.9			1.26			14.0
6.3	5.1	0.47	0.036	13.1	5.9			1.22			14.5
6.2	5.2	0.30	0.028	10.7	6.4			1.28			15.9
6.2	5.4	0.21			6.9						16.8
6.0	4.9	0.18			6.7			1.46			15.5
5.6	4.3	0.15			4.7						8.0

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	5B1a 6Q2a K	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE Na	K	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →		
20.2	6.6	1.1	11.0	0.1	0.5	43			
16.8	5.2	0.8	9.7	<0.1	0.4	45			
14.0	4.5	1.1	6.3	0.2	0.5	50			
14.0	4.0	1.9	6.6	0.2	0.2	49			
12.5	3.5	2.1	6.2	0.2	0.2	49			
11.9	3.0	2.3	5.6	<0.1	0.1	49			
9.7	2.5	1.6	5.8	0.2	<0.1	43			
6.1	1.2	1.0	3.7	<0.1	<0.1	37			

1/ Percent of the whole soil

SITES GRAVELLY LOAM (taxadjunct) 1/
S59Calif-3-3

Collectors: Grant Kennedy, Reuben Nelson, Bob Sketchley, John Rogers.
Date of Sampling: June 17, 1959. Description by: Grant Kennedy.
Location: Amador County, California in the NE corner of Section 9, T6N, R12E, 100 yards north of the Ranger's residence, about 6 miles NE of Jackson.
Elevation: 2,800 feet.
Relief: Moderately steep uplands on a plain slope of 18 percent to the NW.
Drainage: Well drained; slow runoff; moderate permeability to 3 feet, moderately slow below.
Parent material; Metasedimentary rocks of the Calaveras formation.
Biological Activity: Krotovinas and worm holes common above 45 inches.
Climate: Mean annual rainfall about 45".
Vegetation: An abandoned black walnut orchard now with bracken fern, ponderosa pine, black oak, incense cedar, and sugar pine.
Remarks: A medial developed Reddish-Brown Lateritic soil. There are a few gravels above the B_{22} and considerable below. Bureau of Public Roads samples were obtained on samples 1, 3, and 6.
Classification: Ultic Palexeralf, fine, kaolinitic, mesic.

HORIZON		DESCRIPTION
A_{oo}	1/2-0"	Pine needles. Not sampled.
A_{11p}	0-8"	Brown (7.5YR 5/4) gravelly loam, dark reddish brown (5YR 3/4) when moist; strong very fine and fine granular structure; slightly hard when dry, friable when moist, nonsticky and slightly plastic when wet; plentiful very fine, fine and medium roots, few coarse; many very fine and fine tubular and interstitial pores; slightly acid, pH 6.3; abrupt, smooth lower boundary.
A_{12}	8-15"	Reddish brown (5YR 4/5) heavy gravelly loam, dark reddish brown (5YR 3/4) when moist; moderate very fine and fine granular structure (massive in place); consistence, roots, pores, and pH as above except a few medium pores are present; gradual, smooth lower boundary.
B_{11}	15-27"	Reddish brown (5YR 4/5) gravelly clay loam, dark red (2.5YR 3/6) when moist; structure, consistence, roots, and pores as in horizon above except the soil is slightly sticky when wet; few, thin discontinuous clay films in pores; slightly acid, pH 6.4; gradual, smooth lower boundary.
B_{12}	27-35"	Similar to B_{11} except pH is 6.3; gradual, smooth lower boundary.
B_{21}	35-45"	Yellowish red (5YR 4/6) gravelly clay; dark red (2.5YR 3/7) when moist; weak very fine subangular blocky structure when crushed; slightly hard when dry, firm when moist, slightly sticky and slightly plastic when wet; few very fine and fine, very few medium roots; many fine and very fine, few medium tubular and interstitial pores; moderately thick, continuous clay films in pores and bridges; slightly acid; pH 6.2; gradual, smooth lower boundary.
B_{22}	45-59"	Yellowish red (5YR 4/7) gravelly clay, dark red (2.5YR 3/7) when moist; massive; slightly hard when dry, very firm when moist, slightly sticky and plastic when wet; roots as above; common very fine, few fine tubular pores; moderately thick, continuous clay films in pores and bridges, interstitial pores nearly filled with colloid; slightly acid, pH 6.2; gradual, smooth lower boundary.
B_3	55-67"	Yellowish red (5YR 5/6) gravelly clay, yellowish red with dark red (5YR 4/6 and 2.5YR 3/7) colloidal coatings when moist; slightly hard when dry, firm when moist, slightly sticky and plastic when wet; roots and pores as in horizon above; thin continuous clay films in pores; medium acid, pH 6.0; gradual, smooth lower boundary.
C_1	67-72"	Brownish yellow (10YR 6/5) gravelly loam, yellowish brown with yellowish red clay films (10YR 5/6 and 5YR 4/6) when moist; massive; slightly hard when dry, friable when moist, nonsticky and/plastic when wet; few very fine and fine roots; few very fine and fine tubular pores; occasional thin, continuous clay films on pebbles and in pores; medium acid, pH 5.6; gradual, smooth lower boundary.
D_r Not sampled	72"+	Very dark bluish gray (5B 3/1) fine grained, somewhat weathered, but hard schist, with yellowish red (5YR 5/6) to light olive brown (2.5Y 5/4) coatings along fracture planes.

1/ The Sites series is in a clayey, kaolinitic, mesic family of Xeric Haplohumults. This pedon has an argillic horizon with more than 35 percent base saturation.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Ultic Palexeralf, fine, kaolinitic, thermic

SOIL Red Bluff gravelly loam SOIL Nos. S4557-6 LOCATION Tehama County, California

SOIL SURVEY LABORATORY LAB. Nos.

Depth (In.)	Horizon	1B1b Total: Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Size class and particle diameter (mm) Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	Int. II (0.2–0.02)	3A1 (2–0.1)	Coarse fragments: > 2 Pct.	2 – 19 Pct. of < 76mm	19 – 76 Pct. of < 76mm
		Pct. of < 2 mm														
0–6	Ap	45.2	32.0	22.8	8.9	8.2	4.5	9.4	14.2	15.0	17.0		31.0			
6–10½	A11	44.1	30.7	25.2	7.7	8.9	4.8	9.0	13.7	13.3	17.4		30.4			
10½–19½	A12	43.3	31.3	25.4	5.5	7.7	4.9	10.1	15.1	14.1	17.2		28.2			
19½–27	B21tsi	36.1	29.7	34.2	6.9	6.2	3.7	7.4	11.9	13.4	16.3		24.2			
27–37	B22tsi	35.0	28.7	36.3	6.4	6.1	3.5	6.9	12.1	13.1	15.6		22.9			
37–45	B23tsi	34.5	28.8	36.7	6.7	5.8	3.4	6.9	11.7	12.9	15.9		22.8			
55–64	C1	39.6	28.4	32.0	8.7	7.1	3.6	7.8	12.4	12.9	15.5		27.2			
64–72	C2	43.3	27.3	29.4	11.5	7.0	3.9	8.3	12.6	12.4	14.9		30.7			

Depth (In.)	6A2a Organic carbon	6B1a Nitrogen	C/N	Carbonate as $CaCO_3$	Bulk density			Water content			pH	8C1a (1:1)
	Pct.	Pct.		Pct.	g/cc	g/cc	g/cc	Pct.	Pct.	Pct		
0–6	0.61	0.066										5.0
6–10½	0.22	0.039										4.9
10½–19½	0.18	0.034										5.0
19½–27	0.11	0.034										5.0
27–37	0.09	0.029										5.0
37–45	0.07	0.027										5.2
55–64	0.06	0.019										5.2
64–72	0.04	0.020										5.4

Depth (In.)	Extractable bases 5B1a: Ca 6N2b	Mg 6O2b	Na 2/	K 1/	Sum of bases	6H2a Ext. Acidity	5A3a CEC Sum	Base saturation 5C3 Sum
	meq/100 g							Pct.
0–6	1.8	0.6	0.01	0.68	3.1	5.1	8.2	38
6–10½	1.6	0.4	0.02	0.76	2.8	4.7	7.5	37
10½–19½	1.6	1.0	0.02	0.72	3.3	4.3	7.6	44
19½–27	2.3	1.7	0.03	0.62	4.6	4.2	8.8	53
27–37	2.6	1.9	0.00	0.41	4.9	4.0	8.9	55
37–45	2.9	2.1	0.02	0.31	5.3	3.5	8.8	61
55–64	2.9	1.9	0.02	0.30	5.1	2.5	7.6	67
64–72	2.9	2.0	0.07	0.16	5.1	2.4	7.5	68

Depth (In.)

1/ Precipitated as potassium sodium cobaltinitrite and titrated as potassium permanganate

2/ Gravimetrically as sodium uranyl magnesium acetate

RED BLUFF GRAVELLY LOAM
S4557-6

Location: Tehama County, California. SW¼ NE¼ Sec. 36, T27N, R4W, MDB&M, 0.05 mile east of the center of Sec. 36. Date of Sampling: April 2, 1945.
Description by: R. C. Roberts and R. A. Gardner. Collectors: R. C. Roberts, F. O. Youngs, R. A. Gardner, L. T. Alexander, H. Jenny and R. E. Storie.
Classification: Ultic Palexeralf, fine, kaolinitic, thermic.
Vegetation: Sparse short annual plants dominated by alfilaria. Climate: Average annual precipitation is about 24 inches; average annual temperature about 62°F., January 45°F., July 82°F. Parent Material: Mixed alluvium. Topography: On nearly level to gently sloping very old terraces of mixed valley fill. Elevation: 340 feet. Drainage: Well drained, moderately slow permeability, slow runoff. Soil Moisture: Moist.
Remarks: One of the most noticeable characteristics of the soil as observed in the sampling pit, as well as in roadside cuts, is the seemingly high manganese oxide content between depths of about 12 and 20 inches. A high percentage of the manganese oxide appears to be contained in soft and medium hard small concretions. In road banks this zone is as conspicuous as the lime concentration zone of the arid regions. Another distinguishing characteristic of this profile is that the material below about 20 inches is brittle. It has the appearance of a degraded semiconsolidated hardpan.

Observations made in a deep ravine indicate that there are layers at a depth of about 9 or 10 feet that are more compact. These appear to intercept percolating water and force it to flow laterally to outlets in ravines or to hillside seeps. The material above the compact layer is acid and distinctly mottled.

HORIZON	DESCRIPTION
Ap	0 to 6 inches, reddish brown (5YR 4/4) gravelly loam, dark reddish brown (2.5YR 3/4) moist; strong granular structure; slightly hard, friable, slightly plastic; abundant fine roots; very strongly acid (pH 5.0); abrupt smooth boundary.
A11	6 to 10.5 inches, reddish brown (5YR 4/4) gravelly heavy loam; color dry and moist, structure and consistence similar to layer above; abundant fine roots; very strongly acid (pH 4.9); distinct wavy boundary.
A12	10.5 to 19.5 inches, reddish brown (5YR 4/4) heavy loam containing a slight amount of gravel, dark reddish brown (2.5YR 3/4) moist; strong granular structure; slightly hard, friable, slightly plastic; plentiful fine roots; very strongly acid (pH 5.0); abrupt irregular boundary.
B21tsi	19.5 to 27 inches, red (2.5YR 4/6) clay loam containing a slight amount of gravel, weak red (10R 4/4) moist; strong blocky structure; apparently weakly cemented with iron oxide; hard, firm and brittle, plastic; coatings of manganese oxide, particularly in lower part of layer, more in evidence than in any other layer; few fine roots; very strongly acid (pH 5.0); gradual boundary.
B22tsi	27 to 37 inches, red (2.5YR 4/6) clay loam containing a slight amount of gravel; color dry and moist, structure and consistence similar to layer above; apparently weakly cemented with iron oxide, as layer above, but contains somewhat less coatings of manganese oxide; few fine roots; very strongly acid (pH 5.0); diffuse boundary.
B23tsi	37 to 45 inches, red (2.5YR 4/6) gravelly clay loam, weak red (10R 4/4) moist; strong blocky structure; hard, firm and brittle, plastic; apparently weakly cemented but appers to be slightly less cemented than horizon above; contains manganese oxide; few fine roots; strongly acid (pH 5.2); distinct boundary.
C1	55 to 64 inches, red (2.5YR 4/6) gravelly clay loam, color dry and moist similar to layer above; weak blocky structure; compact; consistence similar to layer above; manganese oxide present; few fine roots; no distinct observable difference between this layer and underlying layer.
C2	64 to 72 inches, red gravelly clay loam (near loam); color dry and moist, structure and consistence similar to layer above; few roots present; strongly acid (pH 5.4).

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Ultic Palexeralf, fine, kaolinitic, thermic

SOIL Red Bluff loam SOIL Nos. S4557-8 LOCATION Shasta County, California

SOIL SURVEY LABORATORY LAB. Nos.

Depth (In.)	Horizon	1B1b Size class and particle diameter (mm) Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt (0.05–0.02)	Silt: Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)			Coarse fragments ≥ 2 Pct.	Coarse fragments 2 – 19 Pct of < 76mm	Coarse fragments 19 – 76 Pct of < 76mm
		Pct. of < 2 mm																
0–7	A11	40.7	34.5	24.8	10.4	7.5	4.8	8.9	9.1	11.1	23.4		31.6					
7–14	A12	34.2	32.5	33.3	7.0	6.3	4.1	8.2	8.6	10.4	22.1		25.6					
14–24	B21t	26.3	24.9	48.8	6.1	4.9	3.2	5.8	6.3	7.3	17.6		20.0					
24–33	IIB22t	20.5	23.0	56.5	4.8	3.8	2.3	4.6	5.0	5.5	17.5		15.5					
33–41	IIB23t	19.9	22.9	57.2	7.0	3.7	1.7	3.6	3.9	4.0	18.9		16.0					
41–51	IIB24t	24.6	23.8	51.6	9.5	4.9	2.2	3.7	4.3	4.4	19.4		20.3					

Depth (In.)	6A2a Organic carbon Pct.	6B1a Nitrogen Pct	C/N		Carbonate as $CaCO_3$ Pct.		Bulk density g/cc	g/cc	g/cc		Water content Pct.	Pct.	Pct			pH	8C1a (1:1)
0–7	1.25	0.077															6.1
7–14	0.62	0.048															5.5
14–24	0.23	0.035															4.9
24–33	0.27	0.037															4.9
33–41	0.15	0.029															4.8
41–51	0.16	0.030															4.4

Depth (In.)	Extractable bases 5B1a Ca 6N2b	Mg 6O2b	Na 2/	K 1/	Sum of bases	6H2a Ext. Acidity	5A3a CEC Sum								Base saturation 5C3 Sum Pct.	Pct.
	meq/100 g															
0–7	6.2	0.8	0.02	0.44	7.5	4.4	11.9								63	
7–14	3.6	1.3	<0.01	0.52	5.4	4.9	10.3								53	
14–24	2.8	2.0	tr.	0.43	5.2	6.0	11.2								47	
24–33	2.8	2.6	0.05	0.55	6.0	6.4	12.4								48	
33–41	2.3	2.9	0.02	0.48	5.7	6.2	11.9								48	
41–51	0.6	2.8	0.04	0.53	4.0	6.6	10.6								37	

Depth (In.)					

1/ Precipitated as potassium sodium cobaltinitrite and titrated as potassium permanganate

2/ Gravimetrically as sodium uranyl magnesium acetate

* RED BLUFF LOAM
84557-8

Location: Shasta County, California, 1.35 miles E. of Olinda. Date of Sampling: April 4, 1945.
Description by: R. C. Roberts and R. A. Gardner. Collectors: R. C. Roberts, F. O. Youngs, R. A. Gardner, L. T. Alexander, H. Jenny and R. E. Storie.
Classification: Ultic Palexeralf, fine, kaolinitic, thermic.
Vegetation: Ceanothus, scrub oak, manzanita, digger pine, nitgrass, wild oats, alfilaria and associated herbaceous plants. Climate: Average annual precipitation is 33 inches. Average annual temperature is 62°F., January 45°F., and July 82°F. Parent Material: Mixed. Topography: Undulating to nearly flat tree- and grass-covered tops of old terraces of mixed valley-fill material. Elevation: 500 feet. Drainage: Well drained, moderate permeability, slow runoff. Soil Moisture: Moist to 41 inches, wet to 51 inches, water in bottom of pit.
Remarks: *This soil would be correlated to Red Bluff at the present time. This soil appears to be a good one for study of laterization process under a mean annual precipitation of about 33 inches. The noticeable features of the profile are: (1) The rather intense reddish color of all layers, particularly below the surface; (2) the fairly good granular structure of the soil to a depth of about 2 feet; (3) the subsoil not being so distinct nor so compact a claypan as in the other Redding profiles; and (4) the material immediately below the claypan not being a distinct hardpan. There is not an abrupt change from surface to subsoil, but this soil appears to be quite lateritic judging from the granular structure, more rapid permeability, increasing acidity with depth, and the probable high iron, manganese and aluminum content. A moist clod of this soil has a tendency toward the characteristic soapy feel of a lateritic soil and may indicate that the soil is fairly high in aluminum. The lower part of the subsoil is more or less reticulately mottled, evidence of imperfect internal drainage or at least of uneven water percolation. Below, the soil has a slight tendency toward cementation, but the cementation is definitely not so characteristic nor the soil so indurated as in areas of lower precipitation or in areas that have a longer dry period during the summer months.

Near one end of the bottom of the pit was a more or less circular zone about 4 to 6 inches in diameter, quite deep, where the soil was saturated and not nearly so compact as the adjacent soil. This may have been a filled rodent hole.

HORIZON	DESCRIPTION
A11	0 to 7 inches, reddish brown (5YR 4/4) gravelly heavy loam, dark reddish brown (2.5YR 3/4) moist; granular structure; slightly hard, friable, slightly plastic; plentiful roots; slightly acid (pH 6.1); gradual boundary.
A12	7 to 14 inches, red (2.5YR 4/6) gravelly clay loam, dark red (2.5YR 3/6) moist; weak granular structure; consistence similar to layer above; plentiful roots; strongly acid (pH 5.5); gradual boundary.
B21t	14 to 24 inches, red (2.5YR 4/6) gravelly clay, dark red (10R 3/6) moist; weak granular structure; compact; hard, firm, plastic; plentiful roots; very strongly acid (pH 4.9); distinct wavy boundary.
IIB22t	24 to 33 inches, red (2.5YR 4/6) very gravelly clay; color dry and moist similar to layer above; weak blocky structure; appears to be weakly cemented with iron oxide; compact; hard, firm, plastic; possibility from appearance that this layer is a weathered hardpan; few roots; very strongly acid (pH 4.9); distinct wavy boundary.
IIB23t	33 to 41 inches, red (2.5YR 5/6) very gravelly clay, dark red (2.5YR 3/6) moist; some reticulate mottling; massive; hard, firm, plastic; gravel is highly weathered and crumbles to a mass yellower in color than the soil; very few roots; very strongly acid (pH 4.8); diffuse boundary.
IIB24t	41 to 51 inches, red (2.5YR 5/6) very gravelly clay, some reticulate mottling; color dry and moist, structure and consistence similar to layer above; extremely acid (pH 4.4).

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Abruptic Xerollic Durargid, fine, montmorillonitic, mesic

SOIL Lovejoy loam SOIL Nos. S61Calif-32-21 LOCATION Sierra Valley, Plumas County, Calif.

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 61736 - 61741

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.2)			Coarse fragments 2A2: ≥ 2 Pct.	2 – 19 Pct. of < 76 mm	19 – 76 Pct. of < 76 mm
		Pct. of < 2 mm																
0–2½	A1	30.4	46.3	23.3	0.4	1.1	1.7	10.7	16.5	19.6	26.7	44.2	5.8			0		
2½–10	A21	42.1	30.3	27.6	0.1	0.6	1.7	18.3	21.4	14.2	16.1	49.6	6.7			0		
10–16	A22	52.2	30.6	17.2	1.7	4.1	5.0	21.8	19.6	14.5	16.1	49.0	17.7			0		
16–21	B2t	32.7	27.2	40.1	0.5	3.1	3.3	13.3	12.5	11.9	15.3	33.7	10.9			0		
21–41	C1m	52.0	35.5	12.5	2.5	6.4	6.1	17.5	19.5	14.7	20.8	48.2	20.5			0		
41–53+	C2	48.6	28.9	22.5	0.3	3.1	4.6	20.2	20.4	13.3	15.6	48.6	13.3			0		

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N		6E1b Carbonates as $CaCO_3$ Pct.	6C2a Ext. Iron as Fe Pct.	Bulk density g/cc	g/cc	g/cc		Water content Pct.	Pct.	4B2 15 bar Pct.			pH 8C1b Sat. Paste	8C1a 1:10
0–2½	1.20	0.097	12.4		-	0.6							10.4			5.8	6.5
2½–10	0.57	0.049	11.6		-	0.6							11.2			5.7	6.7
10–16	0.16				-	0.7							9.1			6.1	6.9
16–21	0.13				-	0.7							18.4			5.8	7.0
21–41	0.04				1	0.4							17.3			7.5	8.6
41–53+	0.03				-	0.4							17.4			7.1	7.9

Depth (In.)	Extractable bases 5B1a: 6N2c Ca	6O2c Mg	6P2a Na	6Q2a K	6H2a Ext. Acidity	Cat. Exch. Cap. 5A2b NaOAc	5B1b Exch. Na	Water extract from saturated paste 8A1: 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K		6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g							meq/liter									mmho/cm
0–2½	10.8	4.6	0.3	0.3	5.1	22.8	0.3	0.7	0.6	1.0	0.1		-	1.2	0.3		0.22
2½–10	12.6	5.2	0.6	0.1	4.5	25.0	0.5	0.4	0.4	1.3	-		-	1.2	0.2		0.13
10–16	8.6	3.8	0.7	0.1	3.0	18.5	0.6	0.4	0.3	1.9	-		-	0.9	0.5		0.26
16–21	18.1	8.6	1.8	0.2	4.5	33.5	1.6	0.9	0.9	3.2	-		-	0.9	1.5		0.37
21–41	27.9	16.0	2.4	0.1	0.7	37.5	2.2	1.6	1.2	5.3	-		0.3	2.8	3.7		0.85
41–53+	19.5	7.5	1.4	0.3	1.5	30.6	1.3	0.3	0.5	1.9	-		-	1.2	0.6		0.27

Depth (In.)	8A Water at Saturation Pct.	5C3 Base Sat. (Sum) Pct	Mineral Content (<0.002 mm.) X-ray: Montmorillonite	Vermiculite	Mica	Kaolinite	Kaolinite % DTA
0–2½	34.5	76	xx	t	-	x	12
2½–10	34.4	80	xxx	t	-	x	15
10–16	24.9	81	xxxx	t	-	x	15
16–21	46.2	86	xxxx	t	-	x	18
21–41	45.5	98	xx	t	-	t	5
41–53+	42.4	95					

\- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

LOVEJOY LOAM

S61Calif-32-21

Location: Sierra Valley, Plumas County, California. 0.6 mile north, and 0.1 mile west of the southeast corner of section 14, T. 22 N., R. 14 E. 100 feet north of farm road. Approximately four miles south of Beckwourth. Date of Sampling: September 21, 1961.
Collectors: Grant Kennedy, Reuben Nelson, John Rogers, Paul Nazar, James McLaughlin, Eugene Begg.
Vegetation: Low sage is predominant with some squirrel tail. Climate: Estimated annual precipitation 15 inches. Nearest weather station (Portola): Mean annual temperature 45.1° F.; January average 28.7° F.; July average 62.6° F.; mean annual precipitation 20.62 inches. Parent Material: Alluvium from mixed sources. Relief: Hummocky low terrace with a slope of less than 1 percent. Elevation: 4892 feet. Drainage: Moderately well drained; runoff is slow; permeability is moderately slow in the upper part of the profile and slow below. Soil Moisture: Slightly moist below 16 inches.
Remarks: This is a Planosol, with incipient Chestnut development in the A21. The surface has hummocks 3 to 4 inches high and 7 to 24 inches in diameter and the hummocks are matted with roots. Three inches below the bottom of the B2t in the top of the Clm there is a thin mat of roots spreading out over the underlying pan-like material. The A1 horizon (0-2½ inches), the B2t horizon (16-21 inches), and the C2 horizon (41-53 inches) were sampled for the Bureau of Public Roads and the California State Division of Highways. Texture of Clm cannot be determined satisfactorily in field because of difficulty of grinding up and wetting sample properly. **Classification: Abruptic Xerollic Durargid, fine, montmorillonitic, mesic**

HORIZON	DESCRIPTION
A1 RSL No. 61736	0 to 2½ inches, gray (10YR 6/1) loam (near clay loam), dark grayish brown (10YR 4/2) when moist; strong very fine platy structure; soft, very friable, slightly sticky and slightly plastic; abundant very fine and few fine roots; many very fine, and common fine interstitial, and common fine tubular pores; strongly acid (pH 5.3); clear smooth boundary.
A21 RSL No. 61737	2½ to 10 inches, light brownish gray (10YR 6/2) clay loam, dark grayish brown (10YR 4/2) when moist; moderate medium prismatic and moderate fine platy structure; hard, friable, slightly sticky and plastic; plentiful very fine and few fine to medium roots; many very fine mostly horizontal tubular pores and common very fine vertical tubular pores and common very fine interstitial pores; common thin clay films in pores; strongly acid (pH 5.5); clear, smooth boundary.
A22 RSL No. 61738	10 to 16 inches, light gray (10YR 7/1) loam (near sandy clay loam), dark grayish brown (10YR 4/2) when moist; moderate coarse prismatic structure; hard, friable, slightly sticky and slightly plastic; few very fine to medium mostly exped roots; common very fine tubular and interstitial pores; common thin clay films in pores; few black shot; medium acid (pH 5.9); noncalcareous; abrupt, smooth boundary.
B2t RSL No. 61739	16 to 21 inches, pale brown (10YR 6/3) clay, dark grayish brown (10YR 4/2) when moist; strong coarse columnar structure; extremely hard, extremely firm, very sticky and very plastic; few very fine to medium exped roots; few very fine tubular pores; continuous moderately thick clay films in pores and on ped faces; few black shot; medium acid (pH 6.0); abrupt, smooth boundary.
Clm RSL No. 61740	21 to 41 inches, light gray (2.5Y 7/2), olive brown (2.5Y 4/4) and pale yellow (2.5Y 7/4) when moist; massive, breaking to strong medium angular blocky structure; extremely hard, extremely firm, nonsticky and nonplastic; no roots except for a thin mat 3 inches below the B2; moderately alkaline (pH 8.0); strongly effervescent, lime is in distinct horizontal seams and the matrix is noncalcareous; pale yellow material is predominantly in horizontal seams that are noncalcareous in the upper part of the horizon; horizon does not slake in water; clear and smooth boundary.
C2 RSL No. 61741	41 to 53 inches +, pale yellow (2.5Y 7/4) clay loam (near loam), light olive brown (2.5Y 5/4) when moist; massive; very hard, firm, sticky and plastic; common very fine, few fine tubular and few very fine interstitial pores; common moderately thick clay films in pores; moderately alkaline (pH 7.9); noneffervescent.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Xerollic Durargid, fine-loamy, mixed, mesic

SOIL Lovejoy loam (taxadjunct) SOIL Nos. S61Calif-46-6 LOCATION Sierra Valley, Sierra County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 61742 - 61747

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.2)			Coarse fragments 2A2: > 2 Pct.	Coarse fragments: 2 – 19 (Pct. of < 76 mm)	Coarse fragments: 19 – 76 (Pct. of < 76 mm)
		Pct. of < 2 mm																
0–5	A1	32.6	39.4	28.0	1.9	5.6	4.6	10.3	10.2	14.0	25.4	30.7	15.9			1		
5–10	A21	55.1	26.8	18.1	3.1	14.9	10.0	19.4	7.7	13.3	13.5	31.8	36.6			1		
10–15	A22	68.5	17.8	13.7	7.2	20.9	14.3	19.5	6.6	7.0	10.8	22.9	52.6			5		
15–23	B2t	41.0	28.3	30.7	2.5	9.2	6.2	14.5	8.6	11.6	16.7	29.0	23.6			0		
23–42	C1m	36.8	44.4	18.8	0.1	1.2	1.7	15.1	18.7	17.8	26.6	48.1	6.5			0		
42–58+	C2g	41.0	38.4	20.6	0.1	1.0	1.4	15.2	23.3	20.5	17.9	56.0	5.5			0		

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N		6E1b Carbonate as $CaCO_3$ Pct		Bulk density g/cc	Bulk density g/cc	Bulk density g/cc		Water content Pct.	Water content Pct.	4B2 15 bar Pct.				pH 8C1b Sat. Paste	pH 8C1a 1:10
0–5	2.32	0.191	12.1		–								13.8				5.7	6.5
5–10	0.78	0.072	10.8		–								8.7				5.9	6.5
10–15	0.23				–								6.9				6.1	6.6
15–23	0.17				–								14.7				6.6	7.4
23–42	0.04				1								19.5				7.4	8.5
42–58+	0.04				–								16.6				7.3	7.9

Depth (In.)	Extractable bases 6N2c Ca meq/100 g	6O2c Mg meq/100 g	6P2a Na meq/100 g	5B1a 6Q2a K meq/100 g	6H2a Ext. Acidity meq/100 g	Cat. Exch. Cap. 5A2a NaOAc meq/100 g		5B1b Exch. Na meq/100 g	Water extract from saturated paste 8A1 6N1a Ca meq/liter	6O1a Mg meq/liter	6P1a Na meq/liter	6Q1a K meq/liter		6I1a CO_3 meq/liter	6J1a HCO_3 meq/liter	6K1a Cl meq/liter	SO_4 meq/liter	8A1a Electrical conductivity mmho/cm
0–5	14.5	5.5	0.4	0.3	7.3	30.3		0.3	1.0	0.6	1.0	0.1		–	1.8	0.1		0.24
5–10	8.7	3.8	0.4	0.1	4.2	18.9		0.4	0.6	0.6	1.1	–		–	1.3	0.2		0.21
10–15	6.7	3.2	0.3	0.1	2.3	12.2		0.3	0.9	0.7	2.0	–		–	1.3	0.4		0.28
15–23	14.4	8.8	1.2	0.2	2.4	26.3		1.0	0.9	1.0	3.0	–		–	1.6	1.2		0.47
23–42	26.1	12.9	2.1	0.2	1.1	38.2		1.9	1.5	1.4	4.6	–		0.3	2.6	2.8		0.80
42–58+	18.0	9.0	1.6	0.2	2.4	30.1		1.5	0.5	0.9	3.0	–		–	1.6	1.2		0.43

Depth (In.)	8A Water at Saturation Pct.	Exchangeable Na Pct.		Gypsum Pct.	5C3 Base Sat. (Sum) Pct.		
0–5	49.1				74		
5–10	31.9				76		
10–15	24.2				82		
15–23	46.9				91		
23–42	55.6				97		
42–58+	51.0				92		

LOVEJOY LOAM (taxadjunct) 1/

S61Calif-46-6

Location: Sierra Valley, Sierra County, California. 0.1 mile west of County Highway A-23. 0.25 mile north, 0.1 mile west of the southeast corner of section 9, T. 21 N., R. 14 E. Approximately 1½ miles northeast of Calpine. Date of Sampling: September 20, 1961.
Collectors: Grant Kennedy, Reuben Nelson, John Rogers, Paul Nazar, James McLaughlin, Eugene Begg.
Vegetation: Low sage and dry land sedges. Climate: Estimated annual precipitation 15 inches. Nearest weather station (Sierraville): Mean annual temperature 46.0° F.; January average 28.2° F.; July average 63.6° F.; mean annual precipitation 25.78 inches. Parent Material: Alluvium from mixed sources. Relief: Hummocky low terrace with a slope of 1 percent. Elevation: 4910 feet. Drainage: Moderately well drained; runoff slow; permeability moderately slow in the upper part of the profile and slow in the lower part. Soil Moisture: Slightly moist below 15 inches.
Remarks: This soil appears to be bisequal, with a Chestnut profile developing in the A horizon of an older Planosol or Solodized Solonetz soil. The surface has small hummocks 3 to 4 inches high and 3 to 24 inches in diameter which are very matted with roots. A one-half inch mat of roots spreads out at the bottom of the B2 over the pan below. The pan or C1m has the appearance of having strong medium angular blocky structure when broken and the peds all appear to have thin films. Horizons A1 (0-5 inches), B2t (15-23 inches), and C2g (42-58 inches) were sampled for the Bureau of Public Roads and the California Division of Highways. It is difficult to determine the texture of the C1m in the field because of difficulty in breaking up the pan and wetting satisfactorily.
Classification: Xerollic Durargid, fine-loamy, mixed, mesic.

HORIZON	DESCRIPTION
A1 RSL No. 61742	0 to 5 inches, gray (10YR 5/1 to 6/1) loam, very dark grayish brown (10YR 3/2) when moist; strong fine platy structure; soft, friable, slightly sticky and slightly plastic; abundant very fine, few fine to medium roots; plentiful very fine interstitial, few fine to medium tubular pores; neutral (pH 6.6); clear, smooth boundary.
A21 RSL No. 61743	5 to 10 inches, gray (10YR 5/1) clay loam with common medium faint brown (10YR 5/3) mottles, dark grayish brown (10YR 4/2) with common medium faint dark brown (10YR 4/3) mottles when moist; weak coarse platy and weak medium prismatic structure; hard, friable, sticky and plastic; plentiful very fine to medium roots; common very fine and fine tubular, and few very fine interstitial pores; many thin clay films in pores and on ped faces; medium acid (pH 6.0); clear, smooth boundary.
A22 RSL No. 61744	10 to 15 inches, light brownish gray (10YR 6/2) sandy clay loam, dark brown (10YR 3/3) when moist; moderate coarse prismatic structure; very hard, firm, slightly sticky and slightly plastic; plentiful very fine mainly exped roots; common very fine, few fine to medium tubular and interstitial pores; common thin clay films in pores and bridges; slightly acid (pH 6.4); abrupt, smooth boundary.
B2t RSL No. 61745	15 to 23 inches, grayish brown (10YR 5/2) sandy clay, very dark grayish brown (10YR 3/2) when moist; strong coarse columnar structure; extremely hard, extremely firm, sticky and plastic; plentiful very fine exped roots; few very fine tubular pores; continuous moderately thick clay films on ped faces and in pores; mildly alkaline (pH 7.8); abrupt, smooth boundary.
C1m RSL No. 61746	23 to 42 inches, light gray (2.5Y 7/2), variegated very dark grayish brown (2.5Y 3/2) and light gray (2.5Y 7/2) when moist; massive breaking to strong medium angular blocky structure; extremely hard, extremely firm, sticky and plastic; no roots; moderately alkaline (pH 8.0); strongly effervescent, lime occurs in filaments and in seams mostly in the lower part of the horizon; gray material predominantly in horizontal seams that can be scratched with a #3 pencil; horizon does not slake in water; clear and smooth boundary.
C2g RSL No. 61747	42 to 58 inches, light gray (2.5Y 7/2) and brownish yellow (10YR 6/6) silty clay loam, grayish brown (2.5Y 5/2) with many medium prominent yellowish red (5YR 4/6) mottles when moist; weak fine platy structure; hard, firm, sticky and plastic; common very fine and fine tubular pores; common thick clay films in ped faces and in pores; moderately alkaline (pH 8.2); noneffervescent.

1/ The Lovejoy series is in a fine, montmorillonitic, mesic family of Abruptic Xerollic Durargids. This pedon is a taxadjunct to the Lovejoy series because it has about 5 percent less clay in the argillic horizon than is required for the series.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Mohave sandy clay loam (taxadjunct) **LOCATION** San Bernardino County, California

SOIL FAMILY: Typic Haplargid, fine-loamy, mixed, thermic.

SOIL NOS. S55Calif-36-5 **LAB. NOS.** 5532 thru 5537

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0- 4	Av	0.2	0.7	1.1	11.1	22.1	40.6	24.2	39.1	32.7	0	l
4- 8	B1	0.3	0.6	0.5	4.2	8.3	54.1	32.0	18.9	46.7	0	sicl
8-12	B2	0.1	0.5	0.4	2.6	5.0	48.1	43.3	10.5	44.6	0	sic
12-25	B2ca	2.6	5.9	5.8	25.1	18.6	20.6	21.4	38.3	18.5	6	scl
25-44	Cca	4.1	8.9	6.5	28.6	20.1	17.8	14.0	49.0	9.2	4	fsl
44-52	C	3.1	4.9	4.0	37.3	23.3	17.7	9.7	62.3	6.7	2	fsl

8C1b SATURATED PASTE 1:1	pH 8C1a 1:5	8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	8A1a Elec. Condc. EC×10³ MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	6F1a GYPSUM me./100g. SOIL	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
8.3		9.6	0.34	0.038	8.9		5.6	8.9	0			9.8
8.2		8.8	0.61	0.064	9.5		14.1	8.2	2.6			16.5
8.3		9.1	0.59	0.050	11.8		21.0	6.1	4.4			20.9
8.6		9.9	0.10				7.6	9.6	0			11.1
8.4		9.8	0.06				1.8	5.9	0			6.9
8.3		8.7	0.05				0.7	3.0	0			5.4

5A2a CATION EXCHANGE CAPACITY (+(Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6Q2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	5D1 EXCH. Na %	SATURATION EXTRACT SOLUBLE 6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg	8A1	6K1a	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
25.2				9.9	2.2	39	53.5	0.8	7.9			34.5
39.9				15.4	1.1	39	160	3.0	19.7			55.6
44.4				24.3	1.0	55	263	1.8	18.9			72.5
18.8				18.7	0.6	99	78.5	0.6	1.5			47.0
13.1				3.8	0.4	29	15.8	0.1	0.8			33.3
12.4				2.1	0.4	17	6.4	0.1	0.4			29.7

1/ Percent of the whole soil

MOHAVE SANDY CLAY LOAM (taxadjunct) 1/
S55Calif-36-5

Sampled by: Fred Eggers, W. G. Harper, R. E. Nelson.
Description by: W. G. Harper Sampling date: January, 1955.
Location: 1000 feet W and 100 feet S of center Sec. 20, T8N, R4W, about 1 mile NW of Hglendale, San Bernardino County, California.
Elevation: About 2500 ft. Annual precipitation about 4 inches
Classification: Typic Haplargid, fine-loamy, mixed, thermic.
Vegetation: Shadscale, inkweed, a few patches of saltgrass. About 70 percent of surface barren. Sample taken in barren area
Parent Material: Alluvium on high terrace of the Mojave River. Parent rocks are mixed but largely from granitic formations.
Physiography: Terrace - old river flood plain - slope less than 1 percent
Drainage: Runoff and permeability are slow.

HORIZON		DESCRIPTION
S55Calif-36-5-1 A_y	0- 4"	Light yellowish brown (10YR 6/4 yellowish brown 5/4 moist) loam; moderately defined medium to fine platy and vesicular; slightly hard when dry, friable when moist; very strongly calcareous; slowly permeable; moderately micaceous: contains a few plant roots; pH on 1 to 5 dilution with thymol blue 9.6; lower boundary abrupt and smooth.
S55Calif-36-5-2 B_1	4- 8"	Light brown (7.5YR 6/4 dry, brown 5/4 moist) silty clay loam; weak medium platy; soft when dry, very friable when moist; very strongly calcareous with some coarse prominent white mottling of lime and salts; moderately micaceous; slowly permeable; pH on dilution 9.0; moderate number of plant roots mainly between the plates; abrupt and smooth lower boundary.
S55Calif-36-5-3 B_2	8-12"	Light reddish brown (5YR 6/4 dry, reddish brown 5/4 moist) silty clay; moderately defined fine subangular blocky; extremely hard when dry, firm when moist. This is very strongly calcareous and has a few medium to fine white lime mottlings; contains a moderate amount of very fine flecks of mica; is very slowly permeable; contains very few plant roots; pH on dilution 9.2; abrupt and smooth lower boundary.
S55Calif-36-5-4 B_{2ca}	12-25"	Brown (7.5YR 5/4 dry, 4/3 moist) sandy clay loam; massive; extremely hard when dry, firm to friable when moist; moderately slow permeability. This is very strongly calcareous and contains many lime nodules that range up to 3/8 inch in diameter; pH on dilution 9.6; smooth lower boundary.
S55Calif-36-5-5 C_{ca}	25-44"	Pale brown (10YR 6/3 dry, brown 5/3 moist) fine sandy loam; massive; very hard when dry, friable when moist; very strongly calcareous with many white lime nodules ranging up to 3/8 inch in diameter; very strongly micaceous; moderately permeable; devoid of plant roots; pH on dilution 8.8; lower boundary abrupt and smooth.
S55Calif-36-5-6 C	44-52"	Same color as horizon above; fine sandy loam; massive; hard when dry, friable when moist; very mildly calcareous with an occasional small white lime fleck; moderate to moderately rapid permeability; pH on dilution 8.5; lower boundary abrupt.
S55Calif-36-5-7 D	52"+	Very gravelly loamy sand. Rounded gravel which is mainly from granite and quartzite range up to 2 inches in diameter.

REMARKS: Characteristics of this profile indicate that the soil probably developed under well drained conditions and subsequently became moderately to strongly impregnated with salts high in sodium. The sandy clay loam texture quoted in the name of this soil is taken from the soil survey of the Barstow area. The soil was mapped in that survey as strongly affected by alkali. Under present survey procedure, this soil would be a moderately saline-alkali phase.

1/ This pedon lacks the reddish colors and has more sodium than is characteristic of the series.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Mohave loamy coarse sand **LOCATION** San Bernardino County, Calif.

SOIL FAMILY: Typic Haplargid, fine-loamy, mixed, thermic

SOIL NOS. S59 Calif-36-1 **LAB. NOS.** 59680 - 59686

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-5	A1	8.6	22.3	16.3	25.1	9.8	14.8	3.1	31.7	6.3	8	lcos
5-8	B1t	10.6	20.6	14.5	19.7	8.3	14.9	11.4	26.0	7.4	4	cosl
8-18	B2t	10.6	19.6	13.3	15.5	6.2	10.6	24.2	20.4	4.3	8	scl
18-32	B31t	10.6	22.5	14.5	19.1	7.6	9.3	16.4	23.2	3.7	9	cosl
32-40	B32t	13.8	23.0	12.3	15.9	6.9	11.7	16.4	21.2	6.0	24	cosl
40-45	C1	24.4	27.8	12.2	12.6	3.9	6.2	12.9	13.2	3.0	17	lcos
45-60+	C2	28.8	30.9	12.5	11.7	3.3	4.7	8.1	11.0	2.4	34	lcos

8C1b SATURATED PASTE 1:1	pH 8C1a 1:5	pH 8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	8A1a Elec. Conduc. EC×10³ MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	Ext. Iron % Fe 6C1b	6I1a CO_3 meq/l	6J1a HCO_3 meq/l	4B2 Soil water 15 atmos. Pct.
7.8		7.8	0.21	0.021			0.6	-	0.9	0.2	5.3	2.0
7.4		7.8	0.12	0.016			0.3	-	1.1	-	2.2	4.0
6.6		7.6	0.14	0.019			0.3	-	0.9	-	1.5	9.1
6.8		7.4	0.16	0.010			0.4	-	0.9	-	1.2	6.3
7.7		8.9	0.14	0.007			0.4	<0.5	0.7	-	2.7	6.5
7.8		8.9	0.10				0.4	-	0.7	-	3.0	5.1
8.0		8.9	0.07				0.4	-	0.8	-	2.9	3.6

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	5B Exch. 5B1b Na 6P2a	5B Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil						milliequivalents per liter					
4.9	3.5	0.5	0.3	0.1	0.2	93	0.6	0.5	4.9	0.6	0.2	10.2
8.6	5.3	1.7	0.6	0.1	0.3	93	0.6	0.2	2.3	0.3	0.2	15.7
19.2	13.1	3.5	1.4	0.1	0.3	92	1.1	<0.1	2.1	0.2	0.5	29.9
15.5	9.7	2.1	0.7	0.2	0.2	95	0.8	<0.1	2.5	0.4	0.4	23.2
14.7	13.1	2.1	0.7	0.2	0.2	96	1.4	<0.1	3.1	<0.1	0.4	22.0
11.2	11.3	1.8	0.3	0.1	0.2	98	1.9	0.1	2.7	<0.1	0.4	19.3
8.0	6.0	1.1	0.0	0.1	0.1	100	1.8	0.1	1.1	<0.1	0.8	19.5

MOHAVE LOAMY COARSE SAND
S59Calif-36-1

Location: Approximately 400 feet north, 150 feet east of the south quarter corner of section 33, T. 5 N., R. 4 W., San Bernardino County, California, about 4 miles south of Victorville, California, 0.7 miles west of the intersection of Hesperia Road and Bear Valley Road.
Date: November 5, 1959
Description by: Fred C. Eggers and George Borst
Samples Collected By: Fred C. Eggers, George G. C. Holmgren, Harlan McIntire, and Reuben Nelson
Classification: **Typic Haplargid, fine-loamy, mixed, thermic.**
Vegetation: Sparse desert shrubs and grasses including creosote bush, Mormon tea, desert needlegrass, and occasional Joshua trees.
Climate: Average annual precipitation about 6 inches; average January temperature 42°F., average July temperature 78°F., average annual temperature 66°F.
Parent Material: Coarse-texture alluvium, predominantly from granitic sources.
Topography: Nearly level alluvial terrace, with about 1 per cent northerly slope.
Elevation: 3030 feet above sea level.
Drainage: Well drained
Soil Moisture: None
Remarks: This profile is characterized by an ochric epipedon argillic horizon, according to the revised system of soil classification (7th Approximation). The relatively high pH of the A1 horizon may be due to contamination of calcareous dust from a cement plant about 5 miles north-northwest of this site.

HORIZON		DESCRIPTION
A1 RSL No. 59680	0-5"	Brown (10YR 5/3) loamy coarse sand, brown to dark brown (7.5YR 4/4) when moist; weak fine granular structure; loose, very friable, nonsticky and nonplastic; plentiful fine roots; mildly alkaline (pH 7.8); clear wavy boundary.
B1t RSL No. 59681	5-8"	Brown (7.5YR 5/4) coarse sandy loam, reddish brown (5YR 4/3) when moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky, and slightly plastic; plentiful fine roots; many fine tubular pores, slightly acid (pH 6.5); abrupt, smooth boundary.
B2t RSL No. 59682	8-18"	Reddish brown (5YR 5/4) sandy clay loam, reddish brown (5YR 4/4) when moist; strong medium prismatic structure; very hard, friable, sticky and very plastic; plentiful fine exped roots; few fine tubular pores; many moderately thick clay films on ped faces; slightly acid (pH 6.5); clear smooth boundary.
B31t RSL No. 59683	18-32"	Reddish brown (5YR 5/3) coarse sandy loam, reddish brown (5YR 4/4) when moist; moderate medium subangular blocky structure; hard, very friable, slightly sticky and plastic; few fine roots; few fine tubular pores; common moderately thick clay films on ped faces; neutral (pH 7.0); gradual irregular boundary.
B32t RSL No. 59684	32-40"	Brown (7.5YR 5/4) gravelly coarse sandy loam, brown to dark brown (7.5YR 4/4) when moist; moderate medium subangular blockystructure; hard, very friable, slightly sticky and slightly plastic; few fine roots; moderately alkaline (pH 8.0); slightly effervescent; gradual irregular boundary.
C1 RSL No. 59685	40-45"	Brown (7.5YR 5/4) gravelly loamy coarse sand, brown to dark brown (7.5YR 4/4) when moist; massive; loose, loose, nonsticky and nonplastic; moderately alkaline (pH 8.2); slightly effervescent; gradual irregular boundary.
C2 RSL No. 59686	45-60+"	Brown (7.5YR 5/4) very gravelly loamy coarse sand, brown to dark brown (7.5YR 4/4) when moist; massive; loose, loose, nonsticky and nonplastic; moderately alkaline (pH 8.2).

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Xerollic Haplargid, coarse-loamy, mixed, mesic

SOIL Beckwourth coarse sandy loam (taxadjunct) SOIL Nos. S61Calif-32-16 LOCATION Sierra Valley, Plumas County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 61712 - 61717

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.2)			Coarse fragments 2A2: >2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76 mm	
0–3	A11	88.4	5.8	5.8	2.1	17.9	20.7	41.0	6.7	2.5	3.3	29.6	61.3			1		
3–14	A12	90.5	4.8	4.7	2.1	12.3	21.4	46.9	7.8	2.4	2.4	34.1	58.8			1		
14–19	B1	88.1	4.9	7.0	1.5	14.4	19.7	45.4	7.1	4.7	2.2	33.5	57.3			0		
19–25	B2tca	81.3	7.7	11.0	1.0	12.5	19.5	42.0	6.3	3.2	4.5	31.3	53.2			1		
25–46	C1ca	88.1	5.9	6.0	1.8	12.9	21.6	45.6	6.2	2.8	3.1	32.4	58.5			1		
46–62+	C2g	90.3	4.4	5.3	4.3	27.5	25.5	29.8	3.2	2.3	2.1	17.7	74.9			5		

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N		6E1b Carbonate as $CaCO_3$ Pct.		Bulk density: g/cc	g/cc	g/cc		Water content: Pct.	Pct.	4B2 15 bar Pct.			pH: 8C1b Sat. Paste	8C1a 1:10
0–3	1.18	0.088	13		-								4.3			7.1	7.1
3–14	0.33	0.031	11		-								2.9			7.8	7.6
14–19	0.18				tr								4.1			8.8	9.2
19–25	0.15				5								8.3			8.7	9.4
25–46	0.10				2								6.0			8.3	8.8
46–62+	0.02				-								3.0			7.9	7.4

Depth (In.)	Extractable bases 5B1a: 6N2c Ca	6O2c Mg	6P2a Na	6Q2a K	6H2a Ext. Acidity	Cat. Exch. Cap. 5A2a NaOAc	5B1b Exch. Na	Water extract from saturated paste 8A1: 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K		6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g							meq/liter									mmho/cm
0–3	5.5	2.2	0.2	0.3	1.2	9.6	0.1	2.5	2.1	2.1	0.4		0.3	3.8	0.2		0.64
3–14	3.6	1.7	0.6	0.1	0.4	6.8	0.5	0.3	0.7	3.9	-		-	3.7	0.1		0.42
14–19	3.1	2.7	2.2	0.4	0.5	7.8	2.0	0.6	0.5	9.5	-		0.5	7.9	0.4		0.93
19–25	13.1	6.2	3.8	0.1	0.1	15.2	3.4	0.8	0.7	12.0	-		0.9	9.9	0.9		1.19
25–46	13.2	4.0	0.6	-	-	11.4	0.5	0.9	0.9	2.9	-		-	3.6	0.4		0.42
46–62+	3.4	2.6	0.3	-	0.4	7.0	0.2	0.7	0.9	1.6	-		-	1.8	0.3		0.18

Depth (In.)	8A Water at Saturation Pct.	5D1 Exchangeable Na Pct.	Clay Mineralogy (<0.002 mm.): Montmorillonite (X-ray)	Vermiculite (X-ray)	Mica (X-ray)	Kaolinite (X-ray)	Kaolinite % DTA
0–3	29.0	1	x	x	xx	x	10
3–14	24.0	7					
14–19	25.1	26	xxx	-	-	x	10
19–25	29.0	22					
25–46	25.2	4					
46–62+	20.2	8	xxx	x	-	x	10

\- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

BECKWOURTH COARSE SANDY LOAM (taxadjunct) 1/

S61Calif-32-16

Location: Sierra Valley, Plumas County, California. 1350 feet north of Highway 40A at the center of section 30, T. 23 N., R. 16 E. Approximately three miles west of Vinton.
Date of Sampling: September 16, 1961.
Collectors: Grant Kennedy, Reuben Nelson, John Rogers, Paul Nazar, James McLaughlin, Eugene Begg.
Vegetation: Silver sage, dryland sedge, and shoestring. Climate: Estimated annual precipitation 15 inches. Nearest weather station (Portola): Mean annual temperature 45.1° F.; January average 28.7° F; July average 62.6° F.; mean annual precipitation 20.62 inches. Parent Material: Coarse textured alluvium dominantly from granitic sources. Relief: Flood plain with very slightly hummocky topography with a slope of less than 1 percent. Elevation: 4915 feet. Drainage: Moderately well drained; very slow runoff; rapidly permeable in the upper part of the profile and moderate in the lower part. Moisture: Profile moist below 14 inches.
Remarks: This is a Chestnut soil with a weakly developed Bt horizon. The A12 (3-14 inches), the B2tca (19-25 inches) and the C1ca (25-46 inches) were sampled for the Bureau of Public Roads and the California State Division of Highways. **Classification: Xerollic Haplargid, coarse-loamy, mixed, mesic.**

HORIZON	DESCRIPTION
A11 RSL No. 61712	0 to 3 inches, dark gray (10YR 4/1) loamy sand (near sandy loam), very dark brown (10YR 2/2) when moist; moderate very fine platy structure; soft, very friable, nonsticky and nonplastic; abundant very fine, few fine to medium roots; many very fine tubular and interstitial pores; slightly acid (pH 6.2); clear, smooth boundary.
A12 RSL No. 61713	3 to 14 inches, dark grayish brown (10YR 4/2) loamy sand (near sandy loam), dark brown (10YR 3/3) when moist; weak coarse platy structure; soft, very friable, nonsticky and nonplastic; plentiful very fine, few fine and medium roots; common very fine tubular and interstitial and few fine and medium tubular pores; slightly acid (pH 6.4); clear, smooth boundary.
B1 RSL No. 61714	14 to 19 inches, grayish brown (10YR 5/2) sandy loam, dark brown (10YR 3/3) when moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine and fine and medium roots; common very fine tubular and interstitial and few fine to medium tubular pores; few thin clay films in pores and bridges; strongly alkaline (pH 8.6)(pH 8.0 with thymol blue); slightly effervescent, lime is segregated; clear, smooth boundary.
B2tca RSL No. 61715	19 to 25 inches, light gray (10YR 7/2) sandy loam, variegated brown (10YR 4/3 and 5/3) and white (10YR 8/2) when moist; massive; hard, firm, slightly sticky and slightly plastic; few very fine, fine, and medium roots; common very fine tubular and interstitial, few fine and medium tubular pores; common thin clay films in pores and bridges; strongly alkaline (pH 8.6) (pH 8.0 with thymol blue); strongly effervescent, lime occurs in soft masses; clear, smooth boundary.
C1ca RSL No. 61716	25 to 46 inches, white (10YR 8/1) loamy sand, yellowish brown (10YR 5/4) when moist; massive; slightly hard, friable, nonsticky and nonplastic; very few fine roots; many very fine interstitial, common very fine tubular pores; moderately alkaline (pH 8.2); strongly effervescent, lime is disseminated; clear, smooth boundary.
C2g RSL No. 61717	46 to 62 inches +, light yellowish brown (10YR 6/4) loamy sand with many large prominent mottles, dark reddish brown (5YR 3/4) and light olive gray (5Y 6/2) when moist; massive, slightly hard, friable, nonsticky and nonplastic; very few fine roots; many fine interstitial and few very fine tubular pores; mildly alkaline (pH 7.4).

1/ This pedon has less organic carbon than required for the mollic epipedon of the Beckwourth series.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE McKay silt loam (taxadjunct) **LOCATION** Lassen County, California

SOIL FAMILY: Typic Nadurargid, fine-silty, mixed, mesic

SOIL NOS. S55-Cal. 18-2 **LAB. NOS.** 55488-497

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)								3A1	2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0-1½	Av1	0.3	1.1	1.0	10.5	19.1	63.1	4.9	53.9	36.7	0	sil
1½-3	Av2	0.1	0.8	1.0	8.9	16.8	63.4	9.0	49.4	38.0	0	sil
3-4½	B21	0.1	0.4	0.8	6.3	12.4	64.6	15.4	38.3	43.6	0	sil
4½-9	B22	0.0	0.1	2.1	4.8	6.3	63.2	23.5	24.5	48.4	1	sil
9-12	B31	0.3	1.9	1.8	6.3	6.0	65.3	18.4	23.5	52.0	0	sil
12-18	B32 C	0.1	0.9	1.8	9.6	8.3	63.2	16.1	31.1	47.4	0	sil
18-31	C1	0.2	0.5	1.0	12.6	12.7	56.5	16.5	37.9	41.7	0	sil
31-48	C2	0.4	0.8	0.9	9.7	8.9	64.0	15.3	30.0	50.7	0	sil
48-60	C3	1.0	0.7	0.5	2.6	7.8	69.9	17.5	25.6	54.1	2	sil
60-70	C4	0.7	1.3	0.8	2.1	4.8	75.5	14.8	22.0	59.8	4	sil

	pH		ORGANIC MATTER				8A1a	6E1b	6F1a	MOISTURE TENSIONS		
8C1b SATURATED PASTE 1:1	8C1a 1:5	8C1a 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	Elec. Conduc. EC×10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS.
9.4		10.0	0.25	.029	8.6		18.6	tr.	-			6.0
9.9		10.1	0.16	.024			35.2	2	-			10.0
9.9		10.1	0.21				26.6	5	-			21.4
10.0		10.1	0.17				18.6	4	-			30.3
10.0		10.1	0.13				16.8	3	-			31.3
10.0		10.1	0.10				13.5	6	-			30.0
9.7		10.0	0.12				8.0	10	-			28.4
9.1		9.9	0.10				2.6	6	-			30.3
8.8		9.5	0.09				1.9	3	-			27.6
8.6		9.4	0.06				1.9	2	-			22.9

5A2a	EXTRACTABLE CATIONS			5B		5D1	SATURATION EXTRACT SOLUBLE				8A1	8A
CATION EXCHANGE CAPACITY	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	EXCH. Na %	6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg		6K1a Cl	MOISTURE AT SATURATION %
← Na →	milliequivalents per 100g. soil →						← milliequivalents per liter →					
19.0				13.0	3.6	68	220.0	2.9	2.5			27.1
29.4				22.4	4.9	76	464.0	5.0	1.0			31.5
46.4				34.5	7.6	74	342.0	3.8	0.6			48.2
56.0				47.5	8.1	85	226.0	2.2	0.6			67.2
57.3				45.0	5.7	79	196.0	1.7	0.9			75.9
51.7				50.5	6.6	98	158.0	1.3	0.7			78.3
48.7				39.7	4.6	82	91.0	0.7	0.6			76.6
50.1				33.5	4.7	67	26.0	0.3	1.1			101.1
48.3	1/ Percent of whole soil			25.4	4.4	53	17.8	0.3	0.5			71.3
42.5				17.5	3.4	41	18.0	0.2	0.5			95.0

McKAY SILT LOAM (taxadjunct) 1/
855Calif-18-2

Location: About 10 miles east of Susanville. 53/100 mile west of the east quarter-corner of Section 1, T. 29 N. R. 13 E., Honey Lake Valley SCD, Lassen County, California. 240 feet north of an east-west graveled road. Date of Sampling: August, 1955.
Described by: W. M. Johnson. Collectors: S. B. Johnson, Ralph E. Nelson, Stuart Porter, Reuben E. Nelson, John Cady, E. A. Naphan, and W. M. Johnson.
Classification: Typic Nadurargid, fine-silty, mixed, mesic.
Vegetation: Shrub-grass with many barren patches and an occasional patch of very light gray salt crust. Total density, 15 percent. Composition: Greasewood, 60 percent; big rabbitbrush, 25 percent, big sage, 10 percent; hop sage, 1 percent; horsebrush, trace; salt grass, 3 percent; giant and blue wild rye, 1 percent; pickleweed, trace. Forage production, 100-200 pounds per acre. Climate: At Susanville the January average temperature is 30.7° F., the July average is 69.5° F., and the frost-free period average 142 days. Summers are hot and dry, winters and cold and snowy. Mean annual rainfall at Susanville is 17.6 inches, most of which falls during the period October to May. At the site where samples were taken it is estimated that the mean annual rainfall is 8 to 10 inches. Parent Material: Probably alluvial sediments from Willow Creek, mixed with Lake Lahontan sediments. Material consists of calcareous silty and clayey earths. Use: Pasture in poor condition. Relief: Smooth, nearly level basin rim or old basin floor of ancient Lake Lahontan. There is slight (3-5 inches) microrelief, probably due to wind erosion. High spots are under shrubs; low spots are barren or sparsely covered with grass and herbs. Slope less than ½ percent, plane. Elevation: About 4080 feet. Drainage: Runoff, slow. Permeability, moderate or moderately slow. Soil seems to be imperfectly drained. Probably has high water table during part of the year. Other Features: The soil exists in complex with Canby and with a darker, friable, granular soil that seems to be higher in salt. The entire part of the basin is salt and sodium-affected, different units varying mainly in degree of salinity and alkalinity. Reaction: Free carbonates measured by observing reaction to dilute HCl. pH's determined with thymol blue in about 1:5 soil-indicator dilution.

HORIZON	DESCRIPTION
Av1 RSL No. 55488	0 to 1½ inches, light brownish gray (10YR 6.5/2, dry; 4.5/2.5, moist) silt loam. Very weak thick platy; nearly massive. Soft, friable, plastic, slightly sticky. Has many roots, but they do not branch in this horizon. Very porous--strongly vesicular. Moderately calcareous. pH 9.1. Abrupt, smooth lower boundary.
Av2 RSL No. 55489	1½ to 3 inches, light brownish gray (10YR 6/2, dry; 4/2.5, moist) silt loam. Moderate medium and thin platy. Friable, plastic, slightly sticky. Many roots, but they do not branch in this horizon. Moderately porous, but not so strongly vesicular as the subhorizon above. Moderately calcareous. pH 9.4. Abrupt, smooth lower boundary.
B21 RSL No. 55490	3 to 4½ inches, brown (10YR 5/3, dry; 3.5/3, moist) silty clay loam. Weak medium prismatic, breaking to strong fine and very fine granular. Peds have moderate continuous clay skins. Very hard, firm, very plastic, very sticky. Roots are profuse; they "spread out" in this horizon. Peds are nonporous. Strongly calcareous. pH 9.4. Clear, smooth lower boundary.
B22 RSL No. 55491	4½ to 9 inches, pale brown (10YR 6/3, dry; 4/2.5, moist) silty clay loam with common faint fine mottles of very pale brown (dry). Weak medium prismatic breaking to weak medium and fine subangular blocky. Firm, plastic, very sticky. Peds have moderate continuous clay skins, but are moderately porous. Roots are profuse. Strongly calcareous. pH 9.6. Clear, smooth lower boundary.
B31 RSL No. 55492	9 to 12 inches, pale brown (10YR 6/3, dry; 4/2.5, moist) silty clay loam with common, faint, fine mottles of brown and very pale brown (dry). Weak medium and fine subangular blocky. Friable, with many firm peds; plastic, sticky. Some of the hard lumps are full of snail shells and probably are bits of reworked lacustrine sediments. Reaction varies from noncalcareous to strongly calcareous within this horizon. There are moderate continuous clay skins on surfaces of peds. Peds are slightly porous. Roots are numerous. pH 9.6. Gradual, wavy lower boundary.
B32 RSL No. 55493	12 to 18 inches, pale yellow (2.5Y 7/3, dry; 4/3, moist) silty clay loam with common fine white mottles. Weak medium and fine subangular blocky. Friable matrix, with many firm peds, as above. Plastic, sticky. Peds have moderate continuous clay skins, and are slightly porous. Roots are numerous. Strongly calcareous. pH 9.6. Gradual, wavy lower boundary.
C1 RSL No. 55494	18 to 31 inches, light brownish gray (10YR 6.5/2.5, dry; 4/3, moist) heavy silt loam with common, faint, fine and medium mottles of light brownish gray and light yellowish brown (dry). Massive, with many hard, medium subangular blocky peds. Firm, with a few friable patches, plastic, sticky. Peds have many thin patches of clay skins, and are slightly porous. Moderate number of roots. Very strongly calcareous. pH 9.4. Gradual, wavy lower boundary.
C2 RSL No. 55495	31 to 48 inches, pale brown (10YR 6.5/3, dry; 4/3, moist) heavy silt loam with common, fine, distinct mottles of brown and dark brown (dry). Weak medium subangular blocky. Firm, with a few friable patches; plastic, sticky. There are a few patches of thin clay skins. Few roots. Peds are moderately porous. Varies from noncalcareous to moderately calcareous. pH 8.7. Gradual, slightly wavy lower boundary.
C3 RSL No. 55496	48 to 60 inches, faintly, finely mottled light gray and pale yellow (2.5Y 7/2 and 7/3, dry; 4/2 and 4/3, moist) heavy silt loam with common black spots on the surfaces of planes of breakage. Massive, stratified. Firm, plastic, sticky. Has a couple of horizontal lenses about ½ inch thick of very hard, lime-cemented material, and some hard nodular lime concretions in a noncalcareous matrix. Slightly porous. Very few roots. No clay skins observed. pH 8.7. Clear, smooth lower boundary.
C4 RSL No. 55497	60 to 70 inches, light gray (2.5Y 7.5/2, dry; 5/2, moist) silt loam with common horizontal stripes of strong brown (dry). Massive--stratified. Firm, plastic, sticky. Slightly porous. No roots seen. Contains many small hard nodular lime concretions, but the matrix is noncalcareous. No clay skins observed. pH 8.5.

1/ The McKay series is in a fine-silty, mixed, mesic family of Typic Natrixerolls. This pedon lacks a mollic epipedon and has some silica cementation in the C horizon.

CASA GRANDE SAND (taxadjunct) 1/
S55Calif-36-7

Sampling Date: January, 1955. Description By: W. G. Harper
Collectors: Fred Eggers, W. G. Harper and Reuben E. Nelson.

Location: 0.2 mi. E of W1/4 cor., Sec. 26, T10N, R3W and 150 ft. N of railroad track, about 20 miles ENE of Barstow, San Bernardino County, Calif.
Elevation: About 2500 ft. Annual precipitation about 4 inches
Classification: Typic Natrargid, fine-loamy, mixed, thermic.
Vegetation: Desert sage and creosote bush. 90 percent of surface barren
Parent Material: Alluvium from mixed rocks but mainly from granitic formations
Physiography: Alluvial fan or old stream terrace - slope less than 1 percent
Drainage: Practically no runoff and moderately slow to slow permeability through B_2 horizon.

HORIZON		DESCRIPTION
S55Calif-36-7-1 A	0- 6"	Reddish brown (5YR 5/4 moist) sand; massive; soft when dry, loose when moist; noncalcareous; pH on dilution 8.0; rapidly permeable; devoid of plant roots; abrupt and smooth lower boundary.
S55Calif-36-7-2 B_{21}	6-12"	Reddish brown (5YR 4/4 moist) sandy clay loam; moderately to strongly defined coarse prismatic; hard when dry, slightly firm when moist; noncalcareous; pH on dilution 8.4; few plant roots; slowly permeable; abrupt lower boundary.
S55Calif-36-7-3 B_{22}	12-15"	Brown (7.5YR 5/4 dry, 4/4 moist) sandy clay loam; weakly to moderately coarse prismatic; very hard when dry, friable when moist; noncalcareous except where a few fine threads of lime occur; pH on dilution 8.4; practically devoid of plant roots; moderately permeable; abrupt lower boundary.
S55Calif-36-7-4 B_{2ca}	15-22"	Brown (7.5YR 5/4 moist) sandy clay loam; weak medium subangular blocky; hard when dry, friable when moist; moderate to moderately slow permeability; moderately calcareous with common medium to fine distinct white lime veins; pH on dilution 8.7; no plant roots; abrupt and smooth lower boundary.
S55Calif-36-7-5 C	22-26"	Pale brown (10YR 6/3 dry, brown 5/3 moist) fine sandy loam; massive; slightly hard when dry, friable when moist; moderately calcareous with few medium distinct white lime veins; moderately permeable; pH on dilution 8.6; no plant roots; lower boundary abrupt and wavy.
S55Calif-36-7-6 C_b	26-36"	Pink (7.5YR 7/4 dry, light brown 6/4 moist) sand; massive; soft when dry, loose when moist; mildly calcareous; very rapidly permeable; without plant roots; lower boundary abrupt and wavy.
S55Calif-36-7-7 B_{2b}	36-60"	Pink (7.5YR 7/4 dry, light brown 6/4 moist) sandy clay loam, moderately defined medium subangular blocky; moderately calcareous with common medium distinct white lime veins; moderately slow permeability; pH on dilution 8.9.

1/ The Casa Grande series is now in a hyperthermic family. This pedon has a mean annual soil temperature somewhat below 72° F.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Casa Grande sand (taxadjunct) **LOCATION** San Bernardino County, Calif.

SOIL FAMILY: Typic Natrargid, fine-loamy, mixed, thermic.

SOIL NOS. 855Calif-36-7 **LAB. NOS.** 5547 thru 5552

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0- 6	A	8.9	17.8	17.8	30.7	13.3	8.1	3.4	35.0	3.4	6	s
6-12	B21	11.2	14.1	11.0	18.8	8.4	12.8	23.7	25.0	6.6	10	scl
12-15	B22	13.3	15.2	9.0	16.9	7.3	13.0	25.3	23.2	6.5	9	scl
15-22	B2ca	9.3	13.8	7.3	16.0	8.9	19.4	25.3	29.0	9.0	5	scl
22-26	C	4.9	9.1	5.0	23.7	22.3	19.8	15.2	54.0	6.4	2	fsl
26-36	Cb	8.7	24.7	17.6	36.0	6.7	4.6	1.7	30.6	0.3	2	c s

8C1b pH SATURATED PASTE 1:1	8C1a pH 1:5	8C1a pH 1:10	6A1a ORGANIC MATTER ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	8A1a Elec. Conduc. EC x 10³ MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	6F1a GYPSUM me./100g. SOIL	4B2 MOISTURE TENSIONS 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
8.0		7.8	0.10	0.007			0.67	0	0		3.8	1.8
8.2		9.0	0.15	0.016			11.0	0	0			9.3
8.1		9.3	0.07				16.4	0	0			11.2
8.0		9.3	0.06				17.6	2.7	0			10.0
8.1		9.5	0.05				15.2	3.3	0			5.5
8.3		9.3	0.01				8.9	0	0		4.7	1.7

5A2a CATION EXCHANGE CAPACITY (-(Na)	5B1a Ca 6N2b	5B1a Mg 6Q2c	6H2a H	5B1b Exch. Na 6P2a	5B1b Exch. K 6Q2a	5D1 EXCH. Na %	6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg	6O1a	6K1a	8A MOISTURE AT SATURATION %
	EXTRACTABLE CATIONS 5B milliequivalents per 100g. soil →						SATURATION EXTRACT SOLUBLE 8A1 ← milliequivalents per liter →					
3.6				0.6	0.6	17	5.1	0.8	1.6			19.8
17.0				7.5	0.6	44	99.0	1.1	8.0			34.3
19.0				7.9	0.6	42	153	2.3	13.7			49.7
20.5				9.3	0.3	45	160	2.3	23.3			38.5
12.3				4.7	0.3	38	140	2.5	16.9			38.3
4.2				1.8	Tr	43	80.0	0.7	7.2			22.7

1/ Percent of <1 inch fraction

SOIL SURVEY LABORATORY Riverside, California

Casa Grande

OIL TYPE sand (taxadjunct) **LOCATION** San Bernardino County, California

SOIL FAMILY: Typic Natrargid, fine-loamy, mixed, thermic.

SOIL NOS. S55Calif-36-8 **LAB. NOS.** 5553 thru 5559

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0- 4	A	13.2	24.8	16.9	24.5	9.9	7.9	2.8	30.4	0.5	9	cos
4-11	B2	6.5	15.2	11.8	16.8	7.3	11.6	30.8	22.4	5.3	5	scl
11-18	B2ca	8.0	15.1	9.0	16.0	11.3	16.3	24.3	31.4	5.9	7	scl
18-24	B3	11.1	16.0	7.6	14.8	14.5	18.7	17.3	35.8	7.2	8	cosl
24-32	C	18.3	24.4	9.5	15.9	12.0	11.5	8.4	32.7	1.1	17	ls
32-44	B2cab	1.1	2.1	1.6	12.1	16.2	47.6	19.3	47.8	25.7	1	l
44-60	Cb	11.3	15.9	11.1	28.7	13.3	10.5	9.2	38.9	3.2	16	ls

8C1b pH SATURATED PASTE 1:1	8C1a 1:5	8C1a 1:10	6A1a ORGANIC MATTER ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	8A1a Elec. Condc. EC×10³ MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	6F1a GYPSUM me./100g. SOIL	4B2 MOISTURE TENSIONS 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
8.0		8.4	0.08	0.010			0.7	0	0		3.7	1.4
8.1		9.3	0.10	0.009			2.6	0	0			10.9
8.3		9.4	0.07	0.009			8.6	2.4	0			9.6
8.0		8.6	0.05				16.0	3.6	2.6			6.1
8.1		8.7	0.01				15.1	0	0		9.9	3.8
8.3		9.3	0.01				16.1	10.9	0			9.1
8.2		9.1	0.02				13.6	0	0		12.0	4.3

5A2a CATION EXCHANGE CAPACITY (-Na)	5B1a Ca 6N2b	5B1a Mg 6Q2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	5D1 EXCH. Na %	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg	6O1a	6K1a	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
3.5				0.3	0.3	9	3.5	0.7	4.0			20.6
22.8				6.2	0.9	27	24.3	0.3	1.4			32.7
19.4				8.9	0.4	46	80.0	0.7	4.4			38.9
12.9				7.1	0.4	55	153	1.8	31.7			33.9
11.9				2.7	0.1	23	150	1.8	14.9			26.4
23.3				10.1	0.3	43	168	1.8	26.4			47.4
9.7				4.5	0.1	46	143	1.8	17.4			26.8

1/ Percent of <1 inch fraction

CASA GRANDE SAND (taxadjunct) 1/
S55Calif-36-8

Location: San Bernardino County, California. 200 feet north and 80 feet west of center Sec. 34, T. 10 N., R. 3 W., about 2 miles southwest of Hinkley.
Date of Sampling: January, 1955.
Description by: W. G. Harper. Collectors: Fred Eggers, W. G. Harper, and Reuben E. Nelson.
Classification: Typic Natrargid, fine-loamy, mixed, thermic.
Vegetation: Desert sage 24 inches high, creosote bushes 6 feet high. About 85 percent of surface barren. Climate: Annual precipitation about 4 inches.
Parent Material: Alluvium from mixed rocks but mainly from granitic formations.
Physiography: Old stream terrace - nearly level; ground water about 50 feet below surface. Elevation: About 2,200 feet. Drainage: Little or no runoff; moderate to slow permeability.

HORIZON		DESCRIPTION
S55Calif-36-8-1 A	0- 4"	Reddish brown (5YR 5/3 dry, 5/4 moist) coarse sand; single grain; soft when dry, loose when moist; noncalcareous, slightly micaceous; very rapidly permeable; pH on dilution of 1 to 5 with thymol blue 8.1; few very fine roots; lower boundary abrupt and smooth.
S55Calif-36-8-2 B_2	4-11"	Reddish brown (5YR 5/ 4 dry, 4/4 moist) sandy clay loam; moderately defined coarse prismatic; very hard when dry, friable when moist; noncalcareous; micaceous; slowly permeable; pH on dilution 9.0; few fine plant roots; lower boundary abrupt and smooth.
S55Calif-36-8-3 B_{2ca}	11-18"	Light reddish brown (5YR 6/4 dry, reddish brown 4.5/4 moist; sandy clay loam; weak coarse prismatic; very hard when dry, friable when moist; mildly to moderately calcareous, strongly calcareous on lime veins which range from few to common; moderately to slowly permeable; slightly micaceous; very few fine plant roots; pH on dilution 9.0; lower boundary abrupt and smooth.
S55Calif-36-8-4 B_3	18-24"	Brown (7.5YR 5/4 dry and moist) coarse sandy loam; weakly medium to fine subangular blocky; very hard when dry, friable when moist; strongly calcareous with many fine distinct white flecks of lime; slightly micaceous; moderately permeable; practically devoid of plant roots; pH on dilution 8.8; lower boundary abrupt and smooth.
S55Calif-36-8-5 C	24-32"	Light brown (7.5YR 6/4 dry, brown 5/4 moist) gravelly loamy sand; massive; hard when dry, very friable when moist; mildly calcareous in spots where occasional white lime flecks occur; slightly micaceous; moderately to rapidly permeable; devoid of plant roots; pH on dilution 8.2; lower boundary abrupt and smooth.
S55Calif-36-9-6 B_{2cab}	32-44"	Light yellowish brown (10YR 6/4 dry, dark grayish brown 4/2 moist) loam; moderately defined medium subangular blocky; very hard when dry, very friable when moist; very strongly calcareous with many lime flecks, streaks and splotches; moderate to moderately slow permeability; pH on dilution 9.3; devoid of plant roots; lower boundary abrupt and smooth.
S55Calif-36-9-7 C_b	44-60"	Pale brown (10YR 6/3 dry, brown 5/2.5 moist) loamy sand; slightly hard when dry, very friable when moist; slightly micaceous; noncalcareous; pH on dilution 8.2; devoid of plant roots.

1/ The Casa Grande series is now in a hyperthermic family. This pedon has a mean annual soil temperature somewhat below 72° F.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Aquic Natrargid, fine-loamy, mixed, mesic

SOIL Loyalton fine sandy loam SOIL Nos. S61Calif-32-11 LOCATION Sierra Valley, Plumas County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 61659 - 61667

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.2)	3A1		Coarse fragments 2A2: ≥ 2 Pct.	Coarse fragments 2A2: 2 – 19 Pct. of < 76 mm	Coarse fragments 2A2: 19 – 76 Pct. of < 76 mm
		Pct. of < 2 mm																
0–1/4	A11	78.7	18.5	2.8	5.5	16.1	13.5	28.9	14.7	11.8	6.7	43.6	46.9			2		
1/4–5	A12	72.2	23.1	4.7	4.5	11.4	12.7	28.1	15.5	10.1	13.0	42.1	40.2			2		
5–8	A2	71.8	23.8	4.4	4.8	13.4	12.7	27.4	13.5	11.3	12.5	40.7	42.4			2		
8–12	B21t	58.7	18.9	22.4	5.0	10.2	10.8	21.7	11.0	8.0	10.9	31.2	35.5			4		
12–17	B22tca	51.6	18.7	29.7	5.3	9.4	9.3	18.6	9.0	8.1	10.6	27.7	32.0			3		
17–23	B31ca	43.5	20.6	35.9	3.3	7.8	8.6	16.1	7.7	8.1	12.5	24.6	27.0			5		
23–33	B32ca	53.0	21.4	25.6	7.7	10.8	10.7	16.1	7.7	8.6	12.8	24.4	37.2			3		
33–53	IIC1	83.0	8.2	8.8	20.5	24.6	19.7	15.9	2.3	3.4	4.8	11.3	75.1			39		
53–63+	IIC2	88.7	6.2	5.1	39.6	24.1	9.5	13.4	2.1	3.3	3.9	10.0	81.0			38		

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N		6E1b Carbonate as $^{*}CaCO_3$		Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven-Dry			Water content: 4B1c 1/3 bar		Water content: 4B2 15 bar	4D1 Vert. Extensibility	4A C*		pH: 8C1b Sat. Paste	pH: 8C1a 1:10
	Pct.	Pct.			Pct.		g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.				
0–1/4	1.23	0.073	16.8		-								5.0				7.1	7.3
1/4–5	0.66	0.056	11.8		-		1.54	1.57			12.1		4.7	0.006	0.99		8.0	8.3
5–8	0.38	0.034	11.2		-								4.8				8.6	8.7
8–12	0.37	0.035	10.6		1		1.14	1.65			45.9		20.3	0.115	0.98		9.4	10.1
12–17	0.31				6		1.20	1.47			38.1		23.1	0.065	0.99		9.8	10.2
17–23	0.19				9		1.17	1.41			39.7		24.4	0.061	0.98		9.9	10.3
23–33	0.17				18		1.30	1.46			32.1		20.9	0.039	0.99		9.5	10.2
33–53	0.02						1.32	1.44			25.8		8.9	0.028	0.76		8.9	9.6
53–63+	0.02												7.1				8.5	9.0

Depth (In.)	Extractable bases 5B1a: 6N2c Ca	602c Mg	6P2a Na	6Q2a K	6H2a Ext. Acidity	Cat. Exch. Cap. NaOAc 5A2a	5B1b Exch. Na	Water extract from saturated paste 8A1: 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K	6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g							meq/liter								mmho/cm
0–1/4	4.9	2.4	1.0	1.5	1.1	11.2	0.7	3.4	3.5	9.5	1.6	0.4	9.7	5.1		1.52
1/4–5	5.2	2.6	1.9	1.5	0.6	12.4	1.7	0.5	0.4	7.6	0.3	0.4	5.8	2.4		0.88
5–8	4.4	2.6	3.8	0.8	0.4	13.5	3.5	0.6	0.4	12.3	0.1	0.7	6.1	6.4		1.44
8–12	10.1	2.2	30.9	0.4	-	32.4	27.3	0.8	0.6	66.5	0.1	4.6	14.8	30.9		5.54
12–17	10.5	2.4	33.3	0.3	-	32.9	27.0	0.6	0.6	77.3	0.1	14.6	19.8	21.8		5.21
17–23	13.1	3.6	38.3	0.3	-	35.3	31.2	0.8	0.5	68.5	0.1	16.3	18.1	17.0		6.25
23–33	12.8	4.4	29.0	0.2	-	31.0	26.0	0.7	0.6	47.0	0.1	6.1	12.7	15.8		4.63
33–53	4.0	3.5	11.2	0.1	0.6	20.0	10.5	0.7	0.4	26.4	-	1.6	6.1	9.8		2.70
53–63+	4.6	4.3	8.4	0.1	0.8	18.4	7.8	1.1	0.9	22.1	0.1	1.1	3.7	11.0		2.50

Depth (In.)	8A Water at Saturation Pct.	5D1 Exchangeable Na Pct.	Clay Mineralogy (<0.002 mm.): Montmorillonite (X-ray)	Vermiculite (X-ray)	Mica	Kaolinite	Kaolinite % DTA
0–1/4	31.0	6					
1/4–5	24.0	14	x	x	-	t	t
5–8	25.5	26					
8–12	53.4	84					
12–17	81.7	82	xxx	x	-	t	3
17–23	108.4	88					
23–33	65.4	84	xxx	-	-	t	4
33–53	28.1	52					
53–63+	27.1	42					

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

* Fractional volume of the horizon occupied by <2 mm. soil material.

LOYALTON FINE SANDY LOAM

S61Calif-32-11

Location: Sierra Valley, Plumas County, California. Lucky Hereford property - 200 feet west of Plumas County Highway A-24. 200 feet west and 200 feet north of S1/4 corner section 24, T. 22 N., R. 15 E. Date of Sampling: September 12, 1961.
Collectors: Grant Kennedy, Reuben Nelson, John Rogers, Paul Nazar, James McLaughlin, Eugene Begg.
Vegetation: Rabbit brush, silver sage, big sage and salt grass. Climate: Estimated annual precipitation 12 inches. Nearest weather station (Sierraville): Mean annual temperature 46° F.; January average 28.2° F.; July average 63.6° F.; mean annual precipitation 25.78 inches.
Parent Material: Medium textured alluvium from mixed sources. Relief: Low terrace near valley floor with slightly hummocky topography. Slope less than 1 percent. Elevation: 4889 feet.
Drainage: Moderately well drained; runoff is slow; permeability very slow.
Remarks: This is a Solodized Solonetz soil. The surface (A11) has a winnowed appearance. The A11 may be absent or in the deeper spots may be several inches thick. The B21t and B22t horizons have organic staining on the ped faces. The IIC2 horizon has one inch thick, intermittently cemented bands which are dark red (2.5YR 3/6) when moist and yellowish red (5YR 4/6 and 5/6) when dry. Classification: Aquic Natrargid, fine-loamy, mixed, mesic.

HORIZON	DESCRIPTION
A11 RSL No. 61659	0 to 1/4 inch, light brownish gray (10YR 6/2) loamy sand, very dark grayish brown (10YR 3/2) when moist; single grain; soft, very friable, nonsticky and nonplastic; neutral (pH 7.0); abrupt, smooth boundary.
A12 RSL No. 61660	1/4 to 5 inches, gray (10YR 6/1) fine sandy loam, very dark grayish brown (10YR 3/2) when moist; moderate coarse platy structure; soft, very friable, nonsticky and nonplastic; abundant very fine, plentiful fine to coarse roots; many very fine interstitial, common very fine, few fine and medium tubular pores; neutral (pH 6.8); clear, smooth boundary.
A2 RSL No. 61661	5 to 8 inches, light gray (10YR 7/1) sandy loam, dark grayish brown (10YR 4/2) when moist; weak very fine platy structure; slightly hard, friable, nonsticky and nonplastic; plentiful very fine, fine, and medium roots; common very fine tubular and interstitial pores; few thin clay films in pores; moderately alkaline (pH 8.0)(pH 8.6 with thymol blue); abrupt, smooth boundary.
B21t RSL No. 61662	8 to 12 inches, variegated grayish brown (10YR 5/2) and light gray (10YR 7/2) sandy clay, very dark grayish brown (10YR 3/2) when moist; strong medium columnar structure; extremely hard, very firm, sticky and very plastic; abundant very fine, few fine to medium, mainly exped roots; common very fine and few fine tubular pores; continuous thick clay films on ped faces; moderately alkaline (pH 8.4)(pH 9.6 with thymol blue); very slightly effervescent, lime is concentrated in areas; clear, smooth boundary.
B22tca RSL No. 61663	12 to 17 inches, variegated grayish brown (10YR 5/2) and light gray (10YR 7/2) sandy clay, variegated very dark grayish brown (10YR 3/2) and brown (10YR 5/3) when moist; strong medium prismatic structure; extremely hard, very firm, sticky and very plastic; few very fine inped, and few fine exped roots; common very fine tubular pores; continuous thick clay films on ped faces; moderately alkaline (pH 8.4)(pH 9.6 with thymol blue); strongly effervescent, lime occurs in soft masses; clear, slightly wavy boundary.
B31ca RSL No. 61664	17 to 23 inches, variegated light gray (10YR 7/2) and pale brown (10YR 6/3) sandy clay, variegated dark grayish brown (10YR 4/2), brown (10YR 5/3), and light gray (10YR 7/2) when moist; moderate medium prismatic structure; hard, firm, sticky and plastic; few very fine and fine exped roots; few very fine tubular and common very fine interstitial pores; many thick clay films in pores and on ped faces; moderately alkaline (pH 8.4) (pH 9.6 with thymol blue); violently effervescent, lime occurs in soft masses; clear, slightly wavy boundary.
B32ca RSL No. 61665	23 to 33 inches, variegated white (2.5Y 8/2) and pale yellow (2.5Y 7/4) coarse sandy clay, variegated light gray (2.5Y 7/2) and olive brown (2.5Y 4/4) when moist; weak medium prismatic structure; hard, firm, sticky and plastic; very few very fine roots; few very fine tubular and common very fine interstitial pores; common thick clay films in pores and on ped faces; moderately alkaline (pH 8.4)(pH 9.4 with thymol blue); violently effervescent, lime occurs in soft masses; abrupt, wavy boundary.
IIC1 RSL No. 61666	33 to 53 inches, pale yellow (2.5Y 7/3) coarse sand, variegated very dark grayish brown (2.5Y 3/2) and olive brown (2.5Y 4/4) when moist; massive; friable, nonsticky and nonplastic; no roots; many very fine and few fine interstitial pores; moderately alkaline (pH 8.2)(pH 8.6 with thymol blue); noncalcareous; abrupt, smooth boundary.
IIC2 RSL No. 61667	53 to 63 inches +, pale yellow (2.5Y 7/3) coarse sand, olive brown (2.5Y 4/4) when moist, many medium distinct very dark grayish brown (10YR 2/2) mottles; massive; firm, nonsticky and nonplastic; no roots; common very fine interstitial pores; moderately alkaline (pH 8.0)(pH 8.4 with thymol blue); noncalcareous.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Aquic Natrargid, fine-loamy, mixed, mesic
SOIL Lovalton fine sandy loam **SOIL Nos.** S61Calif-32- 10 **LOCATION** Sierra Valley, Plumas County, California
SOIL SURVEY LABORATORY Riverside, California **LAB. Nos.** 61649 - 61658

Depth (in.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand (2–1)	Sand (1–0.5)	Sand (0.5–0.25)	Sand (0.25–0.1)	Sand (0.1–0.05)	Silt (0.05–0.02)	Silt (0.02–0.002)	Int. II (0.2–0.02)	(2–0.2)			Coarse fragments 2A2 ≥ 2 Pct.	Coarse fragments 2 – 19 Pct. of < 76 mm	Coarse fragments 19 – 76 Pct. of < 76 mm
		Pct. of < 2 mm																
0–2	A1	89.1	7.7	3.2	21.2	19.4	14.5	25.1	8.9	4.5	3.2	27.1	66.5			6		
2–7	A2	63.7	31.3	5.0	7.0	9.7	9.9	24.7	12.4	12.1	19.2	39.6	36.2			3		
7–10	A & B	71.8	21.5	6.7	8.6	12.0	11.8	27.5	11.9	8.4	13.1	36.7	43.5			5		
10–16	B21t	60.5	19.7	19.8	6.7	9.8	10.1	23.0	10.9	7.3	12.4	31.8	36.0			4		
16–21	B22t	42.2	23.7	34.1	3.4	7.3	6.9	16.4	8.2	8.2	15.5	26.6	23.8			1		
21–30	B31t	59.9	16.7	23.4	7.0	11.5	9.1	22.7	9.6	7.4	9.3	31.4	35.9			7		
30–39	B32t	74.5	11.3	14.2	14.9	14.0	8.1	26.8	10.7	5.7	5.6	33.2	47.0			29		
39–49	IIC1	91.8	5.5	2.7	20.6	19.8	14.6	29.9	6.9	3.4	2.1	26.9	68.3			31		
49–60	IIC2m	89.8	5.2	5.0	29.7	35.0	11.8	11.5	1.8	2.7	2.5	10.1	82.4			39		
60–65+	IIC3	83.7	6.3	10.0	25.3	22.0	15.3	18.1	3.0	3.1	3.2	14.2	72.6			33		

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N		6E1b Carbonate as $CaCO_3$ Pct.		Bulk density g/cc		g/cc		Water content Pct.		4B2, 15 bar Pct.			pH 8C1b Sat. Paste	pH 8C1a 1:10
0–2	0.85	0.057	15		–								3.2			6.4	6.5
2–7	0.31	0.030	10		–								3.0			7.0	6.8
7–10	0.28	0.027	10		–								4.2			7.8	7.7
10–16	0.26				–								15.7			8.4	9.3
16–21	0.19				–								24.3			8.7	9.5
21–30	0.09				1								15.6			8.8	9.8
30–39	0.04				1								10.0			8.6	9.6
39–49	0.02				–								3.1			8.0	7.5
49–60	0.02				–								5.1			7.8	7.8
60–65+	0.02				–								8.8			7.5	8.0

Depth (in.)	Extractable bases 5B1a 6N2c Ca	602c Mg	6P2a Na	6Q2a K	6H2a Ext. Acidity	Cat. Exch. Cap. 5A2a $NaOAc$		5B1b Exch. Na	Water extract from saturated paste 8A1 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K		6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0–2	2.7	1.3	0.1	0.5	2.2	7.2		0.1	1.5	1.2	1.3	0.9		–	3.0	1.0		0.52
2–7	2.6	1.5	0.6	0.3	1.6	7.2		0.6	0.4	0.6	3.0	0.1		–	1.7	1.6		0.40
7–10	1.8	1.3	3.7	0.1	0.9	8.6		3.4	2.4	0.6		0.1		–	3.4	9.6		1.59
10–16	2.8	3.9	16.3	0.2	0.7	24.0		15.1	0.8	0.7	26.5	0.1		0.8	6.2	14.7		2.91
16–21	3.7	6.2	26.1	0.3	–	32.9		24.2	0.9	0.5	20.9	0.1		0.3	4.0	9.9		2.20
21–30	6.2	4.6	19.4	0.3	–	24.6		17.2	0.6	0.6	32.2	–		0.9	5.6	13.7		3.37
30–39	5.7	3.4	13.9	0.1	0.3	20.5		12.5	0.5	0.6	41.8	0.1		1.3	6.4	23.4		4.59
39–49	2.0	1.7	2.3	–	1.5	7.3		2.2	0.4	0.1	2.4	–		–	1.2	0.8		0.28
49–60	1.2	3.2	1.9	0.1	0.9	11.3		1.8	0.3	0.2	2.6	–		–	1.4	0.9		0.32
60–65+	6.7	5.5	2.8	0.1	1.4	17.1		2.8	0.2	0.3	2.5	–		0.1	2.7	0.9		0.32

Depth (in.)	8A Water at Saturation Pct.	5D1 Exchangeable Na Pct.		Gypsum Pct.			
0–2	25.5	1					
2–7	18.6	8					
7–10	19.7	39					
10–16	48.6	63					
16–21	91.2	74					
21–30	69.0	70					
30–39	34.2	61					
39–49	20.9	30					
49–60	22.7	16					
60–65+	25.2	16					

LOYALTON FINE SANDY LOAM

S61Calif-32-10

Location: Sierra Valley, Plumas County, California. 100 yards east of County Highway A-24, 100 yards east of center section 24, T. 22 N., R. 15 E. Lucky Hereford property, approximately 4½ miles north of Loyalton along Beckworth Lane. Date of Sampling: September 11, 1961. Collectors: Grant Kennedy, Reuben Nelson, John Rogers, Paul Nazar, James McLaughlin, Eugene Begg. Vegetation: Silver sage, rabbit brush, salt grass, big sage. Climate: Estimated annual precipitation 12 inches. Nearest weather station (Sierraville): Mean annual temperature 46° F.; January average 28.2° F.; July average 63.6° F.; mean annual precipitation 25.78 inches. Parent Material: Medium textured alluvium from mixed sources. Relief: Low terrace near valley floor, slightly hummocky. Slope less than 1 percent. Elevation: 4890 feet. Drainage: Moderately well drained, runoff slow, very slowly permeable. Soil Moisture: Moist below 10 inches when sampled. Remarks: This is a Solodized Solonetz soil. The upper part of the A2 horizon has somewhat more pronounced coarse platy structure than the lower portion. The IIC2m horizon is made up of coarse sand which is somewhat intermittently cemented in bands. The profile appears to be degrading. Evidences for degradation are the gray coatings on peds of the B21t horizon and "ghost columns" in the A & B horizon. Classification: Aquic Natrargid, fine-loamy, mixed, mesic.

HORIZON	DESCRIPTION
A1 RSL No. 61649	0 to 2 inches, light brownish gray (10YR 6/2) loamy coarse sand, very dark grayish brown (10YR 3/2) when moist; single grain; loose, very friable, nonsticky and nonplastic; slightly acid (pH 6.2); noncalcareous.
A2 RSL No. 61650	2 to 7 inches, gray (10YR 6/1) fine sandy loam, dark brown (10YR 3/3) when moist; strong very coarse platy structure; soft, very friable, nonsticky and nonplastic; plentiful very fine and fine, few medium and coarse roots; abundant very fine interstitial, few very fine tubular pores; medium acid (pH 6.0); noncalcareous; abrupt, smooth boundary.
A & B RSL No. 61651	7 to 10 inches, variegated gray (10YR 6/1) and dark brown (10YR 4/3) sandy loam (near loam), dark gray (10YR 4/1) when moist; moderate coarse columnar structure; very hard, firm, slightly sticky and slightly plastic; plentiful very fine and fine, few medium and coarse mainly exped roots; common very fine tubular and interstitial, and few fine and medium tubular pores; common thin clay films in pores and on ped faces; moderately alkaline (pH 8.0)(pH 8.4 with thymol blue); noncalcareous; abrupt, smooth boundary.
B21t RSL No. 61652	10 to 16 inches, dark gray (10YR 4/1) sandy clay, very dark brown (10YR 2/2) when moist; strong coarse columnar structure; extremely hard, firm, sticky and very plastic; plentiful very fine, few fine and medium mainly exped roots; few very fine and fine tubular pores; continuous thick clay films in pores and on ped faces; strongly alkaline (pH 8.5) (pH 9.0 with thymol blue); noncalcareous; clear, smooth boundary.
B22t RSL No. 61653	16 to 21 inches, grayish brown (10YR 5/2) sandy clay, dark brown (10YR 3/3) when moist; moderate coarse prismatic structure; extremely hard, firm, sticky and very plastic; few very fine roots; few very fine pores; many moderately thick clay films in pores and on ped faces; strongly alkaline (pH 8.5)(pH 9.4 with thymol blue); slightly effervescent; lime is segregated; clear, smooth boundary.
B31t RSL No. 61654	21 to 30 inches, variegated pale brown and light gray (10YR 6/3) and (10YR 7/2) sandy clay loam (near sandy clay), dark brown (10YR 3/3) when moist; weak coarse prismatic structure; extremely hard, very firm, sticky, and plastic; very few very fine to medium roots; common very fine interstitial, few fine tubular pores; many thin clay films on ped faces; strongly alkaline (pH 8.5)(pH 9.6 with thymol blue); slightly effervescent; lime is segregated; clear, smooth boundary.
B32t RSL No. 61655	30 to 39 inches, pale brown (10YR 6/3) coarse sandy clay loam, brown (10YR 4/3) when moist; massive; very hard, very firm, slightly plastic and slightly sticky; very few very fine to medium roots; few very fine tubular and interstitial pores; common thin clay films in pores; strongly alkaline (pH 8.5)(pH 9.4 with thymol blue); slightly effervescent; lime is segregated; abrupt, slightly wavy boundary.
IIC1 RSL No. 61656	39 to 49 inches, light gray (10YR 7/1) coarse sand, dark grayish brown (10YR 4/2) when moist; single grain; loose, nonsticky and nonplastic; very few very fine to medium roots; many very fine and common fine interstitial pores; slightly acid (pH 6.3); noncalcareous; abrupt, slightly wavy boundary.
IIC2m RSL No. 61657	49 to 60 inches, pale brown (10YR 6/3) coarse sand, brown (10YR 4/3) when moist; massive; very hard, very firm, nonsticky and nonplastic; very few very fine to medium roots; many very fine interstitial pores; slightly acid (pH 6.5); noncalcareous; abrupt, slightly wavy boundary.
IIC3 RSL No. 61658	60 to 65 inches +, light brownish gray (2.5Y 6/2) loamy sand, brown (10YR 4/3) when moist; massive; friable, nonsticky and nonplastic; very few very fine to medium roots; common very fine interstitial pores; neutral (pH 7.0); noncalcareous.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Churchill silt loam (taxadjunct) **LOCATION** Lassen County, California.

SOIL FAMILY: Duric Natrargid, fine, montmorillonitic, mesic

SOIL NOS. S55-Cal-18-1 **LAB. NOS.** 55479-487

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2	
0-1½	A11	0.3	1.0	1.4	11.6	20.7	60.3	4.7	57.1	32.6	0	sil
1½-3	A12	0.4	0.6	1.0	8.8	17.7	62.7	8.8	50.2	37.1	0	sil
3-10	B2	0.1	0.2	0.4	3.2	5.6	45.0	45.5	19.9	33.1	2	sic
10-16	B3ca	0.3	0.6	0.4	2.2	4.9	60.2	31.4	20.2	46.6	3	sicl
16-28	Cca	0.3	0.6	1.0	8.1	10.4	61.1	18.5	33.4	44.5	0	sil
28-33	C1	0.3	2.0	2.7	8.9	6.9	62.1	17.1	26.8	48.0	0	sil
33-43	C2	1.5	1.4	1.1	4.2	6.8	69.1	15.9	24.4	54.4	2	sil
43-55	C3	0.4	1.1	1.6	7.6	10.9	63.8	14.6	33.5	46.7	6	sil
55-64	C4	1.2	1.5	0.9	2.1	4.5	79.2	10.6	22.6	62.5	9	sil

8C1b SATURATED PASTE 1:1	pH 8C1a 1:5	8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	8F1a Elec. Condc. EC×10³ MILLIMHOS PER CM @25°C	6E1b $CaCO_3$ equivalent %	6F1a GYPSUM me./100g. SOIL	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
7.3		8.2	0.68	.054	12.6		6.2		-			7.4
7.4		8.6	0.30	.035	8.6		22.2		-			6.0
8.7		9.6	0.39				18.1	2	-			28.5
9.1		9.8	0.17				21.3	17	-			36.8
8.9		9.8	0.13				16.0	16	-			27.1
8.9		9.8	0.11				12.3	10	-			27.4
8.8		9.6	0.11				8.2	8	-			28.3
8.4		9.4	0.07				6.6	4	-			27.3
8.2		9.1	0.07				8.4	3	-			22.5

5A2a CATION EXCHANGE CAPACITY (-(Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a N	5B Exch. 5B1b Na 6P2a	5B Exch. 5B1b K 6Q2a	5D1 EXCH. Na %	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a	6O1a	6K1a	8A MOISTURE AT SATURATION
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
12.2				4.0	2.8	33	59.0	2.8	4.8			27.3
14.7				8.3	3.3	56	256.0	5.9	15.7			25.0
45.4				28.0	8.5	62	214.0	3.8	3.0			71.3
45.6				31.6	6.4	69	240.0	3.5	2.0			79.7
45.3				31.4	5.8	69	188.0	2.1	1.8			74.0
50.1				32.2	5.6	64	130.0	1.6	1.4			69.8
48.9				30.9	5.9	63	85.0	1.2	1.7			86.6
46.7				24.7	5.0	53	65.5	0.9	1.6			82.1
40.7				16.4	3.5	40	80.0	1.0	15.1			87.1

CHURCHILL SILT LOAM (taxadjunct) 1/

S55Calif-18-1

Location: About 10 miles east of Susanville, 56/100 mile west of the east quarter-corner of section 1, T 29 N, R 13 E, Honey Lake Valley SCD, Lassen County, California. 80 feet south of an east-west gravelled road. Description by: W. M. Johnson. Collectors: S. B. Johnson, Ralph E. Nelson, Stuart Porter, Reuben E. Nelson, John Cady, E. A. Naphan and W. M. Johnson. Date of Sampling:
Classification: Duric Natrargid, fine, montmorillonitic, mesic.
Vegetation: Sparse (probably about 15 percent density) cover of shrubs and grasses. Big sage, rabbitbrush, greasewood, spiny hopsage, salt grass are dominant. Minor components are giant wild rye and squirreltail. Climate: At Susanville the January average temperature is 30.7 °F, the July average is 69.5° F, and the frost-free period averages 142 days. Summers are hot and dry, winters are cold and snowy. Mean annual rainfall at Susanville is 17.8 inches, most of which falls during the period October to May. At the site where samples were taken it is estimated that the mean annual rainfall is 8 to 10 inches. Parent Material: Mainly alluvial sediments deposited by Willow Creek, including a large proportion of reworked Lake Lahontan sediments. Calcareous silty and clayey materials. The lower horizon may be undisturbed Lake Lahontan sediments. Relief: Smooth, gently sloping basin rim or old basin floor of ancient Lake Lahontan. There is a fairly regular microrelief of 3 to 6 inches due to wind reworking of the surface. High spots are under shrubs; low spots are barren or sparsely covered with grass and herbs. Slope about ½ percent, slightly convex, towards the east. Elevation: About 4080 feet. Use: Pasture in poor condition. Drainage: Runoff, medium. Permeability moderately slow. There is probably a high water table during part of the year. Other Features: The soil surface is characterized by many barren patches, and many small patches with a white salt crust. The surface in more than one-half of the area has a fine polygonal pattern of cracks from 1/4 to 1/2 inch wide, 3 to 4 inches deep. These cracked areas are assumed to have higher salt content in the upper part of the profile than the site sampled. The soil sampled occurs in complex association with a friable, highly saline soil having a granular rather than columnar-blocky B horizon. Reaction: Measure of free carbonates obtained by observing reaction to dilute HCl. pH's determined with thymol blue in about 1:5 soil-indicator dilution.

HORIZON	DESCRIPTION
A11 RSL No. 55479	0 to 1½ inches, light brownish gray (10YR 6/2, dry; 4/2, moist) silt loam. Very weak thick and very thick platy. Soft, friable, slightly plastic, slightly sticky. Roots numerous, but do not branch. Very porous--strongly vesicular. Noncalcareous. pH 8.0. Abrupt, smooth lower boundary.
A12 RSL No. 55480	1½ to 3 inches, light gray (10YR 7/2, dry; 4/2, moist) silt loam. Moderate medium and thin platy. Slightly hard, friable, slightly plastic, slightly sticky. Slightly porous--moderate number of very fine vesicles. Roots numerous, but do not branch. Noncalcareous. pH 8.3. Abrupt, slightly wavy lower boundary.
B2t RSL No. 55481	3 to 10 inches, brown (10YR 5/3, dry; 3/3, moist) silty clay loam. Weak medium columns break to strong fine and very fine blocks with thick, continuous clay skins. Very hard, firm, very plastic, very sticky. Roots numerous and permeate the soil mass; they "spread out" in this horizon. Soil mass as a whole is porous, but individual peds are nonporous. Noncalcareous. pH 9.2. Clear, wavy lower boundary.
B3tca RSL No. 55482	10 to 16 inches, light brownish gray (10YR 6.5/2.5, dry; 4/3, moist) silty clay loam with many coarse, distinct mottles of very pale brown (dry). Moderate fine and very fine subangular blocky. Friable, very plastic, very sticky. Peds have thin, continuous clay skins and are nonporous. Roots numerous. Strongly calcareous. pH 9.4. Gradual, wavy lower boundary.
Cca RSL No. 55483	16 to 28 inches, light brownish gray (10YR 6.5/2.5, dry; 4.5/3, moist) silty clay loam with common, fine, thread-like mottles of white and a few coarse mottles of very pale brown (dry). Moderate medium and fine subangular blocky. Very firm, plastic, very sticky. There are friable masses in this horizon, but most of the material appears to be slightly cemented. Moderate number of roots. Many thin patches of clay skins on vertical and horizontal surfaces and in root channels. Strongly calcareous. pH 9.3. Gradual, wavy lower boundary.
C1 RSL No. 55484	28 to 33 inches, light gray (10YR 7/2.5, dry; 5.5/3, moist) heavy silt loam with common, fine, faint mottles of white (dry). Weak medium subangular blocky. Varies from friable to very firm in different parts of the same horizon. Peds have thin, scattered patches of clay skins. Contains a few snail shells. Few roots. Some places are noncalcareous, but most are strongly calcareous. pH 9.3. Gradual, wavy lower boundary.
C2 RSL No. 55485	33 to 43 inches, very pale brown (10YR 7/3, dry; 5.5/3, moist) heavy silt loam with many fine, faint mottles of light yellowish brown, yellowish brown, and white. Weak very thick platy (stratified). Consistence varies from friable to very firm in different parts of the horizon. Has thin lenses of very firm material that appear to be slightly cemented; these are strongly calcareous. Friable spots are noncalcareous. Very few roots. A few thin patches of clay skins along lines of cleavage. Porous. pH 9.0. Gradual, wavy lower boundary.
C3 RSL No. 55486	43 to 55 inches, light gray (10YR 7/2.5, dry; 5/3, moist) heavy silt loam with common, fine mottles of white and light brown (dry). Massive-stratified. Friable matrix, with thin and thick cemented lamina or lenses. The friable parts are noncalcareous. Contains many fine and medium hard carbonate concretions that look like root channel fillings. Very few thin patches of clay skins. Porous. Very few roots. pH 8.9. Gradual, slightly wavy lower boundary.
C4 RSL No. 55487	55 to 64 inches+, white (2.5Y 8/2, dry; 5.5/2, moist) silt loam or silt with many prominent, coarse mottles of strong brown (dry). Massive-stratified. Friable matrix, with many thin and thick cemented lenses that are strongly calcareous. Most of the matrix material is noncalcareous. A few thin patches of thin clay skins, especially in tubules. Very few roots. pH 8.4.

1/ The Churchill series is in a fine, montmorillonitic, mesic family of Typic Natrargids. This pedon has a C horizon that is weakly cemented by silica.

U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Xerollic Natrargid, fine-silty, mixed, mesic
SOIL Skumpah silt loam (taxadjunct) SOIL Nos. 854Calif-18-2 LOCATION Lassen County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 54297 - 54304

Depth (In.)	Horizon	1B1b Total Sand (2–0.05) Pct. of <2 mm	Total Silt (0.05–0.002) Pct. of <2 mm	Total Clay (<0.002) Pct. of <2 mm	Sand Very coarse (2–1) Pct. of <2 mm	Sand Coarse (1–0.5) Pct. of <2 mm	Sand Medium (0.5–0.25) Pct. of <2 mm	Sand Fine (0.25–0.1) Pct. of <2 mm	Sand Very fine (0.1–0.05) Pct. of <2 mm	Silt 0.05–0.02 Pct. of <2 mm	Silt Int. III (0.02–0.002) Pct. of <2 mm	Int. II (0.2–0.02) Pct. of <2 mm	(2–0.1) Pct. of <2 mm			2A2 Coarse fragments >2 Pct.	2 – 19 Pct. of <76 mm	19 – 76 Pct. of <76 mm
0-2	A11	29.6	53.9	16.5	0.4	1.5	2.7	12.9	12.1	19.2	34.7		17.5			0		
2-4	A12	26.5	52.9	20.6	0.3	1.4	2.7	12.4	9.7	17.5	35.4		16.8			0		
4-12	B2t	15.2	42.8	42.0	0.0	0.6	1.5	6.4	6.7	12.5	30.3		8.5			0		
12-20	B3	23.1	48.7	28.2	0.0	3.2	4.3	9.2	6.4	14.4	34.3		16.7			0		
20-38	C1	Incomplete dispersion - Gypsum														0		
38-52	C2	Possible incomplete dispersion														0		
52-60	C3	11.9	67.7	20.4	0.0	0.7	1.0	4.9	5.3	18.5	49.2		6.6			0		
60-80	C4	Incomplete dispersion - Gypsum														0		

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N		6E1b Carbonate as $CaCO_3$ Pct	Bulk density g/cc	Bulk density g/cc	Bulk density g/cc		Water content Pct.	Water content Pct.	4B2 Pct.				pH 8C1b Sat. Paste	pH 8C1a 1:10 H_2O
0-2	1.12	0.072	15.6		tr.							9.2				7.1	8.0
2-4	1.10	0.064	17.2		"							11.1				7.2	8.1
4-12	0.79	0.066	12.0		"							22.2				7.5	8.6
12-20	0.72	0.062	11.6		"							28.2				7.7	8.2
20-38	0.49				tr.							24.1				8.3	8.7
38-52	0.24				10							22.5				8.2	9.1
52-60	0.14				7							25.3				8.2	8.9
60-80	0.11				3							24.7				8.3	8.8
					4												

Depth (In.)	Extractable bases 6N1a Ca 5B1a meq/100 g	6O1a Mg 5B1a meq/100 g	6P2a Na 5B1b meq/100 g	6Q2a K 5B1b meq/100 g	Sum of bases meq/100 g	5A2a CEC NaOAc meq/100 g			Water extract from saturated paste 6N1a 6O1a Ca+Mg meq/liter	6P1a Na meq/liter	6Q1a K meq/liter		CO_3	HCO_3	Cl	SO_4	8A1a Electrical conductivity mmho/cm
0-2	9.1	9.2	1.0	3.4	22.7	20.9			3.4	5.9	1.6						0.98
2-4	9.6	7.5	2.7	3.9	23.7	24.9			1.3	8.6	0.9						1.01
4-12	11.1	12.1	9.7	7.5	40.4	38.4			3.7	25.0	1.6						2.80
12-20	19.5	17.1	15.9	4.3	56.8	49.3			60.4	216.0	12.0						18.70
20-38	86.8	18.0	17.0	3.3	125.1	42.7			76.2	371.9	15.9						30.20
38-52	46.3	15.8	15.2	3.2	80.5	43.3			57.9	400.0	11.6						31.60
52-60	39.7	16.8	23.2	7.1	86.8	44.9			57.3	390.6	11.6						30.40
60-80	78.1	17.9	28.6	5.1	129.7	39.8			46.1	390.6	11.6						30.50

Depth (In.)	8A Water at Saturation Pct.	5D1 Exchangeable Na Pct.		6F1a Gypsum Pct.			
0-2	36.3	5		-			
2-4	35.3	11		-			
4-12	72.4	25		-			
12-20	79.2	32		2			
20-38	67.9	40		10			
38-52	87.5	35		tr.			
52-60	82.5	52		tr.			
60-80	68.6	72		10			

SKUMPAH SILT LOAM (taxadjunct) 1/
S54Calif-18-2

Location: Lassen County, California, in Honey Lake Valley SCD on Herbert Miller's ranch, or NE1/4 NW1/4 section 6, T 29 N, R 14 E, Mount Diablo Base and Meridian, 0.55 mile N of cattle guard, also 0.15 mile N of field road to east.
Collectors: S. B. Johnson, R. E. Nelson, S. Porter, R. C. Roberts and L. R. Wohletz.
Date of Sampling: October 19, 1954.
Classification: Xerollic Natrargid, fine-silty, mixed, mesic.
Vegetation: Virgin area, about 20 percent barren, 30 percent occupied by medium growth big sage, 30 percent occupied by big rabbitbrush, 10 percent by greasewood, 10 percent by grasses and gray spinosa. Climate: At Susanville, 11½ miles west of sample site, the January average temperature is 30.7 F, the July average is 69.5 F, and the growing season is 142 days. Average annual precipitation for a 30-year period is 17.8 inches divided as follows: January 3.64, February 2.66, March 2.64, April 1.05, May .84, June .51, July .22, August .19, September .50, October 1.01, November 1.77, and December 2.77. The average annual precipitation at the sample site is probably about 15 inches. The average snowfall is probably about 60 inches. Parent Material: Stratified fine-textured lake-laid sediments of "Lahontan" age. Relief: Nearly level basin floor with some hummocks around shrubs. Elevation: 4050 feet. Drainage: Very slow external drainage and slow internal drainage due to low permeability of the B2 horizon. Probably affected by fluctuating water table.

HORIZON	DESCRIPTION
A11	0 to 2 inches, grayish brown (10YR 5/2) silt loam; very dark grayish brown (10YR 3/2) moist; massive; soft, friable, slightly plastic, slightly brittle; many vesicular pores. The pores are largest near the surface and gradually become smaller with depth; pH 7.8; gradual boundary.
A12	2 to 4 inches, grayish brown (10YR 5/2) silt loam, dark brown to very dark grayish brown (10YR 3/3 to 10YR 2/3) moist; moderate fine platy structure; slightly plastic, soft. The plates are noticeably darker on the under side than on the top side. pH 8.0. Abrupt boundary.
B2t	4 to 12 inches, grayish brown (10YR 5/2) silty clay, dark brown to yellowish brown (10YR 3/3 to 10YR 3/4) moist; strong medium columnar that breaks to strong fine angular blocky structure; very firm, very hard, plastic; clay skins in ped surfaces; light colored powdery fine sand on column tops gives the upper 1/4 inch an A2-B2 appearance; gradual boundary.
B3	12 to 20 inches, pale brown (10YR 6/3) silty clay loam, brown (10YR 4/3) moist; moderate medium angular blocky structure; slightly hard, firm, plastic, a few lime concretions and some visible salt accumulation; pH 8.6; gradual boundary.
C1	20 to 38 inches, light gray (10YR 7/2) heavy silt loam, brown (10YR 5/3) moist; massive; slightly plastic, very friable, soft; strongly calcareous with some soft lime concretions; pH 8.8; gradual boundary.
C2	38 to 52 inches, similar in color, texture, pH, and consistence to layer above, but appears to have much more salt and some faint fine strong brown mottling.
C3	52 to 60 inches, light gray (10YR 7/3) silt loam, dark brown (10YR 4/3) moist, mottled with manganese; appears to be a zone of accumulation of manganese and is darker than the layers above and below; somewhat brittle and semi-cemented; pH 8.8; stratified lake-laid sediment.
C4	60 to 80 inches, light gray (10YR 7/3) silt loam, brown (10YR 4/3) moist; hard brittle lake-laid sediments; some gypsum in the lower part; pH 8.8; moist but not saturated at time of sampling.

Remarks: Healthy looking roots mostly from big sagebrush to a depth of 52 inches.

1/ The Skumpah series is in a fine-silty, mixed, mesic family of Typic Natrargids. This pedon has more than 0.6 percent organic carbon in the surface 38 cm. and has a Xeric moisture regime.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Calneva silt loam (taxadjunct) **LOCATION** Lassen County, California

SOIL FAMILY: Typic Paleargid, fine-loamy, mixed, mesic

SOIL NOS. S55-Cal. 18-3 **LAB. NOS.** 55498-505

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0-1	Av-1	0.9	5.1	6.2	17.6	15.6	45.1	9.5	42.8	29.4	2	1
1-2	Av-2	0.5	4.0	5.3	13.2	10.9	46.6	19.5	31.7	34.3	1	1
2-5	B_{21}	0.4	2.6	3.6	7.6	5.5	36.4	43.9	16.7	29.8	0	c
5-10	B_{22}	0.5	2.1	2.1	6.4	8.4	56.0	24.5	24.2	44.6	1	sil
10-22	C_1	7.0	8.8	4.6	9.0	7.6	43.4	19.6	22.3	34.4	0	1
22-32	C_2	10.8	10.9	4.6	8.8	7.7	39.7	17.5	27.9	25.0	0	1
32-33	D_1	4.1	11.9	13.1	22.5	8.9	28.4	11.1	28.0	22.2	2	fsl
33-41	D_2	0.5	7.6	14.3	46.6	19.1	6.6	5.3	52.6	3.7	0	fs

8C1b SATURATED PASTE 1:1	pH 8C1a 1:5	8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	6A1a Elec. Condc. EC·10³ MILLIMHOS PER CM @25°C	6E1b $CaCO_3$ equivalent %	6F1a GYPSUM me./100g. SOIL	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
8.6		9.4	0.51	.049	10.4		2.1		-			6.4
8.9		9.7	0.33	.041	8.0		7.0	tr.	-			12.0
9.5		9.9	0.53	.057	9.3		17.5	2	-			24.6
10.1		10.1	0.30				17.0	19	-			27.9
10.1		10.3	0.20				17.6	17	-			27.7
10.2		10.4	0.10				15.0	6	-			25.9
10.2		10.2	0.11				12.1	7	-			15.0
10.1		10.0	0.02				5.1	tr.	-			6.1

5A2a CATION EXCHANGE CAPACITY (+(Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	5B1b Exch. Na 6P2a	5B1b Exch. K 6Q2a	5D1 EXCH. Na %	SATURATION EXTRACT SOLUBLES 6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg	6K1a	8A MOISTURE AT SATURATION
	milliequivalents per 100g. soil →						← milliequivalents per liter →				
16.7				4.2	2.2	25	21.8	0.4	1.2		23.3
31.8				20.7	4.4	65	73.0	0.8	1.4		30.1
47.9				35.1	5.0	73	202.0	1.6	2.0		50.9
55.2				45.2	5.3	82	208.0	1.4	0.8		65.5
64.3				51.4	5.0	80	208.0	1.2	1.0		69.7
61.2				54.3	4.1	89	182.0	0.9	1.1		66.5
33.2				33.5	2.8	100+	141.0	0.7	0.7		49.7
14.4				15.2	1.0	100+	54.0	0.3	0.3		38.1

1/ Percent of the whole soil

CALNEVA SILT LOAM (taxadjunct) 1/
S55Calif-18-3

Location: About 8 miles east of Susanville. 4/10 mile east of the west quarter-corner of Section 3, T. 29 N., R. 13 E.; 165 feet north of east-west graveled road. Honey Lake Valley SCD, Lassen County, California.
Date of Sampling: August, 1955.
Description by: S. B. Johnson. Collectors: S. B. Johnson, Ralph E. Nelson, Stuart Porter, Reuben E. Nelson, John Cady, E. A. Naphan, and W. M. Johnson.
Classification: Typic Paleargid, fine-loamy, mixed, mesic.
Vegetation: Shrub-grass, with many barren spots. Total density about 17 percent. Composition: Greasewood, 40 percent; big sage, 40 percent; rabbitbrush, 16 percent; annual weeds, 2 percent; giant and blue wild rye, 1 percent; salt grass, 1 percent; trace of Indian rice grass and squirreltail. Forage production, 100 to 150 pounds per acre. Climate: At Susanville the January average temperature is 30.7° F., the July average is 69.5° F., and the frost-free period averages 142 days. Summers are hot and dry, winters are cold and snowy. Mean annual rainfall at Susanville is 17.8 inches, most of which falls during the period October to May. At the site where samples were taken it is estimated that the mean annual rainfall is 8 to 10 inches.
Parent Material: Loamy calcareous alluvium, probably mainly reworked Lake Lahontan sediments. The sandy substratum may be an ancient bar or beach. This site is a few feet higher than that of S55Calif-18-4. Use: Pasture in poor condition. Relief: Smooth, very gently sloping basin rim or old basin floor of ancient Lake Lahontan. There is 3 to 6 inch microrelief, probably due to wind erosion, with the high spots occurring under shrubs. Slope is about ½ percent, plane, toward the southwest. Elevation: About 4,100 feet.
Drainage: Runoff, slow. Permeability, moderate or moderately slow. Soil is probably imperfectly drained. It probably has a high water table during part of the year. Other Features: Profile was slightly moist below the Av. This soil exists in complex with a Canby-like soil and with a darker colored, more strongly saline soil. The sandy substratum is intermittent. Would probably correlate as sandy substratum phase of the soils whose samples are numbered S55Calif-18-2 and S55Calif-18-4. Reaction: Free carbonates estimated by observing reaction to dilute HCl. pH's determined with thymol blue in about 1:5 soil-indicator dilution.

HORIZON	DESCRIPTION
Av1 RSL No. 55498	0 to 1 inch, grayish brown (10YR 5.5/2, dry; 3.5/2, moist) silt loam or very fine sandy loam. Weak medium platy. Very soft, very slightly plastic. Strongly vesicular. Noncalcareous. pH 8.5. Abrupt, wavy lower boundary.
Av2 RSL No. 55499	1 to 2 inches, light brownish gray (10YR 6.5/2, dry; 4/2, moist) silt loam, with common, prominent medium mottles of brown (dry) in the lower part. Moderate fine and medium platy. Soft, slightly plastic. pH 8.8. Calcareous. Abrupt, wavy lower boundary.
B21 RSL No. 55500	2 to 5 inches, dark grayish brown (10YR 4/2, dry; 3/2, moist) light silty clay loam. Moderate fine and very fine granular. Hard, plastic. Calcareous. Lime is segregated, so that some spots are highly calcareous. Clay skins along root channels. pH 9.6. Abrupt lower boundary.
B22 RSL No. 55501	5 to 10 inches, light yellowish brown (2.5Y 6/4, dry; 4.5/4, moist) silty clay loam, with common, faint, medium mottles of light brownish gray (dry). Medium and coarse granular. Hard, plastic. Thin clay skins along root channels. Strongly calcareous. pH 9.8 plus. Clear lower boundary.
C1 RSL No. 55502	10 to 22 inches, light yellowish brown (10YR 6/4, dry; 5/4, moist) silt loam with common, faint fine mottles of light brownish gray and a few distinct medium mottles of light gray (dry). Massive or very weak, very coarse platy. Crushes to weak medium and coarse granular. Firm, slightly plastic. Thin clay skins along root channels. Strongly calcareous. pH 9.8 plus. Probably an "alkali pan." Clear, wavy lower boundary.
C2 RSL No. 55503	22 to 32 inches, light brownish gray (2.5Y 6.5/2, dry; 4/4, moist) silt loam with common faint medium mottles of light gray (dry). Weak very coarse platy, crushing to weak coarse granular. Extremely firm; slightly cemented. Few thin clay skins. Strongly calcareous. pH 9.8 plus. Abrupt, wavy lower boundary.
D1 RSL No. 55504	32 to 33 inches, pale yellow (2.5Y 7/4, dry; 5/4, moist) fine sandy loam with a few prominent fine mottles of strong brown (dry). Massive. Soft, very friable. Strongly calcareous. pH 9.8 plus. Abrupt, wavy lower boundary.
D2 RSL No. 55505	33 to 41 inches, light brownish gray (2.5Y 6/2, dry; 4/2, moist) loamy sand. Massive. Very soft, nearly loose. One rodent burrow observed, filled with roots. Strongly calcareous. There is a thin (2-4 mm.) strongly cemented layer at the top of the horizon; this layer is also strongly calcareous. Contains a few fine gravels. pH 9.8 plus. Clear lower boundary.
D3 RSL No.	41 to 47 inches, grayish brown (2.5Y 5/2, dry; 3.5/2 moist) loamy fine sand with a few prominent fine mottles of strong brown (dry). Massive. Nearly loose. Slightly micaceous. Noncalcareous. pH 9.6. Abrupt lower boundary.
D4	47 to 51 inches, grayish brown (2.5Y 5/2, dry; 3.5/2, moist) fine gravelly sand. Massive. Slightly micaceous. Very soft. Noncalcareous. pH 8.0. Abrupt lower boundary.
D5 RSL No.	51 to 61 inches +, grayish brown (2.5Y 5/2, dry; 4/2, moist) fine sand. Massive. Very soft, nearly loose. Slightly micaceous. Noncalcareous. pH 8.8.

Roots go through Av horizon without branching, spread out in the B2 horizon, then decrease in the C and spread out again in the sandy substratum.

1/ The Calneva series is in a fine, montmorillonitic, mesic family of Xeralfic Natrargids. This pedon is dry in all parts of the moisture control section more than 3/4 of the time the soil temperature at 50 cm. is 5° C or more.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Morales clay loam. **LOCATION** San Bernardino County, California

SOIL FAMILY: Typic Calciorthid, fine, montmorillonitic, thermic.

SOIL NOS. S55Calif-36-2 **LAB. NOS.** 5510 thru 5516

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0- 4	Ap	0.6	4.8	5.1	16.2	11.6	28.2	33.5	29.3	21.2	0	cl
4- 9	C1	0.2	1.2	1.6	8.1	10.2	31.7	47.0	24.2	23.7	1	c
9-16	C2	0.3	0.8	0.8	3.6	5.7	29.3	59.5	14.7	22.9	3	c
16-23	Cca1	0.3	0.4	0.5	1.6	2.7	26.7	67.8	9.3	21.3	16	c
23-30	Cca2	4.9	2.0	0.7	1.8	3.0	29.3	58.3	11.2	22.4	18	c
30-46	Cca3	1.2	2.0	1.4	4.3	4.4	37.2	49.5	25.5	19.1	11	c
46-60	Cca4	1.5	2.8	1.4	3.7	5.4	30.8	54.4	14.3	24.5	8	c

	pH		ORGANIC MATTER				6E1a Elec. Conduc.	6E1b	6F1a	MOISTURE TENSIONS		
8C1b SATURATED PASTE 1:1	8C1a 1:5	8C1a 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	EC x 10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
8.0		9.0	0.41	0.034	12.1		2.4	15.3	0			11.9
8.1		9.0	0.35	0.028	12.5		2.2	23.0	0			11.9
7.7		8.2	0.25	0.022	11.4		5.2	24.7	23.2			12.6
7.9		8.3	0.18				10.0	32.3	23.0			17.6
7.9		8.4	0.17				19.2	44.8	9.7			19.0
7.8		8.4	0.25				41.3	34.9	9.4			28.4
7.7		8.4	0.18				41.4	41.1	2.5			17.9

5A2a	EXTRACTABLE CATIONS 5B					5D1	SATURATION EXTRACT SOLUBLE 8A1				8A
CATION EXCHANGE CAPACITY (← Na)	5B1a Ca 6N2b	5B1a Mg 6Q2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	EXCH. Na %	6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg	6K1a	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →				
17.6				1.9	2.8	11	16.3	3.9	4.8		37.7
19.4				2.5	2.2	13	16.5	3.0	4.5		43.7
17.5				2.0	1.3	11	28.8	3.7	31.2		39.4
19.0				3.9	1.2	21	79.0	4.6	61.1		72.3
21.3				4.5	1.2	21	155	11.3	67.3		73.5
22.7				8.5	1.4	37	270	8.8	237		90.9
21.1				4.1	1.9	19	290	5.0	199		71.1

1/ Percent of the whole soil

MORALES CLAY LOAM
S55Calif-36-2

Location: 1120 feet N and 70 feet E of SW Corner of section 29, T 5 N, R 1 E about 4 miles NE of Lucerne Valley, San Bernardino County, California.
Collectors: Fred Eggers, W. G. Harper, R. E. Nelson, January, 1955.
Elevation: About 3000 ft. Annual precipitation about 4 inches
Classification: Typic Calciorthid, fine, montmorillonitic, thermic.
California Grouping: III. Has had one crop this year
Vegetation: Barley probably was cut for hay - fair to poor stubble
Parent Material: Alluvium from mixed rocks but mainly from granitic formations
Physiography: Broad, nearly level plain a few feet above basin of playa
Drainage: Rapid runoff where slope is sufficient and no vegetation occurs. Permeability is slow
Described by: W. G. Harper

HORIZON		DESCRIPTION
S55Calif-36-2-1 A_p	0- 4"	Very pale brown (10YR 7/3, pale brown 5.5/3 moist) clay loam; moderately defined very coarse prismatic; very hard when dry, firm when moist; very strongly calcareous; slowly permeable; pH on 1 to 5 dilution with thymol blue 8.6; plant roots common; diffused lower boundary.
S55Calif-36-2-2 C_1	4- 9"	Very pale brown (10YR 7/3 dry, pale brown 6/3 moist) clay; weakly defined very coarse prismatic; very hard when dry; firm when moist; very strongly calcareous; slowly permeable; pH on dilution 9.0; few plant roots; abrupt and smooth lower boundary.
S55Calif-36-2-3 C_2	9-16"	Very pale brown (10YR 7/3 dry, 7/2 crushed, light grayish brown 6/2 moist) clay; weak fine subangular blocky; slightly hard when dry, friable when moist; very strongly calcareous with about 25 percent of surface mottled by lime or gypsum; few soft lime nodules; moderately slow to moderate permeability; few fine plant roots; pH on dilution 8.0; clear and smooth lower boundary.
S55Calif-36-2-4 C_{ca1}	16-23"	A mixture of white and light grayish brown (10YR 8/2 and 6/2 dry, light gray 7/2 moist) fine nodular clay; weak fine to medium subangular blocky; very hard when dry, friable when moist; very strongly calcareous with many lime nodules ranging up to 1/2 inch in diameter; moderate to moderately slow permeability; pH on dilution 8.0; practically devoid of plant roots; clear and smooth lower boundary.
S55Calif-36-2-5 C_{ca2}	23-30"	A mixture of white and light grayish brown (10YR 8/2 and 6/2 dry, pale brown 6.5/3 moist) gravelly or nodular clay; moderately medium subangular blocky and nodular; very hard when dry, friable when moist; moderate to moderately slow permeability; very strongly calcareous with common to many lime nodules ranging up to 1/2 inch in diameter, together with some gypsum; pH on dilution 8.0; practically no plant roots; clear and smooth lower boundary.
S55Calif-36-2-6 C_{ca3}	30-46"	A mixture of white and light brownish gray (10YR 8/2 and 6/2 dry, 6/2 moist) clay; moderately defined medium subangular blocky; very hard when dry, friable when moist; moderately slow permeability; very strongly calcareous; pH on dilution 8.2; no visible roots; clear and smooth lower boundary.
S55Calif-36-2-7 C_{ca4}	46-60"	A mixture of white and light brownish gray (10YR 8/2 and 6/2 dry, light brownish gray 2.5YR 6/2 moist) clay.

Remarks: This soil appears to have been strongly affected by the precipitation of lime and gypsum during a period when a water table stood close to the surface. Most of the soluble salts have been leached from the topmost horizons but salts, gypsum and calcium carbonate are high below a depth of 16 inches. Profile development by the downward movement of materials is very slight in the soil. The color below 16 inches consists of a mixture of white, which is the color of the lime nodules, or lime-coated aggregates, and the light brownish-gray fine-textured soil material.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Morales silty clay loam (taxadjunct) **LOCATION** San Bernardino County, California

SOIL FAMILY: Typic Calciorthid, fine, montmorillonitic, thermic.

SOIL NOS. 855Calif-36-4 **LAB. NOS.** 5526 thru 5531

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2	
0- 3	C1sa	0.0	0.3	0.4	2.7	6.1	60.1	30.4	13.8	54.6	0	sicl
3- 6	C2sa	0.2	0.6	0.6	3.8	6.7	56.6	31.5	17.5	48.7	0	sicl
6-16	C3sa	0.0	0.1	0.2	1.4	3.4	46.7	48.2	7.7	43.5	0	sic
16-27	C4sa	0.0	0.1	0.1	1.7	4.5	42.2	51.4	10.6	37.5	0	sic
27-45	C5	0.1	0.5	0.4	3.8	8.8	32.0	54.4	18.6	25.2	0	c
45-60	C6	0.2	0.4	0.2	1.6	4.5	21.9	71.2	7.8	19.9	6	c

	pH		ORGANIC MATTER				8A1a Elec. Condc.	6E1b	6F1a	MOISTURE TENSIONS		
8C1b SATURATED PASTE 1:1	8C1a 1:5	8C1a 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	EC x 10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
7.6		8.2	0.38	0.038	10.0		50.5	21.8	1			11.0
7.5		8.0	0.32	0.042	7.6		72.1	22.8	13.4			12.2
7.7		8.1	0.26	0.030	8.7		50.0	27.4	3.5			14.9
7.7		8.2	0.21	0.017			28.1	28.9	11.4			15.2
8.5		9.7	0.15				3.9	23.1	0			18.2
8.4		9.7	0.13				4.0	26.4	0			24.8

5A2a	EXTRACTABLE CATIONS 5B					5D1	SATURATION EXTRACT SOLUBLE 8A1				8A
CATION EXCHANGE CAPACITY ←(Na)	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	Exch. Na %	6P1a Na	6Q1a K	6N1a Ca+Mg 6O1a	6K1a Cl	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →				
26.3				4.1	3.9	16	250	20.0	289		46.6
25.5				3.1	2.7	12	365	16.0	590		42.0
27.8				5.6	2.4	20	290	13.5	291		52.3
27.0				8.5	2.2	32	230	13.5	86.9		50.3
28.6				13.3	2.4	47	33.7	1.1	1.6		98.9
34.5				15.4	3.6	45	34.3	1.0	1.5		97.5

MORALES SILTY CLAY LOAM (taxadjunct) 1/
S55Calif-36-4

Sampled by: Fred Eggers, W. G. Harper, Reuben Nelson, January, 1955.
Description by: W. G. Harper

Location: 250 ft. E and 250 ft. N of W1/4 Cor., Sec. 30, T5N, R1E, or about 300 ft. NE of Schieldmyer's pump, about 3 miles NE of Lucerne Valley, San Bernardino County, California. Elevation: About 3000 feet.
Classification: Typic Calciorthid, fine, montmorillonitic, thermic.
California Group: III
Vegetation: Shadscale 10 to 15 inches high. 98 percent of surface barren.
Parent Material: Alluvium from mixed rocks but mainly from granitic formations
Physiography: Playa - nearly level
Drainage: Little or no runoff, very slow permeability. 50 feet to water table

HORIZON		DESCRIPTION
S55Calif-36-4-1 C1sa	0- 3"	Very pale brown (10YR 7/3, pale brown 6/3 moist) weakly vesicular and moderately fine platy; hard when dry, friable when moist; very strongly calcareous; slowly permeable; pH on 1 to 5 dilution with thymol blue 8.2; few fine plant roots; lower boundary abrupt and smooth.
S55Calif-36-4-2 C2sa	3- 6"	Pale brown (10YR 6/3 dry, brown 5/3 moist) silty clay loam; weakly defined medium to fine granular; hard when dry, friable when moist; very strongly calcareous and with many very fine white gypsum and salt crystals; slowly permeable; pH on dilution 8.0; very few fine plant roots; lower boundary abrupt and smooth.
S55Calif-36-4-3 C3sa	6-16"	Same color as layer above; silty clay; moderately medium subangular blocky; very hard but easily crumbled when dry, firm when moist; slowly permeable; very strongly calcareous with many white lime mottlings and salt or gypsum crystals; pH on dilution 8.2; almost devoid of plant roots; lower boundary clear and smooth.
S55Calif-36-4-4 C4sa	16-27"	Brown (10YR 5/3 moist) silty clay; moderately defined coarse to medium subangular blocky; extremely hard when dry, firm when moist; very strongly calcareous with many medium and fine lime mottlings and/or salt and gypsum crystals; pH on dilution 8.3; slowly permeable; devoid of plant roots; lower boundary clear and smooth.
S55Calif-36-4-5 C5	27-45"	Pale brown (10YR 6/3 moist) clay; massive; extremely hard when dry, very firm when moist; very strongly calcareous with a few medium white lime mottlings; very slowly permeable; pH on dilution 9.6; devoid of plant roots; lower boundary clear and smooth.
S55Calif-36-4-6 C6	45-60"	Slightly finer in texture. Otherwise similar to layer above.

Remarks: This is a strongly saline Alluvial soil. In nearby locations on Mr. Schieldmyer's farm, the distribution of gypsum is erratic ranging in occurrence from within a few inches below the surface to a depth of 5 feet or more.

1/ The Morales series is in a fine, montmorillonitic, thermic family of Typic Calciorthids. This pedon does not have the reaction and effervescence typical of the series.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Aquic Calciorthid, coarse-loamy, mixed, mesic

SOIL Balman loam (texadjunct) SOIL Nos. S61Calif-46-4 LOCATION Sierra Valley, Sierra County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 61668 - 61675

Depth (in.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.2)			Coarse fragments 2A2: ≥ 2 Pct.	2 – 19 Pct. of < 76 mm	19 – 76 Pct. of < 76 mm
		Pct. of < 2 mm										3A1						
0–2	Ap1ca	30.2	42.7	27.1	0.8	3.7	3.6	12.5	9.6	11.8	30.9	29.8	12.2			2		
2–11	Ap2ca	27.5	43.4	29.1	0.9	2.9	3.0	11.1	9.6	13.4	30.0	30.5	10.4			0		
11–18	ACca	35.7	37.9	26.4	1.1	4.3	4.2	14.7	11.4	11.4	26.5	32.6	14.5			0		
18–27	IIC1	60.6	29.8	9.6	1.3	9.8	8.6	21.6	16.3	12.7	17.1	44.8	28.5			2		
27–37	IIC2	67.6	18.0	14.4	3.0	11.0	9.8	28.3	15.5	8.8	9.2	42.4	34.0			6		
37–48	IIC3	73.1	16.2	10.7	4.8	11.9	10.6	29.5	16.3	7.8	8.4	42.6	38.3			7		
48–63	IIC4	74.8	14.1	11.1	9.1	18.5	12.7	24.3	10.2	6.9	7.2	30.8	50.9			16		
63–75+	IIIC5	28.8	38.5	32.7	0.6	2.1	2.5	9.2	14.4	14.5	24.0	35.6	7.7			0		

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N		6E1b Carbonate as $CaCO_3$ Pct.	6C2a Ext. Iron as Fe Pct.	Bulk density g/cc	g/cc	g/cc		Water content Pct.	Pct.	4B2 15 bar Pct.			pH 8C1b Sat. Paste	8C1a 1:10
0–2	3.26	0.319	10		27	0.1							20.1			8.3	8.7
2–11	3.00	0.293	10		29	0.1							21.0			8.6	9.2
11–18	1.35	0.136	10		35	0.1							22.2			8.0	8.7
18–27	0.25				5	0.5							9.5			7.9	8.7
27–37	0.11				2	0.6							9.0			7.7	8.7
37–48	0.05				1	0.7							7.8			7.8	8.5
48–63	0.04				2	0.7							8.7			7.9	8.6
63–75+	0.04				tr.	0.3							15.7			7.4	8.4

Depth (in.)	Extractable bases 5B1a: 6N2c Ca	6O2c Mg	6P2a Na	6Q2a K	6H2a Ext. Acidity	Cat. Exch. Cap. 5A2a NaOAc	5B1b Exch. Na	Water extract from saturated paste 8A1: 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K	6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g							meq/liter								mmho/cm
0–2	31.0	9.2	1.0	2.1	–	32.0	0.8	2.6	1.8	3.1	2.5	1.2	6.3	0.4		0.72
2–11	23.1	10.7	4.7	0.8	–	31.1	3.9	1.7	1.8	13.7	0.2	1.6	8.1	2.4		1.53
11–18	22.2	14.1	3.5	0.1	–	28.4	2.3	8.8	15.4	20.3	–	0.8	2.7	23.4		4.15
18–27	22.5	10.0	2.0	0.2	–	22.6	1.6	12.9	19.3	13.0	0.1	0.5	1.6	27.5		4.08
27–37	18.2	8.3	1.1	0.2	–	20.6	0.8	16.4	17.2	9.3	0.1	–	1.6	34.3		3.64
37–48	14.1	6.3	0.7	0.2	0.1	17.5	0.5	5.5	5.6	4.3	0.1	–	1.8	10.6		1.62
48–63	16.9	5.9	0.5	0.2	0.2	18.5	0.4	2.2	1.7	1.9	0.1	–	2.5	1.9		0.60
63–75+	20.2	8.5	0.5	0.4	0.3	26.6	0.4	1.6	1.2	1.4	0.1	–	2.8	0.4		0.35

Depth (in.)	8A Water at Saturation Pct.	5D1 Exchangeable Na Pct.		Gypsum Pct.
0–2	59.1	2		
2–11	60.4	12		
11–18	59.8	8		
18–27	32.4	7		
27–37	31.9	4		
37–48	28.0	3		
48–63	28.6	2		
63–75+	43.5	1		

BALMAN LOAM (taxadjunct) 1/

S61Calif-46-4

Location: Sierra Valley, Sierra County, California; 0.25 mile south of NE1/4 corner, 100 yards east of Hariot Lane, section 4, T. 21 N., R. 15 E. Date of Sampling: September 13, 1961. Collectors: Grant Kennedy, Reuben Nelson, John Rogers, Paul Nazar, James McLaughlin, Eugene Begg. Vegetation: Cropped; now planted to dryland seeding of tall wheat grass. Climate: Estimated annual precipitation 14 inches. Nearest weather station (Sierraville): Mean annual temperature 46° F.; January average 28.2° F.; July average 63.6° F.; mean annual precipitation 25.78 inches. Parent Material: Somewhat stratified medium textured alluvium from mixed sources. Relief: Old lake terrace mound with slightly hummocky topography and less than 1 percent slope. Elevation: 4885 feet. Drainage: Moderately well drained; slow runoff, moderately slowly permeable. Soil Moisture: Slightly moist below 27 inches.

Remarks: This is a Calcium Carbonate Solonchak in the Chestnut soil zone. The surface 1/4 inch tends to be crusted. Surface appears to seal. **Classification: Aquic Calciorthid, coarse-loamy, mixed, mesic.**

HORIZON	DESCRIPTION
Aplca RSL No. 61668	0 to 2 inches, light gray (10YR 7/1) loam, dark gray (10YR 4/1) when moist; weak coarse platy structure; soft, very friable, slightly sticky and slightly plastic; abundant very fine roots below surface crust; common very fine tubular and interstitial pores; moderately alkaline (pH 8.3)(8.2 with thymol blue); violently effervescent, lime disseminated; abrupt, smooth boundary.
Ap2ca RSL No. 61669	2 to 11 inches, gray (10YR 6/1) loam, dark gray (10YR 4/1) when moist; weak medium platy structure; soft, very friable, slightly sticky and slightly plastic; abundant very fine, many fine, few medium roots; many very fine tubular and common very fine interstitial pores; moderately alkaline (pH 8.3)(8.8 with thymol blue); violently effervescent, lime disseminated; clear, smooth boundary.
ACca RSL No. 61670	11 to 18 inches, light gray (10YR 7/1) loam, dark gray (10YR 4/1) when moist; weak coarse platy breaking to moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; plentiful very fine and fine, few medium roots; common very fine tubular and interstitial, few fine and medium tubular pores; moderately alkaline (pH 8.3)(pH 8.0 with thymol blue); violently (?) effervescent, lime disseminated; clear, smooth boundary.
IIC1 RSL No. 61671	18 to 27 inches, light gray (2.5Y 7/2) sandy loam, brown (10YR 4/3) when moist; massive; slightly hard, slightly firm, slightly sticky and slightly plastic; plentiful very fine and fine, few medium roots; common very fine tubular and interstitial, few fine and medium tubular pores; moderately alkaline (pH 8.2)(pH 8.0 with thymol blue); strongly effervescent, lime disseminated; clear, smooth boundary.
IIC2 RSL No. 61672	27 to 37 inches, light brownish gray (10YR 6/2) sandy clay loam (near sandy loam) with white segregated lime (10YR 8/2), dark grayish brown (10YR 4/2) when moist; massive; hard, firm, slightly sticky and slightly plastic; few very fine, plentiful fine and medium roots; common very fine tubular and interstitial, few fine to medium tubular pores; few thin clay films in pores; few dark concretions; moderately alkaline (pH 8.2)(pH 8.0 with thymol blue); strongly effervescent, lime occurs in seams; gradual, smooth boundary.
IIC3 RSL No. 61673	37 to 48 inches, light gray (10YR 7/2) sandy loam with white (10YR 8/2) lime in seams, dark brown (10YR 4/3) when moist; massive; slightly hard, slightly firm, nonsticky and slightly plastic; few very fine, plentiful fine to medium roots; common very fine tubular and interstitial, few fine and medium tubular pores; mildly alkaline (pH 8.2)(pH 8.0 with thymol blue); strongly effervescent, lime occurs in seams; clear, irregular boundary.
IIC4 RSL No. 61674	48 to 63 inches, very pale brown (10YR 7/3) sandy loam, dark yellowish brown (10YR 4/4) when moist; massive; soft, friable, nonsticky and nonplastic; few very fine, plentiful fine to medium roots, many very fine interstitial, common very fine and few fine to medium tubular pores; moderately alkaline (pH 8.2)(pH 8.2 with thymol blue); strongly effervescent, lime disseminated; abrupt, slightly wavy boundary.
IIIC5 RSL No. 61675	63 to 73 inches, pale yellow (5Y 7/3) and white (5Y 8/2) silty clay lake sediments, dark grayish brown (2.5Y 4/2) with common fine distinct dark brown (10YR 3/3) mottles when moist; massive; very hard, very firm, sticky and plastic; no roots, pores or clay films observed; moderately alkaline (pH 8.0)(pH 8.4 with thymol blue); strongly effervescent, lime occurs in soft masses.

1/ This pedon has less clay in the 10 to 40 inch control section than required for the Balman series in the fine-loamy family.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Aquic Calciorthid. fine-loamy, mixed, mesic
SOIL Balman loam **SOIL Nos.** S61Calif-32-12 **LOCATION** Sierra Valley, Plumas County, California
SOIL SURVEY LABORATORY Riverside, California **LAB. Nos.** 61676 - 61685

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.2)			Coarse fragments 2A2: ≥ 2	2 – 19	19 –76
		Pct. of < 2 mm														Pct.	Pct. of < 76 mm	
0–2	Ap1ca	31.8	45.8	22.4	1.1	3.0	4.4	14.1	9.2	11.7	34.1	29.6	13.9			0		
2 –10	Ap2ca	30.9	45.6	23.5	0.5	2.1	3.5	14.0	10.8	11.6	34.0	31.6	10.9			0		
10–17	ACca	32.4	40.7	26.9	0.4	2.8	4.4	14.2	10.6	10.8	29.9	30.4	12.8			0		
17–22	C1ca	41.9	37.4	20.7	2.0	5.0	6.3	17.3	11.3	11.2	26.2	33.1	20.0			2		
22–30	C2ca	49.0	26.8	24.2	2.8	6.2	8.0	20.5	11.5	8.9	17.9	32.8	25.1			3		
30–42	C3ca	68.3	17.8	13.9	6.2	10.3	11.4	27.1	13.3	8.0	9.8	37.1	39.2			7		
42–53	C4	76.6	14.7	8.7	6.2	10.6	13.1	32.4	14.3	6.8	7.9	40.3	43.1			8		
53–67	C5	76.4	16.6	7.0	5.9	12.0	12.6	32.1	13.8	8.5	8.1	41.1	43.8			12		
67–71	IIC6c	90.0	5.7	4.3	11.4	31.5	19.2	24.9	3.0	3.1	2.6	16.6	76.5			20		
71–80+	IIIC7g	15.7	32.9	51.4	0.1	1.5	2.0	8.2	3.9	8.9	24.0	18.4	6.2			0		

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N		6E1b Carbonate as $CaCO_3$		Bulk density				Water content		4B2 15 bar			pH 8C1b Sat. Paste	pH 8C1a 1:10
	Pct.	Pct.			Pct.		g/cc	g/cc	g/cc		Pct.	Pct.	Pct.				
0–2	5.78	0.390	15		13								23.1			8.7	9.4
2 –10	3.65	0.338	11		17								23.2			8.9	9.7
10–17	2.70	0.248	11		22								22.2			8.3	9.0
17–22	1.90	0.177	11		29								18.2			8.3	8.7
22–30	1.07	0.100	11		24								16.7			8.1	8.7
30–42	0.19				9								10.0			8.3	8.8
42–53	0.05				1								7.8			8.0	8.8
53–67	0.04				1								7.6			7.9	8.7
67–71	0.02				–								5.4			7.8	8.1
71–80+	0.04				–								26.3			7.3	8.1

Depth (In.)	Extractable bases 5B1a: 6N2c Ca	602c Mg	6P2a Na	6Q2a K	6H2a Ext. Acidity	Cat. Exch. Cap. 5A2a NaOAc	5B1b Exch. Na	Water extract from saturated paste 8A1: 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K		6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g							meq/liter									mmho/cm
0–2	23.8	8.5	10.0	4.8	–	38.5	8.6	1.5	1.5	17.7	0.8		1.3	15.6	0.6		1.59
2 –10	19.0	11.8	17.1	2.5	–	38.6	14.3	2.4	1.7	40.0	0.4		0.8	19.4	7.1		3.23
10–17	24.6	14.6	6.7	1.3	–	36.9	4.9	3.9	7.4	26.4	0.2		–	7.2	10.8		3.09
17–22	28.7	8.2	0.8	0.4	–	29.6	0.7	3.4	2.3	2.1	–		–	5.5	0.8		0.63
22–30	28.1	6.4	0.5	0.3	–	25.4	0.5	2.4	1.7	1.3	–		–	4.1	0.3		0.41
30–42	21.5	4.6	0.3	0.2	–	19.7	0.3	1.8	1.3	1.1	–		–	3.2	0.2		0.35
42–53	17.8	4.2	0.3	0.2	–	17.4	0.3	1.5	0.9	0.9	0.1		–	2.7	0.2		0.29
53–67	16.4	4.1	0.3	0.1	0.1	17.0	0.3	1.1	1.0	1.0	0.1		–	2.4	0.2		0.30
67–71	8.0	3.1	0.3	0.2	0.4	12.3	0.3	1.2	0.8	0.9	–		–	2.1	0.3		0.25
71–80+	27.0	13.6	0.6	0.6	1.6	42.9	0.5	1.1	0.6	0.9	0.1		–	1.6	0.3		0.23

Depth (In.)	8A Water at Saturation	5D1 Exchangeable Na		Gypsum			
	Pct.	Pct.		Pct.			
0–2	79.5	22					
2 –10	71.4	37					
10–17	65.9	13					
17–22	56.5	2					
22–30	50.9	2					
30–42	31.7	2					
42–53	29.0	2					
53–67	25.7	2					
67–71	25.0	2					
71–80+	70.0	1					

*Sands include some organic matter

BALMAN LOAM
S61Calif-32-12

Location: Sierra Valley, Plumas County, California, Southeast corner SW1/4NW1/4 section 35, T. 22 N., R. 15 E. Approximately 2-3/4 miles north and 1-3/4 miles west of Loyalton.
Date of Sampling: September 13, 1961.
Collectors: Grant Kennedy, Reuben Nelson, John Rogers, Paul Nazar, James McLaughlin, Eugene Begg.
Vegetation: Cropland, now planted to dryland seeding of tall wheat grass. Climate: Estimated annual precipitation 13 inches. Nearest weather station (Sierraville): Mean annual temperature 46° F.; January average 28.2° F.; July average 63.6° F.; mean annual precipitation 25.78 inches.
Parent Material: Stratified medium textured alluvium from mixed sources. Relief: Old lake terrace mound, slightly hummocky, slope less than 1 percent. Elevation: 4890 feet. Drainage: Moderately well drained, runoff slow, permeability moderately slow. Soil Moisture: Slightly moist below 24 inches, moist at 43 inches.
Remarks: This soil is a Calcium Carbonate Solonchak in the Chestnut soil zone. It often occurs in complex with Ramelli silty clay loam; the Ramelli occupying the swales and lower topography and the Hovey the mounds on higher ground. The C2ca has dark stains in pores.
Classification: Aquic Calciorthid, fine-loamy, mixed, mesic.

HORIZON	DESCRIPTION
Ap1ca RSL No. 61676	0 to 2½ inches, light brownish gray (10YR 6/2) loam, very dark grayish brown (10YR 3/2) when moist; moderate medium platy structure; soft, very friable, slightly sticky and slightly plastic; abundant very fine, few fine and medium roots; many very fine mostly horizontal tubular and common fine interstitial pores; moderately alkaline (pH 8.4)(pH 9.2 with thymol blue); violently effervescent, lime disseminated; clear, smooth boundary.
Ap2ca RSL No. 61677	2½ to 10 inches, gray (10YR 6/1) loam, very dark grayish brown (10YR 3/2) when moist; moderately fine platy structure; soft, very friable, slightly sticky and slightly plastic; abundant, very fine, plentiful fine and medium roots; abundant very fine, few fine and medium tubular and common fine interstitial pores, moderately alkaline (pH 8.4)(pH 9.0 with thymol blue); violently (?) effervescent, lime disseminated; clear, smooth boundary.
ACca RSL No. 61678	10 to 17 inches, gray (10YR 6/1) loam, very dark grayish brown (10YR 3/2) when moist; massive breaking to weak medium and coarse subangular blocky structure; soft, friable to firm, slightly sticky and slightly plastic; abundant very fine, common fine, few medium roots; many very fine and fine, few medium tubular and few very fine interstitial pores; few thin clay films; moderately alkaline (pH 8.0)(pH 8.6 with thymol blue); violently effervescent, lime disseminated; clear, smooth boundary.
C1ca RSL No. 61679	17 to 22 inches, gray (10YR 6/1) loam, very dark grayish brown (10YR 3/2) when moist; massive breaking to weak medium and coarse subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; plentiful very fine, few fine roots; common very fine, few fine and medium tubular pores, few very fine interstitial pores; few thin clay films in pores; moderately alkaline (pH 8.0)(pH 8.2 with thymol blue); violently effervescent, lime disseminated; clear, smooth boundary.
C2ca RSL No. 61680	22 to 30 inches, gray (10YR 6/1) loam, very dark brown (10YR 2/2) when moist; massive breaking to weak medium and coarse subangular blocky structure; hard, very firm, slightly sticky and slightly plastic; few very fine and fine roots; common very fine to medium tubular, common very fine, few fine interstitial pores; common thin clay films in pores; moderately alkaline (pH 8.0)(pH 8.2 with thymol blue); violently effervescent, lime disseminated; gradual, smooth boundary.
C3ca RSL No. 61681	30 to 42 inches, light gray (10YR 7/2) sandy loam, dark grayish brown (10YR 4/2) when moist; massive breaking to weak medium and coarse subangular blocky structure; hard, firm, slightly sticky and slightly plastic; very few very fine and fine roots; many very fine, common fine and medium tubular and common very fine and few fine interstitial pores; common moderately thick clay films in pores; moderately alkaline (pH 8.0)(pH 8.0 with thymol blue); strongly effervescent, lime occuring in filaments or threads; gradual, smooth boundary.
C4 RSL No. 61682	42 to 53 inches, light gray (10YR 7/2) sandy loam, dark grayish brown (10YR 4/2) when moist; massive; hard, friable, slightly sticky and slightly plastic; very few very fine and fine roots; many very fine, fine and few medium tubular, and common very fine to medium interstitial pores; few thin clay films in pores; strongly alkaline (pH 8.3)(pH 8.0 with thymol blue); strongly effervescent, lime disseminated; gradual, smooth boundary.
C5 RSL No. 61683	53 to 67 inches, light gray (10YR 7/2) sandy loam, dark grayish brown (10YR 4/2) when moist; sandy loam; massive; slightly hard, friable, slightly sticky and slightly plastic; very few very fine and fine roots; common very fine to medium tubular and interstitial pores; moderately alkaline (pH 8.0)(pH 8.0 with thymol blue); strongly effervescent, lime disseminated; abrupt, slightly wavy boundary.
IIC6g RSL No. 61684	67 to 71 inches, light brownish gray (2.5Y 6/2) coarse sand, dark grayish brown (2.5Y 4/2) when moist; weak medium platy structure; loose, very friable, nonsticky and nonplastic; very few very fine and fine roots; few fine to medium tubular and many very fine interstitial pores; neutral (pH 7.0); noneffervescent; abrupt, slightly wavy boundary.
IIIC7g RSL No. 61685	71 to 80 inches +, light gray (5Y 7/1) clay loam (near clay) with common reddish yellow (7.5YR 6/8) large prominent mottles, olive gray (5Y 5/2) with common large strong brown (7.5YR 5/6) mottles when moist; massive; very hard, very firm, sticky and plastic; common very fine and fine tubular pores; neutral (pH 7.0); noneffervescent.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Aquic Duric Calciorthid, coarse-loamy, mixed, mesic
SOIL Kisring silt loam (taxadjunct) SOIL Nos. S56Calif-18-4 LOCATION Lassen County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 55506 - 55515

Depth (In)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	3A1 (2–0.1)			Coarse fragments: 2A2 > 2	Coarse fragments: 2 – 19	Coarse fragments: 19 – 76
		Pct. of < 2 mm														Pct	Pct. of < 76 mm	
0-1	Av1	33.4	56.9	9.7	0.4	1.9	2.3	12.0	16.8	22.1	34.8	47.8	16.6			1		
1-2	Av2	26.4	59.6	14.0	0.3	1.3	1.9	9.4	13.5	19.7	39.9	40.0	12.9			0		
2-4	B21	38.3	51.3	10.4	0.3	1.2	1.3	13.0	22.5	19.0	32.3	52.7	15.8			0		
4-6	B22	42.0	46.2	11.8	0.4	0.9	1.1	17.5	22.1	18.0	28.2	54.8	19.9			0		
6-11	B3	32.2	57.0	10.8	1.1	1.6	0.9	8.9	19.7	18.9	38.1	46.1	12.5			0		
11-20	C1	30.4	50.5	19.1	5.9	6.2	2.9	6.9	8.5	13.0	37.5	26.1	21.9			0		
20-31	C2	33.0	47.7	19.3	5.0	8.7	4.3	8.6	6.4	11.0	36.7	22.8	26.6			0		
31-37	C3	30.1	57.2	12.7	3.0	5.6	3.4	9.1	9.0	16.1	41.1	31.0	21.1			0		
37-49	C4	25.6	56.5	17.9	6.2	4.6	2.6	5.3	6.9	14.5	42.0	24.8	18.7			0		
49-60+	Cu	8.2	72.7	19.1	1.4	1.5	0.8	2.0	2.5	10.6	62.1	14.4	5.7			2		

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N		6E1b Carbonate as $CaCO_3$		Bulk density				Water content:		4B2 15 bar			pH: 8C1b Sat. Paste	pH: 8C1a 1:10
	Pct.	Pct.			Pct.		g/cc	g/cc	g/cc		Pct	Pct	Pct				
0-1	0.40	0.043	9.3		3								8.2			8.8	9.7
1-2	0.35	0.038	9.2		5								12.9			9.1	9.9
2-4	0.33	0.040	8.3		7								26.4			9.9	10.0
4-6	0.35				6								32.2			10.1	10.1
6-11	0.19				8								33.1			10.2	10.2
11-20	0.16				18								29.3			10.2	10.2
20-31	0.15				17								29.6			9.7	10.1
31-37	0.12				20								26.3			9.1	9.7
37-49	0.09				11								27.1			8.8	9.6
49-60+	0.12				3								27.5			8.8	9.4

Depth (In)	Extractable bases: Ca	Mg	5B1b Exch. Na 6P2a	5B1b Exch. K 6Q2a		5A2a CEC NaOAc			Water extract from saturated paste: 6N1a 6O1a Ca + Mg	Mg	6P1a Na	6Q1a K		CO_3	HCO_3	Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0-1			12.9	3.6		21.2			1.1		26.0	0.5						2.4
1-2			23.6	3.0		29.6			0.5		43.5	0.7						4.5
2-4			44.1	7.6		53.6			0.4		97.0	1.0						8.5
4-6			49.2	7.2		61.0			0.7		142.0	1.3						11.9
6-11			56.1	6.5		63.0			1.7		156.0	1.2						12.3
11-20			53.0	5.0		59.4			0.5		109.0	0.8						9.4
20-31			42.1	4.4		54.2			0.4		45.5	0.3						4.4
31-37			32.9	3.6		48.3			0.5		18.8	0.2						1.7
37-49			30.1	3.1		49.2			0.5		13.1	0.1						1.3
49-60+			25.0	2.4		47.4			0.5		11.0	0.1						1.1

Depth (In)	8A Water at Saturation	5D1 Exchangeable Na		6F1a Gypsum			
	Pct.	Pct		Pct.			
0-1	25.6	61		-			
1-2	32.9	80		-			
2-4	65.5	82		-			
4-6	68.4	81		-			
6-11	73.6	89		-			
11-20	68.3	89		-			
20-31	73.7	78		-			
31-37	72.1	68		-			
37-49	71.8	61		-			
49-60+	116.4	53		-			

KISRING SILT LOAM (taxadjunct) 1/
S55Calif-18-4

Location: About 8 miles east of Susanville. 41/100 mile east of west quarter-corner of Section 3, T. 29 N., R. 13 E., and 400 feet north of east-west graveled road; Honey Lake Valley SCD, Lassen County, California. Date of Sampling: August, 1955.
Description by: W. M. Johnson. Collectors: S. B. Johnson, Ralph E. Nelson, Stuart Porter, Reuben E. Nelson, John Cady, E. A. Naphan, and W. M. Johnson.
Classification: Aquic Duric Calciorthid, coarse-loamy, mixed, mesic.
Vegetation: Shrub-grass with many barren patches. Total density, about 15 percent. Composition: Big sage, 30 percent; greasewood, 30 percent; rabbitbrush, 37 percent; giant and blue wild rye, 1 percent; salt grass, 1 percent; lupine and poverty weed, 1 percent; squirreltail and Indian rice grass, trace. Forage production about 100 to 200 pounds per acre. Climate: At Susanville the January average temperature is 30.7° F., the July average is 69.5° F., and the frost-free period averages 142 days. Summers are hot and dry, winters are cold and snowy. Mean annual rainfall at Susanville is 17.8 inches, most of which falls during the period October to May. At the site where samples were taken it is estimated that the mean annual rainfall is 8 to 10 inches. Parent Material: Calcareous silty alluvium, probably derived from the reworking of Lake Lahontan sediments. The lowest horizon may be the bedded lacustrine sediments. Use: Pasture in poor condition. Relief: Smooth, gently sloping basin rim or old basin floor of ancient Lake Lahontan. There is microrelief of 3-6 inches, probably due to wind erosion and deposition. High spots are around shrubs. Slope is about 1 percent, plane, toward the northeast. Elevation: About 4,100 feet. Drainage: Runoff is slow and permeability is moderate or moderately slow. Soil is probably imperfectly drained. It gives the appearance of being influenced by relatively high water table during a part of the year. At the time the profile was examined, there was free water at a depth of 84 inches. Other Features: The profile was dry in the Av, moist below to a depth of 49 inches, and very moist below 49 inches. The surface of the soil is characterized by many barren "slick spots", some of which have small patches of salt crust. This soil occurs in complex with a similar soil having sandy substratum, with a Canby-like soil, and with a dark-colored, more strongly saline soil. Reaction: Free carbonates were estimated by observing reaction to dilute HCl. pH's were determined with thymol blue in about 1:5 soil-indicator dilution.

HORIZON	DESCRIPTION
Av1 RSL No. 55506	0 to 1 inch, light brownish gray (10YR 6.5/2, dry; 4/2, moist) silt loam. Very weak thick platy, nearly massive. Soft, friable, slightly plastic, slightly sticky. Roots are numerous, but do not branch in this horizon. Very porous--strongly vesicular. Moderately calcareous. pH 9.0. Abrupt, smooth lower boundary.
Av2 RSL No. 55507	1 to 2 inches, light brownish gray (10YR 6.5/2, dry; 4/2, moist) silt loam. Moderate medium platy; soft, friable, slightly plastic, slightly sticky. Moderately porous--vesicular. Roots are numerous but do not branch in this horizon. Moderately calcareous. pH 9.4. Abrupt, smooth lower boundary.
B21 RSL No. 55508	2 to 4 inches, pale brown (10YR 6/3, dry; 3.5/3, moist) silty clay loam. Weak medium prismatic, breaking to strong fine granular. Firm, very plastic, very sticky. Moderate continuous clay skins. Roots profuse. Peds are nonporous. Moderately to strongly calcareous, the lime being disseminated and in tiny soft segregations. pH 9.8. Clear, slightly wavy lower boundary.
B22 RSL No. 55509	4 to 6 inches, pale brown (10YR 5.5/3, dry; 4/3.5, moist) silty clay loam. Weak medium prismatic, breaking to strong medium and fine granular. Firm, very plastic, very sticky. Moderate continuous clay skins. Roots profuse. Peds are nonporous. Moderately to strongly calcareous, the carbonates being disseminated and in tiny soft segregations. pH 9.6. Clear, slightly wavy lower boundary.
B3 RSL No. 55510	6 to 11 inches, pale brown (1Y 6/3, dry; 4.5/3, moist) light silty clay loam. Weak medium subangular blocky, breaking to moderate medium granular. Friable, plastic, very sticky. Moderate, nearly continuous clay skins. Roots are numerous. Peds are nonporous. Strongly calcareous, the lime being mainly disseminated. pH 9.6. Clear, wavy lower boundary.
C1 RSL no. 55511	11 to 20 inches, pale brown (1Y 6/3, dry; 4.5/3, moist) light silty clay loam with common medium and fine mottles of white. Moderate medium subangular blocky. Friable, with many firm peds; plastic, sticky. Few roots. Peds are slightly porous. Moderate, nearly continuous clay skins. Strongly calcareous, the lime existing in disseminated form and in common fine soft segregations. pH 9.6. Gradual, wavy lower boundary.
C2 RSL No. 55512	20 to 31 inches, light gray (10YR 7.5/2, dry; 5/3, moist) light silty clay loam with common medium mottles of white and a few brown specks (dry). Weak medium subangular blocky. Firm, with a few friable patches; plastic, sticky. Numerous distinct patches of clay skins. Very few roots. Peds are slightly porous. Very strongly calcareous; lime is disseminated and in common fine soft segregations. pH 9.6. Gradual, wavy lower boundary.
C3 RSL No. 55513	31 to 37 inches, white (10YR 8/2, dry; 5/2, moist) silt loam with many fine mottles of strong brown (dry). Very weak medium subangular blocky. Friable, with many very firm peds or lumps of lacustrine sediment (cemented ?). A very few thin patches of clay skins. Very few roots. Reaction to HCl varies from none to very strong within short distances in this horizon. pH 9.4. Gradual, broken lower boundary.
C4 RSL No. 55514	37 to 49 inches, distinctly mottled pale yellow and dark grayish brown (2.5Y 7/3 and 10YR 4.5/2, dry; 2.5Y 5/3 and 10YR 2/2, moist) silt loam. Massive. Firm, with many irregular lumps of material that appear to be very firm "alkali pan". No roots observed. No clay skins observed. Porous. Moderately to strongly calcareous. pH 9.1. Clear, wavy lower boundary.
Cu RSL No. 55515	49 to 60 inches +, white (2.5Y 8/2, dry; 6/2, moist) silt loam with many thin horizontal bands of reddish yellow (dry). Massive--laminated. Friable, plastic, sticky. This appears to be a substratum of lacustrine sediments in place. No roots observed. Slightly porous. Slightly calcareous. pH 8.9.

1/ The Kisring series is in a fine-loamy, mixed, mesic family of Aquic Duric Calciorthids. This pedon has less than 18 percent clay in the control section.

SOIL SURVEY LABORATORY Riverside, California

OIL TYPE Laveen sandy clay loam (taxadjunct) **LOCATION** San Bernardino County, California

SOIL FAMILY: Typic Camborthid, coarse-loamy, mixed, thermic.

SOIL NOS. 855Calif-36-9 **LAB. NOS.** 5560 thru 5567

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 1B1b								3A1	2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0- 2	A	25.9	25.2	12.5	21.1	6.9	6.1	2.3	24.5	0.6	9	cos
2- 8	B2	15.0	20.1	11.5	20.6	7.1	10.1	15.6	24.7	4.6	15	sl
8-17	B2ca	4.4	12.6	12.6	32.6	11.8	13.4	12.6	39.8	4.9	6	fsl
17-25	C1	6.5	14.0	9.8	16.3	8.8	25.0	19.6	30.2	13.1	5	sl
25-31	C2	5.5	16.0	14.9	29.6	11.9	13.9	8.2	36.4	6.2	1	sl
31-38	C3	6.3	20.2	14.6	20.9	6.8	19.5	11.7	29.1	9.1	1	cosl
38-51	C4	15.3	34.4	19.5	17.8	3.9	4.7	4.4	13.0	3.6	5	cos
51-60	C5	35.5	25.6	6.1	7.6	3.9	10.2	11.1	11.4	6.7	17	cosl

DEPTH INCHES	pH 8C1b SATURATED PASTE 1:1	8C1a 1:5	8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	6A1a Elec. Condc. EC×10³ MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	6F1a GYPSUM me./100g. SOIL	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
0- 2	8.6		9.0	0.05	0.007			0.85	0	0		3.8	1.2
2- 8	8.7		9.4	0.04	0.006			19.8	2.0	0			5.7
8-17	9.3		9.7	0.02				15.7	4.6	0			5.7
17-25	9.3		9.6	0.01				17.5	1.6	0			9.5
25-31	9.3		9.4	0.00				13.9	0	0			4.7
31-38	9.4		9.5	0.01				15.5	0.6	0			6.5
38-51	9.5		9.4	0.10				11.1	0	0			3.3
51-60	9.5		9.7	0.02				16.9	0.9	0			6.5

DEPTH INCHES	5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	5D1 Exch. Na %	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a Ca+Mg 6O1a	6K1a Cl	8A MOISTURE AT SATURATION %
		milliequivalents per 100g. soil →						← milliequivalents per liter →				
0- 2	3.7				0.7	0.3	19	9.5	0.2	1.3		18.4
2- 8	15.3				8.8	0.5	58	238	1.3	7.6		25.1
8-17	13.8				8.4	0.2	61	193	1.3	2.4		30.2
17-25	21.9				15.5	0.2	71	218	1.3	2.0		51.5
25-31	12.1				9.8	0.1	81	158	1.3	1.0		38.4
31-38	17.5				13.6	0.1	78	180	1.3	1.3		42.3
38-51	4.5				3.1	0.2	69	173	1.3	1.0		28.2
51-60	14.0				9.6	Tr	69	203	1.3	0.6		26.4

1/ Percent of the whole soil

LAVEEN SANDY CLAY LOAM (taxadjunct) 1/
S55Calif-36-9

Sampled by: Fred Eggers, W. G. Harper, Reuben E. Nelson.
Location: 300 ft. S and 40 ft. W of the NE cor., Sec. 1, T8N, R3E, about 4 mi. E of Newberry, San Bernardino County, California.
Elevation: About 1800 ft. Annual precipitation about 4 inches
Description by: W. G. Harper. Sampling date: January, 1955.
Classification: Typic Camborthid, coarse-loamy, mixed, thermic.
Vegetation: Shadscale, creosote, mesquite bushes on nearby sand dunes, and desert sage. About 70 percent of surface barren
Parent Material: Alluvium from mixed rocks but mainly from granitic formations.
Physiography: Valley plain - less than 1 percent slope
Drainage: Water table is about 16 ft. below surface at present. Runoff is nil. Permeability of profile moderate to moderately slow

HORIZON		DESCRIPTION
S55Calif-36-9-1 A	0-2"	Pale brown (10YR 6/3 dry, dark grayish brown 4/2 moist) coarse sand; single grain; soft when dry, loose when moist; noncalcareous; rapidly permeable; pH at 1 to 5 dilution 8.4; no plant roots apparent; lower boundary abrupt and smooth.
S55Calif-36-9-2 B_2	2-8"	Reddish brown (5YR 5/4 dry, 4/4 moist) with a few fine faint iron mottlings; sandy loam; moderately defined coarse prismatic; hard when dry, friable when moist; micaceous; mildly calcareous and strongly calcareous where occasional medium flecks of lime occur; pH on dilution 9.6; few fine plant roots; moderately permeable.
S55Calif-36-9-3 B_{2ca}	8-17"	Light brown (7.5YR 6/4 dry, brown 5/4 moist) fine sandy loam with common medium faint (5YR 4/4) iron mottlings and common medium (10YR 8/4) lime flecks; very weak coarse subangular blocky; hard when dry, friable when moist; micaceous; moderately permeable; very strongly calcareous; pH on dilution 9.6; abrupt and smooth lower boundary.
S55Calif-36-9-4 C_1	17-25"	Pale brown (10YR 6/3)dry, 5/2.5 moist) sandy loam with a few medium distinct (5YR 4/4) iron mottlings and a few fine (10YR 8/4) lime flecks; very weak medium subangular blocky; moderately to strongly calcareous; micaceous; moderately permeable; devoid of plant roots; lower boundary abrupt and smooth.
S55Calif-36-9-5 C_2	25-31"	Pale brown (10YR 6/3 dry, brown 4.5/2.5 moist) sandy loam with a few medium distinct (5YR 4/4) iron mottlings; massive; hard when dry, friable when moist; micaceous; very mildly calcareous; pH on dilution 9.4; devoid of plant roots; lower boundary abrupt and smooth.
S55Calif-36-9-6 C_3	31-38"	Pale brown (10YR 6/3 dry, brown 5/3 moist) coarse sandy loam, with common, medium reddish brown (5YR 4/4) iron mottlings; massive; hard when dry, very friable when moist; moderately permeable; pH on dilution 9.4; devoid of plant roots; lower boundary abrupt and smooth.
S55Calif-36-9-7 C_4	38-51"	Very pale brown (10YR 7/3 dry, brown 5/3 moist) coarse sand; soft when dry, loose when moist; very mildly calcareous; micaceous; rapidly permeable; pH on dilution 9.4; lower boundary abrupt and smooth.
S55Calif-36-9-8 C_5	51-60"	Pale brown (10YR 6/3 dry, brown 4.5/2.5 moist) gravelly coarse sandy loam, with common medium distinct reddish brown (5YR 4/4) iron mottlings; massive; slightly hard when dry, friable when moist; mildly calcareous; micaceous; moderately rapid permeability; devoid of plant roots.

REMARKS: This soil was correlated Laveen sandy clay loam, poorly drained phase, in the soil survey of the Barstow area. The soil is too red in color and does not contain the high lime either disseminated or in nodular form that occurs in typical Laveen soils. Today, the soil is not poorly drained, but is strongly saline-alkali.

1/ The Laveen series is in a coarse-loamy, mixed, thermic family of Typic Calciorthids. This pedon has a cambic horizon and lacks a calcic horizon.

OIL SURVEY LABORATORY Riverside, California

OIL TYPE Milham sandy clay loam (taxadjunct) **LOCATION** San Bernardino County, California

SOIL FAMILY: Typic Camborthid, fine-loamy, mixed, thermic.

SOIL NOS. S55Calif-36-10 **LAB. NOS.** 5568 thru 5572

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0- 6	A	20.0	23.6	13.1	27.3	9.2	3.8	3.0	27.7	2.4	5	cos
6-11	B2	5.3	16.4	18.9	38.8	5.7	3.3	11.6	26.1	3.5	4	lfs
11-16	B2ca	6.2	11.0	17.2	47.5	6.5	3.5	8.1	32.8	2.0	15	lfs
16-36	D1	9.1	14.9	7.6	12.9	7.5	22.7	25.3	20.7	17.0	3	scl
36-57	D2	1.9	6.9	8.3	23.6	20.1	27.1	12.1	48.4	13.8	1	fsl

8C1b SATURATED PASTE 1:1	pH 8C1a 1:5	8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	8A1a Elec. Conduc. EC×10³ MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	6F1a GYPSUM m.e./100g. SOIL	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
8.4		8.5	0.08	0.006			1.3-	0	0		3.5	1.6
8.4		9.4	0.07	0.007			11.7	3.4	0		13.9	4.8
8.8		9.5	0.04				12.8	1.4	0		10.8	4.0
8.5		9.1	0.03				20.0	0.9	2.3			12.4
8.7		9.4	0.02				17.4	0	0			6.7

5A2a CATION EXCHANGE CAPACITY (+ Na)	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	5D1 Exch. Na %	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a Ca+Mg 6O1a		6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
3.6				0.8	0.3	22.2	3.9	0.1	1.4			21.8
8.4				5.5	0.2	65.5	122.5	1.3	4.0			29.1
7.2				4.2	0.2	58.3	135.0	1.3	6.4			32.0
21.7				12.8	0.6	58.9	222.5	1.3	20.9			58.0
15.7				8.4	Tr	53.5	190.0	1.3	15.5			52.3

1/ Percent of the whole soil

MILHAM SANDY CLAY LOAM (taxadjunct) 1/
S55Calif-36-10

Sampled by: Fred Eggers, W. G. Harper, Reuben E. Nelson.
Location: 200 ft. S and 250 ft. W of NE cor., Sec. 36, T9N, R3E - about 4 mi. E of Newberry, San Bernardino County, California.
Elevation: About 1800 ft. Annual precipitation about 4 inches
Description by: W. G. Harper. Sampling date: January, 1955.
Classification: Typic Camborthid, fine-loamy, mixed, thermic.
California Group: III
Vegetation: Desert sage, shadscale, creosote bushes and rabbitbrush occur on occasional dunes that are 5 to 6 feet high and about 250 ft. long - 80 percent of surface is barren.
Parent Material: Alluvium from mixed rocks but mainly from granitic formations.
Physiography: Valley plain less than 1 percent slope, with occasional dunes 6 to 8 feet high
Drainage: No runoff, no surface drainage channels, moderate to slow internal permeability

HORIZON		DESCRIPTION
S55Calif-36-10-1 A	0- 6"	Light yellowish brown (10YR 6/4 dry, grayish brown 4.5/2 moist) coarse sand; single grain; soft when dry, loose when moist; noncalcareous; rapidly permeable; pH at 1 to 5 dilution with thymol blue 8.2; almost devoid of plant roots; lower boundary abrupt and smooth.
S55Calif-36-10-2 B_2	6-11"	Light reddish brown (5YR 6/4 dry, reddish brown 5/4 moist) loamy fine sand with common, medium to coarse prominent white lime mottling; hard when dry, friable when moist; mildly calcareous, but strongly calcareous on the white lime flecks and spots; moderately permeable; pH on dilution 9.4; almost devoid of plant roots; lower boundary clear and smooth.
S55Calif-36-10-3 B_{2ca}	11-16"	Pinkish gray (7.5YR 6/2 dry, brown 5/4 moist) fine gravelly loamy sand with common, fine to medium prominent white lime veins and flecks; hard when dry, friable when moist; strongly calcareous; moderately permeable and almost devoid of plant roots; pH on dilution 9.6; lower boundary abrupt and smooth.
S55Calif-36-10-4 D_1	16-36"	Pale brown (10YR 6/3 dry, brown 4.5/2.5 moist) massive; sandy clay loam with common, large, prominent salt mottlings and a few fine lime mottlings; very hard when dry, friable when moist; devoid of plant roots; moderately permeable; pH on dilution 9.5; lower boundary abrupt and smooth.
S55Calif-36-10-5 D_2	36-57"	Light yellowish brown (10YR 6/4 dry, brown 5/3 moist) fine sandy loam; massive; hard when dry, friable when moist; mildly calcareous with few fine to medium lime mottlings; moderately permeable; pH on dilution 9.6.

REMARKS: Although this soil was mapped as a dune phase of Laveen sandy clay loam in the Barstow area, the soil between the dunes is much like that mapped Laveen sandy clay loam, poorly drained. This soil does not have a high water table now, but appears to have had at one time, and is high in soluble salts and exchangeable sodium.

1/ The Milham series is in a fine-loamy, mixed, thermic family of Typic Camborthids. This pedon has higher chromas than is typical of the series.

SOIL FAMILY: Typic Salorthid, very-fine, montmorillonitic, thermic.
SOIL Morales clay (taxadjunct) SOIL Nos. S55Calif-36-3 LOCATION San Bernardino County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 5517 - 5523

Depth (cm)	Horizon	1B1b Total Sand (2-0.05)	Total Silt (0.05-0.002)	Total Clay (<0.002)	Sand: Very coarse (2-1)	Sand: Coarse (1-0.5)	Sand: Medium (0.5-0.25)	Sand: Fine (0.25-0.1)	Sand: Very fine (0.1-0.05)	Silt (0.05-0.02)	Silt: Int. III (0.02-0.002)	Int. II (0.2-0.02)	2-0.2			Coarse fragments 1A2a: > 2 Pct. of whole soil	2-19 Pct. of <76mm	19-76 Pct. of <76mm
		Pct. of <2 mm																
0-5	C1	12.4	25.4	62.2	0.2	0.5	0.5	3.9	7.3	1.3	24.1	11.9	5.1			1		
5-15	C2sa	10.2	24.7	65.1	0.1	0.4	0.6	3.3	5.8	1.8	22.9	10.2	4.4			0		
15-25	C3sa	8.9	45.4	45.7	0.3	0.5	0.5	2.9	4.7	13.2	32.2	20.1	4.2			0		
25-58	C4sa	6.8	29.5	63.7	0.1	0.2	0.3	1.8	4.4	2.2	27.3	8.0	2.4			0		
58-86	C5sa	4.4	30.5	65.1	0.1	0.3	0.2	1.1	2.7	2.1	28.4	5.6	1.7			0		
86-105	C6sa	5.4	24.0	70.6	0.2	0.4	0.4	1.5	2.9	2.4	21.6	6.5	2.5			0		
105-135	C7	1.9	34.1	64.0	0.0	0.1	0.0	0.5	1.3	2.6	31.5	4.3	0.6			0		

Depth (cm)	6A1a Organic carbon a/ Pct.	6B1a Nitrogen Pct.	C/N	6C2b Ext. iron as Fe Pct.	Carbonate as $CaCO_3$: 6E1b <2 mm Pct.	Carbonate as $CaCO_3$: 3A1a <0.002 mm Pct.	Bulk density: 4A1f 1/3 bar g/cc	Bulk density: 4A1h Oven dry g/cc	Bulk density: g/cc	3B2 Cm	Water content: 4B1c 1/3 bar Pct.	Water content:	Water content: 4B2 15 bar Pct.	4D1 Extensibility COLEf cm/cm	4D1 Extensibility COLE cm/cm	pH: 8C1b Saturated paste	pH: 8C1a H_2O 1:10	pH: 8C1c IN KCl 1:1
0-5	0.10	0.013			13.8								14.6			8.6	9.8	
5-15	0.17	0.012			13.6								17.0			8.5	9.1	
15-25	0.20	0.013			13.9								17.7			8.4	9.0	
25-58	0.16	0.015			16.7								18.6			8.4	9.4	
58-86	0.18				21.9								18.9			8.5	9.7	
86-105	0.19				24.0								18.6			8.6	9.7	
105-135	0.13				28.5								18.1			8.6	9.8	

Depth (cm)	Extractable bases: 6N4c Ca 5B3a	6O4c Mg 5B3a	6P2a Exch. Na 5B1b	6Q2a Exch. K 5B1b	6H2a Ext. acidity	5A2a CEC $NaOAc$	5D1 Exchangeable Sodium Pct.	5E Sodium adsorption ratio	8A Water at saturation Pct.	Water extract from saturated paste 8A1: 6O1a 6N1a Ca + Mg	6P1a Na	6Q1a K	6I1a CO_3	6J1a HCO_3	6K1a Cl	6L1b SO_4	8A1a Electrical conductivity mmho/cm
	meq/100 g									meq/liter							
0-5			20.2	6.2		33.0	61	107	47.7	2.1	110	5.0					10.8
5-15			24.5	6.2		32.8	75	352	43.9	34.4	1460	45.0					92.6
15-25			28.6	5.3		31.3	91	399	44.1	30.6	1560	30.0					99.0
25-58			24.5	6.2		33.7	73	181	53.4	34.2	750	27.0					63.8
58-86			22.6	4.3		35.4	64	154	64.4	13.3	396	10.0					36.4
86-105			26.1	4.0		36.2	72	153	56.4	8.2	310	10.0					30.2
105-135			25.8	3.1		33.3	77	153	59.1	3.9	213	6.8					22.0

Depth (cm)	Ratios to clay 8D1: CEC $NaOAc$	Ratios to clay 8D1: Ext. iron	Ratios to clay 8D1: 15 bar water	Salt Pct.	6F1a Gypsum Pct.
0-5	0.53		0.23	0.3	-
5-15	0.50		0.26	3.9	0.73
15-25	0.68		0.39	4.1	2.06
25-58	0.53		0.29	2.5	0.09
58-86	0.54		0.29	1.6	-
86-105	0.51		0.26	1.1	-
105-135	0.52		0.28	0.8	-

a/ 1.7 kg of organic carbon per square meter to a depth of 1 meter

MORALES CLAY (taxadjunct) 1/
S55Calif-36-3

Location: San Bernardino County, California. About 5 miles northeast of Lucerne Valley, 400 feet west and 200 feet south of center of sec. 24, T. 5 N., R. 1 W. Date of Sampling: January, 1955.
Description by: W. G. Harper. Collectors: Fred Eggers, W. G. Harper, and Reuben E. Nelson.
Classification: Typic Salorthid, very-fine, montmorillonitic, thermic.
Vegetation: Occasional clumps of shad scale (Atriplex canescens), about 24 inches high. 99 percent of surface barren. Climate: Annual precipitation about 4 inches. Parent Material: Alluvium, mainly from granitic rocks. Elevation: About 3000 feet. Physiography: Playa - nearly level. Drainage: Well drained; no runoff, no surface outlet, very slow permeability through soil. Water table about 50 feet.
Remarks: Weakly defined very coarse prisms are present in the C2sa and C3sa horizons.

HORIZON	DESCRIPTION
	Colors are for the dry soil unless indicated otherwise.
C1 RSL No. 5517	0-2 inches (0-5 cm.), pale brown (10YR 6/3) clay, yellowish brown (10YR 5/4) moist; weak coarse prisms breaking to strong very fine subangular blocks; very hard (dry), firm (moist); violently effervescent; few pebbles; abrupt smooth boundary.
C2sa RSL No. 5518	2-6 inches (5-15 cm.), light yellowish brown (10YR 6/4) clay, yellowish brown (10YR 5/4) moist; strong very fine granules; soft (dry), very friable (moist); very few roots; 5 to 10 percent by volume of salt crystals up to 3 mm in diameter; abrupt wavy boundary.
C3sa RSL No. 5519	6-10 inches (15-25 cm.), yellowish brown (10YR 5/4) silty clay, dark yellowish brown (10YR 4/4) moist; weak very coarse prisms breaking to moderate very fine to medium granules; slightly hard (dry), friable (moist); violently effervescent; few shad scale roots; abrupt smooth boundary.
C4sa RSL No. 5520	10-23 inches (25-58 cm.), brown (10YR 5/3) clay, brown (10YR 5/3) moist; very weak medium to coarse prisms breaking to weak fine subangular blocks; very hard (dry), firm (moist); violently effervescent; few shad scale roots; clear smooth boundary.
C5sa RSL No. 5521	23-34 inches (58-86 cm.), brown (10YR 5/3) clay moist; weak medium subangular blocks; hard (dry), firm (moist); violently effervescent; very few fine shad scale roots; abrupt smooth boundary.
C6sa RSL No. 5522	34-41 inches (86-105 cm.), brown (10YR 5/3) clay moist; massive; very hard (dry), firm (moist); violently effervescent, common fine to medium white (10YR 8/1) carbonate mottles; very few roots; abrupt smooth boundary.
C7 RSL No. 5523	41-53 inches (105-135 cm.), pale brown (10YR 6/3) clay moist; massive; very hard (dry), firm (moist); violently effervescent, many white (10YR 8/2) carbonate mottles.

1/ The Morales series is in a fine, montmorillonitic, thermic family of Typic Salorthids. This pedon has a salic horizon and more clay than is typical of the series.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Rosamond silt loam (taxadjunct) LOCATION San Bernardino County, California

SOIL FAMILY: Typic Torrifluvent, fine, montmorillonitic, thermic.

SOIL NOS. S55Calif-36-1 LAB. NOS. 553 thru 559

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2	
0- 4	C1	0.1	0.4	0.4	7.4	16.5	55.3	19.9	37.9	40.0	0	sil
4-12	C2	0.2	0.9	0.8	13.4	19.9	38.5	26.3	45.5	24.4	0	l
12-22	C3	0.2	1.3	1.4	7.5	12.4	42.9	34.3	30.7	30.4	0	cl
22-28	C4	0.2	1.1	1.4	4.8	7.6	43.0	41.9	22.9	31.0	0	sic
28-41	C5	0.4	1.8	1.9	5.4	7.1	33.3	50.1	20.1	24.0	1	c
41-51	C6	1.7	4.8	2.9	7.4	7.0	24.3	51.9	18.0	18.3	14	c
51-63	C7	6.6	17.0	9.2	13.5	7.0	13.4	33.3	19.3	8.7	2	scl

8C1b SATURATED PASTE 1:1	pH 8C1a 1:5	8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	8A1a Elec. Conduc. EC×10³ MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	6F1a GYPSUM me./100g. SOIL	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
7.7		8.6	0.56	0.064	8.8		26.9	38.6	0			9.0
7.7		8.4	0.48	0.065	7.4		38.5	17.3	1.2			10.8
7.8		8.8	0.27	0.029	9.3		22.9	25.2	0			11.7
7.9		8.4	0.25				19.9	38.5	20.0			13.5
8.2		8.6	0.27				19.1	49.1	13.6			15.8
8.3		8.8	0.21				16.7	43.2	2.3			18.6
8.1		8.7	0.10				11.8	16.5	2.9			11.2

5A2a CATION EXCHANGE CAPACITY ←(Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	5D1 Exch. Na %	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a Ca+Mg 6O1a	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →				
21.3				3.6	5.1	17	183	28.8	103		40.8
24.3				3.6	2.0	15	228	12.5	236		45.8
22.8				5.7	0.4	25	190	5.0	58.3		47.2
21.1				9.1	0.3	43	188	5.0	51.3		38.4
19.6				5.2	0.3	27	183	3.0	72.1		64.3
17.6				5.4	0.2	31	155	3.0	62.1		74.5
9.8				4.5	0.3	46	103	3.0	51.4		47.6

ROSAMOND SILT LOAM (taxadjunct) 1/
S55Calif-36-1

Sampled by: Fred Eggers, W. G. Harper, Reuben Nelson, January, 1955.
Described by: W. G. Harper
Location: On Stringer farm - 1/4 mi. E and 1120 ft. S of NW Cor., Sec. 6, T4N, R1E, about 2 miles NE of Lucerne Valley, San Bernardino County, Calif.
Elevation: About 3000 ft. Annual precipitation about 4 inches
Classification: Typic Torrifluvent, fine, montmorillonitic, thermic.
California Group: III
Vegetation: Shadscale 12 to 14 inches high, and some Mormon tea. About 85 percent of surface is barren
Parent Material: Alluvium deposited in playa - derived largely from granitic rocks but with a mixture of other rock forms
Physiography: Playa - nearly level
Drainage: No surface outlet. Water table at about 50 ft.

HORIZON		DESCRIPTION
S55Calif-36-1-1 C1	0- 4"	Very pale brown (10YR 7/3 dry, brown 5/3 moist) silt loam; vesicular in topmost 1/2 inch; moderately defined fine to medium platy; slightly hard when dry, friable when moist; moderately permeable; low in organic carbon; very strongly calcareous and almost devoid of plant roots; pH on 1 to 5 dilution with thymol blue 8.5.
S55Calif-36-1-2 C2	4-12"	Same color as surface soil; loam; weakly defined medium subangular blocky; hard when dry, friable when moist; very strongly calcareous; moderately permeable; pH on 1 to 5 dilution 8.5. This contains a few shadscale roots.
S55Calif-36-1-3 C3	12-22"	Pale brown (10YR 6/3 dry, brown 5/3 moist) clay loam; moderately defined medium subangular blocky; very hard when dry, very firm when moist; very strongly calcareous; slowly to very slowly permeable; pH on 1 to 5 dilution 8.6.
S55Calif-36-1-4 C4	22-28"	Same color as layer above; silty clay; moderately defined medium to coarse subangular blocky; very hard when dry; very firm when moist; strongly calcareous; very slowly permeable; pH on 1 to 5 dilution 8.5. This contains a few shadscale roots and a few fine distinct white flecks of lime and gypsum.
S55Calif-36-1-5 C5	28-41"	Pale brown (10YR 6/3 dry and moist) clay; weak medium subangular blocky; very hard when dry, very firm when moist; very slowly permeable; very strongly calcareous with common, fine to medium flecks of white (10YR 8/2) lime and gypsum; very few shadscale roots; pH on dilution 8.6.
S55Calif-36-1-6 C6	41-51"	This contains a few small lime carbonate concretions, but otherwise appears similar to the layer above but contains no plant roots; pH on 1 to 5 dilution 8.8.
S55Calif-36-1-7 C7	51-63"	White (10YR 8/2 dry and moist) sandy clay loam; moderately defined medium to coarse platy (laminated) extremely hard when dry, friable when moist; slowly permeable; very strongly calcareous; pH on dilution 8.7; no plant roots.

Remarks: This is a stratified soil laid down in slowly moving water. The lime concentrated in the three lower layers may have been accumulated from a high water table. The gypsum probably precipitated from ground water.

1/ The Rosamond series is in a fine-loamy, mixed (calcareous), thermic family of Typic Torriorthents. This pedon has more clay and an organic carbon content that decreases irregularly with depth.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE San Emigdio loam **LOCATION** Riverside County, California

SOIL FAMILY: Typic Xerofluvent, coarse-loamy, mixed, calcareous, thermic

SOIL NOS. S55Calif-33-11 **LAB. NOS.** 55578-583

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0- 8	Ap1	0.3	1.4	2.6	15.3	13.7	49.3	17.4	43.7	30.1	0	1
8-14	Ap2	0.7	2.3	4.5	19.3	13.9	40.6	18.7	41.5	25.9	1	1
14-28	C1	1.7	3.5	5.0	20.0	14.8	37.1	17.9	43.7	21.7	2	1
28-39	C2	1.2	3.0	4.7	23.4	18.5	36.0	13.2	51.5	19.0	2	1
39-54	C3	1.6	4.5	7.6	30.7	16.2	28.5	10.9	47.4	16.1	2	fsl
54-64	C4	0.1	0.7	1.6	11.7	14.6	51.2	20.1	42.2	32.4	1	sil

pH 8C1b SATURATED PASTE 1:1	pH 8C1a 1:5	pH 8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	ORGANIC MATTER 6B1a NITROGEN %	ORGANIC MATTER C/N	EST% SALT (BUREAU CUP)	8A1a Elec. Conduc. EC x 10³ MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	6F1a GYPSUM me./100g. SOIL	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	MOISTURE TENSIONS 4B2 1/3 ATMOS. %	MOISTURE TENSIONS 4B2 15 ATMOS. %
7.6		8.2	0.66	0.070	9.4		0.82	<1				9.3
7.9		8.2	0.44	0.049	9.0		0.36	1				9.6
7.8		8.5	0.31				0.36	<1				9.1
8.0		8.7	0.17				0.43	2				7.5
8.0		8.7	0.12				0.42	2				6.2
7.9		8.9	0.20				0.27	<1				11.4

5A2a CATION EXCHANGE CAPACITY (+ Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	5D1 EXCH. Na %	SATURATION EXTRACT SOLUBLE 6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg	8A1 6K1a	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →				
26.1	27.0	1.5		0.2	0.7	<1	0.6	0.3	7.4		38.5
28.1	32.6	1.7		0.2	0.4	<1	0.4	0.1	3.4		39.3
24.4	30.4	1.9		0.3	0.3	1	0.5	0.1	3.2		35.4
21.1	28.6	0.9		0.2	0.2	<1	0.6	0.1	3.9		32.8
18.4	26.0	1.8		0.2	0.2	<1	0.6	0.1	3.7		28.6
31.1	35.3	3.3		0.5	0.3	3	0.9	Tr.	1.8		43.3

1/ Percent of the whole soil

SAN EMIGDIO LOAM
S55Calif-33-11

Sampled by: Fred Eggers, Arnold Knecht, F. G. Stephens, W. G. Harper, R. E. Nelson and F. F. Harradine. Description by: W. G. Harper.

Location: 1700' W of Wolfskill-Moreno ranch headquarters, 1000' E of the S 1/4 corner Sec. 18, T3S, R2W, near Moreno, Riverside County, California. Sampling date: December 6, 1955.

Elevation: 1490 feet

Precipitation: 13 inches

Classification: Typic Xerofluvent, coarse-loamy, mixed, calcareous, thermic.

California Group: I

Vegetation: Used for dry farm grain. Fallow this season.

Parent Material: Alluvium from San Timoteo Badlands.

Physiography: Near lower end broad alluvial fan.

Drainage: Well drained.

HORIZON		DESCRIPTION
Ap1	0- 8"	Pale brown (10YR 6/3 dry, dark brown 3/3 or 3.5/3 moist) loam; weakly defined; medium to fine crumb structure; very hard, friable; moderately permeable; many roots; very slightly calcareous; pH 8.2; abrupt smooth boundary.
Ap2	8-14"	Pale brown (10YR 6/3 dry, dark brown 4/3 moist) loam; massive but breaks up into various sized angular blocky aggregates; very hard, friable; moderately permeable; many roots; effervesces strongly; white lime veins; pH 8.2; abrupt smooth boundary.
C1	14-28"	Pale brown (10YR 6/3 dry, dark brown 4/3 moist) loam; massive; very hard; friable; moderately permeable; strong effervescense; many pores and many worm holes; moderate amount of roots; pH 8.2; abrupt smooth boundary.
C2	28-39"	Brown (10YR 5.5/3 dry, dark brown 4.5/3 moist) fine sandy loam; massive; slightly hard, very friable; moderately permeable; few roots; strong effervescense; pH 8.2; clear smooth boundary.
C3	39-54"	Brown (10YR 5.5/3 dry, dark brown 4.5/3 moist) sandy loam; slightly hard, very friable; moderately permeable; very few roots; strong effervescense; pH 8.2; clear smooth boundary.
C4	54-64"	Light yellowish brown (10YR 6/4 dry, dark brown 4.5/3 moist) silt loam; massive; may have some clay films; very hard, friable; moderately permeable; very few roots; effervesces strongly; pH 8.2; many pores.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE San Emigdio fine sandy loam **LOCATION** Riverside County, California

SOIL FAMILY: Typic Xerofluvent, coarse-loamy, mixed, calcareous, thermic.

SOIL NOS. S57Calif-33-1 **LAB. NOS.** 57468 - 57475

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0- 7	Ap1	0.8	5.3	10.5	35.5	14.8	26.3	6.8	51.8	12.7	0	fsl
7-11	Ap2	0.5	4.5	11.9	40.7	14.4	22.0	6.0	50.5	9.9	0	fsl
11-15	C1	0.4	10.3	23.1	45.5	9.7	8.5	2.5	36.3	3.9	0	s
15-18	C2	0.4	3.3	7.8	29.0	14.2	38.5	6.8	49.6	20.9	0	fsl
18-34	C3	0.6	4.5	9.7	40.8	19.8	19.9	4.7	58.7	7.3	0	lfs
34-45	C4	1.7	9.0	12.3	35.4	15.4	20.1	6.1	49.2	7.3	0	fsl
45-47	C5	0.9	4.1	4.7	16.9	9.8	49.6	14.0	39.6	30.8	0	l
47-60+	C6	3.7	11.8	12.9	35.3	12.7	17.9	5.7	43.6	7.4	0	ls

pH 8C1b Saturated Paste 1:1	pH 8C1a 1:10	4A3a Bulk Density g/cc	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6I1a CO_3 meq/l	8A1a Elec. Conduc. mmhos/cm. at 25° C.	6E1b $CaCO_3$ equivalent %	6J1a HCO_3 meq/l	MOISTURE TENSIONS 4B1a 1/10 ATMOS. %	4B1a 1/3 ATMOS. %	4B2 15 ATMOS. %
7.5	7.6		0.60	0.058	10.3	1.2	1.1	<1.0	7.4	21.4	13.4	4.3
7.8	8.4		0.25	0.017	14.7	0.0	1.1	1.0	4.7	18.4	11.4	3.5
8.0	8.3		0.05	0.004		0.0	0.5	<1.0	2.9	7.3	3.9	1.5
7.5	8.2		0.22			0.0	1.2	1.4	3.4	30.2	17.7	4.7
7.8	8.5	1.35	0.13			0.0	0.8	1.2	2.8	19.3	8.5	2.7
7.8	8.5	1.37	0.13			0.0	0.8	1.3	2.9	20.1	9.2	3.0
7.7	8.5		0.30			0.0	1.8	3.4	3.7			7.8
8.0	8.7	1.37	0.15			0.0	0.8	<1.0	2.9	18.7	8.6	2.8

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	5B1b Exch. Na 6P2a	5B1b Exch. K 6Q2a	5D1 Exch. Na %	SATURATION EXTRACT SOLUBLE 6P1a Na	6Q1a K	8A1 6N1a Ca	6O1a Mg	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil						milliequivalents per liter					
11.9	15.7	3.0		0.7	0.4	6	4.6	0.4	5.6	2.6	1.9	32.6
12.3	13.7	1.8		0.6	0.3	5	4.0	0.5	5.4	1.0	1.4	29.8
8.0	6.7	0.8		0.5	0.2	6	2.1	0.3	2.1	1.2	0.4	27.3
17.5	17.9	1.6		0.4	0.5	2	7.8	0.8	5.9	1.0	2.8	34.5
13.3	15.5	1.2		0.5	0.3	4	3.5	0.3	3.3	0.6	1.2	29.8
12.7	16.9	1.2		0.6	0.2	5	3.7	0.3	3.2	0.8	1.2	30.8
24.1	25.3	2.2		1.1	0.6	5	9.2	0.4	9.5	1.4	4.7	44.2
9.5	15.3	1.2		0.9	0.2	9	4.7	0.3	2.6	0.7	1.2	28.1

SAN EMIGDIO FINE SANDY LOAM
S57Calif-33-1

Location: Riverside County, California. 3,050 feet west and 150 feet north of southeast corner of Sec. 8, T. 5 S., R. 1 E. On the Lovell Ranch, 150 feet north of Acacia, about 3 miles east of Hemet. Date of sampling: June 3, 1957.
Described by: Fred Eggers. Collectors: George Borst, R. E. Nelson, Cliff Henry, and Arnold Knecht.
Classification: Typic Xerofluvent, coarse-loamy, mixed, calcareous, thermic.
Vegetation: Walnut grove. Precipitation: 10-14 inches. Parent material: Alluvium from the Bautista Beds. Physiography: Flood plain. Elevation: 1,765 feet. Drainage: Well drained.
Remarks: Very thin silt lenses in all horizons. These were not sampled except in C2 and C5. The entire profile is highly micaceous. There are grass roots in Ap1, Ap2 and C1 and walnut tree roots throughout the profile.

HORIZON	DESCRIPTION
Ap1 RSL No. 57468	0-7 inches, grayish brown (10YR 5/2 dry, very dark grayish brown 3/2 moist) fine sandy loam; weakly defined medium to fine subangular blocky structure; slightly hard when dry, firm when moist; nonsticky and nonplastic when wet; moderately rapid permeability; many plant roots; pH 7.6; strong effervescence; clear smooth lower boundary.
Ap2 RSL No. 57469	7-11 inches, grayish brown (10YR 5/2 dry, very dark grayish brown 3/2 moist) fine sandy loam; moderately defined medium angular blocky structure; hard when dry, very firm when moist; nonsticky and nonplastic when wet; moderately permeable; many plant roots; pH 8.0; strong effervescence; clear wavy lower boundary. This is a moderately compacted cultivation pan.
C1 RSL No. 57470	11-15 inches, gray (10YR 6/1 dry, dark gray 4/1 moist) loamy sand, single grain; loose when dry, loose when moist; nonsticky and nonplastic when wet; rapid permeability; many plant roots; pH 8.0; strong effervescence; clear smooth lower boundary.
C2 RSL No. 57471	15-18 inches, gray (10YR 6/1 dry, dark gray 4/1 moist) very fine sandy loam; moderately defined fine platy; slightly hard when dry; very firm when moist; slightly sticky and nonplastic when wet; moderate permeability; many plant roots; pH 8.0; strong effervescence; clear smooth lower boundary. This is a mixture of very thin silt lenses and loamy fine sand.
C3 RSL No. 57472	18-34 inches, gray (10YR 6/1 dry, dark gray 4/1 moist) loamy fine sand, single grain; loose when dry, loose when moist, nonsticky and nonplastic when wet; moderately rapid permeability; many plant roots; pH 8.0; strong effervescence; clear smooth lower boundary.
C4 RSL No. 57473	34-45 inches, gray to light brownish gray (10YR 6/1-6/2 dry, dark gray to dark grayish brown 4/1-4/2 moist), loamy sand, single grain; loose when dry, loose when moist; nonsticky and nonplastic when wet; rapid permeability; clear smooth lower boundary.
C5 RSL No. 57474	45-47 inches, gray (10YR 6/1 dry, dark gray 5/1 moist) silt loam; moderately defined fine platy; slightly hard when dry, firm when moist; slightly sticky and plastic when wet; moderately permeable; common plant roots; pH 8.0; clear smooth lower boundary.
C6 RSL No. 57475	47-60 inches +, gray (10YR 5/1 dry, dark gray 4/1 moist) loamy sand, single grain; loose when dry, loose when moist; nonsticky and nonplastic when wet; rapid permeability; common plant roots; pH 8.2; strong effervescence.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE San Emigdio fine sandy loam **LOCATION** Riverside County, California

SOIL FAMILY: Typic Xerofluvent, coarse-loamy, mixed, calcareous, thermic.

SOIL NOS. S57Calif-33-2 **LAB. NOS.** 57476 - 57482

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)							3A1			TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2	
0- 8	Ap1	1.1	7.3	8.4	28.7	18.2	26.8	9.5	50.9	12.8	0	fsl
8-13	Ap2	0.9	6.8	8.2	29.5	18.1	28.3	8.2	52.1	13.5	0	fsl
13-23	C1	1.0	6.2	7.9	28.4	17.3	30.2	9.0	50.7	14.8	0	fsl
23-30	C2	0.9	6.5	8.0	27.3	15.4	31.6	10.3	48.0	16.0	0	fsl
30-35	C3	0.7	5.5	8.2	26.4	15.2	32.9	11.1	47.6	16.8	0	fsl
35-42	C4	0.6	5.4	8.1	28.6	18.1	30.9	8.3	52.9	14.5	0	fsl
42-60+	C5	0.7	8.1	10.1	35.2	18.1	19.7	8.1	52.3	7.9	0	fsl

8C1b pH SATURATED PASTE 1:1	8C1a pH 1:10	4A3a Bulk Density g/cc	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6I1a CO_3 me/L	6A1a Elec. Conduc. EC×10³ MILLIMHOS PER CM @25°C	6E1b $CaCO_3$ equivalent %	6J1a HCO_3 me./l	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
7.6	7.8		0.52	0.055	9.5	0.5	1.7	Tr	6.2	23.7	14.0	4.8
7.8	8.3	1.47	0.24	0.026		0.0	0.7	<1.0	4.0	22.7	13.3	4.6
7.8	8.6	1.36	0.19	0.021		0.0	0.9	1.9	3.0	24.0	14.5	4.9
7.7	8.5	1.32	0.17	0.022		0.0	1.7	2.3	3.0			5.3
7.9	8.6	1.16	0.26	0.021		0.0	1.8	2.1	2.5			5.7
7.8	8.4	1.42	0.13			0.0	1.7	1.1	2.5			5.0
7.9	8.7	1.50	0.12			0.0	1.9	0.0	15.0			3.5

5A2a CATION EXCHANGE CAPACITY (-Na)	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6Q2c	6H2a H	Exch. 5F1b Na 6P2a	Exch. 5B1b K 6Q2a	5D1 EXCH. Na %	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil						milliequivalents per liter					
12.0	9.4	2.7	-	0.7	0.9	6	4.0	1.7	9.0	2.1	0.5	30.5
12.2	17.6	1.9	-	0.7	0.5	6	3.8	0.4	3.0	0.8	0.1	31.2
14.6	22.1	1.5	-	0.8	0.3	5	3.4	0.3	5.1	0.7	1.0	32.2
14.4	23.0	1.4	-	0.9	0.3	6	6.5	0.2	9.0	1.2	4.8	33.7
15.7	24.1	1.5	-	0.8	0.2	5	7.2	0.2	9.3	1.2	5.3	34.2
13.6	21.4	1.6	-	0.9	0.2	7	6.9	0.2	7.5	1.3	5.1	32.3
9.5	17.5	1.4	-	0.7	0.2	7	7.8	0.3	8.6	1.7	6.7	29.6

SAN EMIGDIO FINE SANDY LOAM
S57Calif-33-2

Location: Riverside County, California. 900 feet east and 800 feet south of the center of Sec. 14, T. 5 S., R. 1 W., 450 feet west and 550 feet north of the intersection of Yale and Johnston Streets, on the J. Rite Ranch, Hemet. Date of sampling: June 3, 1957.
Description by: Fred Eggers. Collectors: George Borst, R. E. Nelson, Cliff Henry, and Arnold Knecht.
Classification: Typic Xerofluvent, coarse-loamy, mixed, calcareous, thermic.
Vegetation: Apricot grove. Precipitation: 10-14 inches. Parent material: Alluvium from Bautista Beds. Physiography: Alluvial fan. Elevation: 1,648 feet. Drainage: Well drained.
Remarks: Lime in seams and pores in all C horizons.

HORIZON	DESCRIPTION
Ap1 RSL No. 57476	0-8 inches, grayish brown (10YR 5/2 dry, dark brown 3/3 moist) fine sandy loam; weakly defined medium subangular blocky structure; hard when dry, friable when moist; nonsticky and nonplastic when wet; moderately rapid permeability; many plant roots; pH 8.0; slight effervescence; abrupt smooth lower boundary.
Ap2 RSL No. 57477	8-13 inches, grayish brown (10YR 5/2 dry, dark brown 3/3 moist) fine sandy loam; moderately defined medium angular blocky structure; very hard when dry, friable when moist; nonsticky and nonplastic when wet; moderately rapid permeability; many plant roots; pH 8.0; strongly effervescent; diffuse smooth lower boundary.
C1 RSL No. 57478	13-23 inches, grayish brown (2.5Y 5/2 dry, dark brown 10YR 3/3 moist) fine sandy loam; massive; breaks to weakly defined fine angular blocky structure; slightly hard when dry, friable when moist; nonsticky and plastic when wet; moderately rapid permeability; many plant roots; pH 8.0; strong effervescence; gradual smooth lower boundary.
C2 RSL No. 57479	23-30 inches, grayish brown (2.5Y 5/2 dry, dark brown 10YR 3/3 moist) very fine sandy loam; massive; breaks to weakly defined fine angular blocky structure; slightly hard when dry, firm when moist; nonsticky and plastic when wet; moderately permeable; many plant roots; pH 8.0; strong effervescence; clear smooth lower boundary.
C3 RSL No. 57480	30-35 inches, light brownish gray to grayish brown (2.5Y 6/2-5/2 dry, dark brown 10YR 3/3-3/4 moist) fine sandy loam; massive; slightly hard when dry, firm when moist; nonsticky and plastic when wet; moderately rapid permeability; many plant roots; pH 8.0; strong effervescence; clear smooth lower boundary.
C4 RSL No. 57481	35-42 inches, light brownish gray (2.5Y 6/2 dry, dark yellowish brown 10YR 3/4 moist) fine sandy loam; massive; slightly hard when dry, firm when moist; nonsticky and plastic when wet; moderately rapid permeability; many plant roots; pH 8.0; strong effervescence; clear smooth lower boundary.
C5 RSL No. 57482	42-60 inches +, light brownish gray (2.5Y 6/2 dry, dark yellowish brown 10YR 3/4 moist) loamy fine sand; massive; loose when dry, loose when moist; nonsticky and nonplastic when wet; rapid permeability; common plant roots; pH 8.0; strong effervescence.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Campbell clay loam (taxadjunct) **LOCATION** Contra Costa County, California

SOIL FAMILY: Aquic Xerofluvent, fine-silty, mixed, nonacid, thermic

SOIL NOS. S57Calif-07-2 **LAB. NOS.** 5824 - 5829

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-5	A1	0.1	0.2	0.2	2.3	3.1	52.7	41.4	18.8	38.8	0	sic
5-13	B1	0.1	0.2	0.4	8.4	9.9	46.4	34.6	33.9	29.2	0	sicl
13-20	B21	0.1	0.2	0.5	10.1	10.9	47.7	30.5	38.4	28.5	0	cl
20-28	B22	0.1	0.5	0.9	12.0	11.3	47.6	27.6	40.0	28.4	0	cl
28-44	C11	0.4	1.2	1.0	8.7	7.2	50.4	31.1	30.5	33.6	0	sicl
44+	C12	0.1	0.2	0.7	8.8	11.1	47.7	31.4	36.1	29.7	0	cl

	pH		ORGANIC MATTER			6I1a	8A1a	6E1b	6J1a	MOISTURE TENSIONS		
8C1b SATURATED PASTE 1:1	1:5	8C1a 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	CO_3 meq/l	Elec. Conduc. mmhos/cm. at 25° C.	$CaCO_3$ equivalent %	HCO_3 meq/l	1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
8.2		8.5	0.37	0.032	11.6	0.0	38.4	Tr	6.5			20.0
7.6		8.3	0.82	0.062	13.2	0.0	35.8	Tr	4.5			15.6
7.8		8.4	0.50	0.041	12.2	0.0	40.0	Tr	4.0			15.1
8.3		8.7	0.39	0.031	12.6	5.0	40.2	Tr	0.5			14.6
8.3		9.0	0.39	0.032	12.2	0.0	44.9	1	11.4			15.7
7.2		8.0	1.20	0.102	11.8	0.0	13.1	Tr	3.5			12.9

5A2a	EXTRACTABLE CATIONS 5B					5D1	SATURATION EXTRACT SOLUBLE 8A1					8A
CATION EXCHANGE CAPACITY (Na)	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	EXCH. Na %	6P1a Na	6Q1a K	6N1a	6O1a	6K1a	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
34.4	43.7	7.3	--	13.0	0.1	37.8	387.5	0.5	32.1	78.9	321	62.1
29.8	9.8	13.6	--	14.9	0.5	50.0	380.0	0.2	25.5	84.8	283	56.9
29.1	18.3	6.5	--	9.3	0.2	32.0	377.5	0.2	31.1	98.3	364	54.4
28.1	25.0	6.0	--	10.8	0.1	38.4	410.0	0.3	32.8	87.4	357	53.5
30.7	19.3	15.6	--	17.7	0.4	57.7	372.0	0.3	33.7	84.2	388	56.8
29.0	11.9	9.8	--	4.0	0.7	13.8	105.0	1.0	40.7	45.9	68	48.3

CAMPBELL CLAY LOAM (taxadjunct) 1/
S57Calif-07-2

Collector; R. C. Huff, May 16, 1957
Location: Contra Costa County, California, Eastern Contra Costa SCD, SE1/4, Sec. 2, T1S, R 3 E, about 1 mile W of Byron.
Native Vegetation: Salt bush and meadow barley.
Salt or alkali: Appears to be strongly saline-alkali.
Climate: Rainfall 18". Cool, moist winters and dry summers.
Parent Material: Mixed alluvium - dominately sedimentary.
Relief: Flat to very gently sloping on the basin rim.
Elevation: 20 feet.
Drainage: Surface and internal drainage is slow. Free water at 5 feet at time of sampling.
Root Distribution: Many 0 - 5". Some large salt bush roots extend to 5' or more.
Classification: Aquic Xerofluvent, fine-silty, mixed, nonacid, thermic.

HORIZON		DESCRIPTION
57Calif-07-2-1		Gray brown (10YR 5/2 dry), very dark grayish brown
A_1	0- 5"	(10YR 3/2 moist) clay loam; strong, medium angular blocky; sticky, plastic, and very hard. The pH is 7.0. Clear, wavy lower boundary.
57Calif-07-2-2		Very dark gray (10 YR 3/1 moist) clay; massive, very sticky,
B_1	5-13"	and very plastic. The pH is 8.0, but the soil does not react to dilute HCl. Salts appear as soft masses and in seams. Diffuse, wavy lower boundary.
57Calif-07-2-3		Very dark grayish brown (10YR 3/2 moist) clay; massive, very
B_{21}	13-20"	sticky and very plastic; thin, patchy clayskins; The soils react slightly to dilute HCl. Lime and salts (gypsum?) occur in seams and as soft masses. Clear, wavy lower boundary.
57Calif-07-2-4		Dark brown (10YR 3.5/3 moist) clay; massive, sticky and
B_{22}	20-28"	plastic. Clayskins are prominent and continuous. Reacts violently to dilute HCl. Lime and salts (gypsum) disseminated and in seams or as soft masses. The pH is 8+.
57Calif-07-2-5		Dark grayish brown (10YR 4/2 moist) clay loam; massive,
C_{11}	28-44"	sticky and plastic. Clayskins are thin and discontinuous. Few soft iron or manganese concretions. Soil reacts violently to dilute HCl. Lime is disseminated and lime and salts also occur in seams or as soft masses. The pH is 8+. Diffuse, wavy lower boundary.
57Calif-07-2-6		Dark grayish brown (10YR 4/2 moist) clay loam. Massive,
C_{12}	44"+	sticky, and plastic; thin clayskins in pores. Soil reacts strongly to dilute HCl and pH is 8+. Large amounts of salts and lime in seams and large soft masses; numerous soft iron or manganese concretions. Mottles are dark olive gray (5Y 3/2) few, coarse, and prominent.

1/ The Campbell series is in a fine-silty, mixed, nonacid, thermic family of Aquic Xerochrepts. This pedon is a taxadjunct because it has an organic carbon content that decreases irregularly with depth. This pedon has more salt than is permitted in the series.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Oxalis clay loam (taxadjunct) **LOCATION** Contra Costa County, California

SOIL FAMILY: Aquic Xerofluvent, fine, montmorillonitic, nonacid, thermic

SOIL NOS. S57Calif-07-1 **LAB. NOS.** 5818 - 5823

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-6	A1	0.3	1.7	3.0	13.1	4.1	36.5	41.3	19.6	29.4	0	c
6-13	B1	0.0	1.0	2.0	9.8	3.0	28.0	56.2	13.4	24.1	0	c
13-24	B21	0.1	1.2	2.1	10.9	3.2	28.8	53.7	13.6	25.7	0	c
24-31	B22	0.1	1.8	3.3	18.6	4.3	25.7	46.2	20.0	22.5	0	c
31-47	C11	0.2	2.8	5.3	27.7	5.2	22.4	36.4	27.0	18.7	0	cl
47+	C12	1.1	5.7	10.3	28.6	6.3	17.6	30.4	26.3	13.3	0	scl

pH 8C1b SATURATED PASTE 1:1	pH 1:5	pH 8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	ORGANIC MATTER 6B1a NITROGEN %	C/N	6I1a CO_3 meq/l	8A1a Elec. Conduc. mmhos/cm at 25°C.	6E1b $CaCO_3$ equivalent %	6J1a HCO_3 meq/l	MOISTURE TENSIONS 1/10 ATMOS. %	MOISTURE TENSIONS 1/3 ATMOS. %	4B2 15 ATMOS. %
6.7		7.5	1.85	0.163	11.3	0.0	4.8	--	3.2			15.3
7.8		8.7	1.00	0.075	13.3	0.0	20.6	--	4.0			18.9
8.0		8.5	0.34	0.034	10.0	0.0	22.4	Tr	5.0			18.7
8.3		9.1	0.40	0.033	12.1	0.0	18.3	Tr	8.9			16.4
8.2		9.0	0.25	0.045	5.5	0.0	22.0	Tr	9.4			14.2
8.0		8.5	0.18	0.018		0.0	15.3	3	4.0			11.6

5A2a CATION EXCHANGE CAPACITY (+ Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	5D1 EXCH. Na %	SATURATION EXTRACT SOLUBLE 6P1a Na	6Q1a K	6N1a	6O1a	6K1a	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
35.5	11.5	14.4	--	5.0	1.2	14.1	33.8	0.2	4.1	7.9	9	56.0
44.0	12.4	17.3	--	16.1	0.8	36.6	192.5	0.2	19.0	29.5	109	68.7
42.2	11.5	16.9	--	15.6	0.7	37.0	250.0	0.2	26.9	48.5	138	69.9
37.0	10.2	16.6	--	15.1	0.5	40.8	218.8	0.2	10.8	35.1	145	63.7
27.6	8.2	15.2	--	8.8	0.4	31.9	220.0	0.3	11.5	39.6	132	54.4
23.8	24.0	7.3	--	7.5	0.1	31.5	3.8	0.2	23.3	28.2	63	47.4

OXALIS CLAY LOAM (taxadjunct) 1/
S57Calif-07-1

Collector: R. C. Huff, May 16, 1957
Location: Contra Costa County, California. Eastern Contra Costa, SCD, SW corner Delta and Byron Roads. 200 feet west and 300 feet south of power pole in corner.
Vegetation: Meadow barley and weeds.
Salt or alkali: Appears to be strongly saline-alkali.
Climate: Rainfall 18". Cool moist winters and hot dry summers.
Parent Material: Mixed alluvium-dominately sedimentary.
Relief: Flat to very gently sloping on the basin rim.
Elevation: 10 feet.
Drainage: Surface and internal drainage is slow. Free water at 5 feet at time of sampling. Root Distribution: Many 0 to 5 inches, few below.
Classification: Aquic Xerofluvent, fine, montmorillonitic, nonacid, thermic.

HORIZON	DESCRIPTION
57Calif-07-1-1 A_1 0- 6"	Grayish brown (10YR 5.5/2 dry), very dark grayish brown (10YR 3/2 moist) clay loam; moderate, medium, angular blocky, plastic, sticky and extremely hard. The pH is 6.5. Clear, wavy lower boundary.
57Calif-07-1-2 B_1 6-13"	Very dark gray (10YR 3/1) moist clay; massive, very sticky, very plastic, and firm. The soil does not react to dilute HCl but salt crystals (probably gypsum) occur as seams. The pH is 8+. Clear, wavy lower boundary.
57Calif-07-1-3 B_{21} 13-24"	Very dark grayish brown (10YR 3/2 moist) clay; massive, very sticky and very plastic; clayskins are thin and discontinuous. The soil effervesces with dilute HCl and lime and gypsum are very prominent as seams or soft masses. The pH is 8+. Clear, wavy lower boundary.
57Calif-07-1-4 B_{22} 24-31"	Very dark grayish brown to dark grayish brown (10YR 3.5/2 moist) clay; massive, firm, plastic and sticky; clayskins prominent and continuous. Soil reacts strongly to dilute HCl. Salts (probably gypsum) and lime are very prominent as seams and as masses. The pH is 8+. Diffuse, wavy lower boundary.
57Calif-07-1-5 C_{11} 31-47"	Dark grayish brown (10YR 4.5/2) clay loam; massive, plastic, sticky, and firm; thin, patchy clayskins. Soil reacts strongly to dilute HCl. Salts (gypsum?) and lime are disseminated and in seams; there are also a few soft iron or manganese concretions. The pH is 8+. There are common, fine and faint mottles.
57Calif-07-1-6 C_{12} 47"+	Dark yellowish brown (10YR 4/4 moist) clay loam; massive, sticky, plastic, and firm to very firm. Salts (probably gypsum) and lime occur as seams and masses. Soil reacts violently to dilute HCl. The pH is 8+. Mottles, which are dark olive gray (5Y 3/2) are common, medium, and distinct. Soft iron or manganese concretions are common. This horizon appears to have the firmness and brittleness of a fragipan.

1/ The Oxalis series is in a fine, montmorillonitic (calcareous), thermic family of Aquic Xerorthents. This pedon has an organic carbon content that decreases irregularly with depth.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Rosamond sandy clay, I am **LOCATION** San Bernardino County, California

SOIL FAMILY: Typic Torriorthent, fine-loamy, mixed, calcareous, thermic

SOIL NOS. 855Calif-36-6 **LAB. NOS.** 5538 thru 5546

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2 >2 1/	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002		
0- 2	A1v	0.1	0.4	0.7	12.0	24.2	28.4	34.2	43.1	19.8	0	cl
2- 4	A	0.0	0.4	0.9	7.2	19.2	34.1	38.2	34.3	24.9	0	cl
4- 9	B1	0.0	0.7	1.2	7.8	14.9	37.0	38.4	28.2	29.6	0	cl
9-17	B21	0.0	0.2	0.5	4.8	14.7	41.0	38.8	26.6	33.0	0	cl
17-23	B22	0.3	1.2	1.9	9.8	17.1	38.4	31.3	38.5	24.3	0	cl
23-30	C	0.4	2.3	3.6	18.1	26.0	30.8	18.8	53.1	17.2	0	l
30-34	B1b	1.6	6.7	7.5	21.4	20.0	19.9	22.9	42.9	11.1	2	scl
34-60	B2b	0.9	2.5	2.4	8.2	14.7	34.9	36.4	29.4	26.0	0	cl
60-64	Ccab	0.5	1.3	0.8	2.8	7.0	52.7	34.9	22.7	39.1	2	sicl

8C1b SATURATED PASTE 1:1	pH 8C1a 1:5	pH 8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	8A1a Elec. Conduc. EC×10³ MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	6F1a GYPSUM me./100g. SOIL	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
8.4		9.4	0.40	0.034	11.8		69.4	5.9	0			12.3
8.6		9.6	0.43	0.037	11.6		65.8	7.0	0			14.1
8.7		9.7	0.33	0.036	9.2		46.8	4.7	0			15.0
8.9		9.8	0.25	0.027	9.3		27.0	2.4	0			15.9
9.1		9.9	0.26	0.025	10.4		17.7	3.0	0			13.5
9.3		9.9	0.13				9.6	3.5	0			9.4
9.1		10.0	0.11				7.2	7.5	0			9.8
9.0		10.0	0.10				3.8	5.7	0			15.7
8.4		9.5	0.10				1.1	13.2	0			16.6

5A2a CATION EXCHANGE CAPACITY (+(Na)	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6Q2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	5D1 EXCH. Na %	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg		6K1a	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
26.5				9.8	2.8	37	820	22.0	33.9		10	46.4
27.0				13.1	2.8	49	820	20.0	14.4			50.1
26.5				15.1	2.1	57	555	16.5	12.9			51.6
26.0				17.3	2.6	67	305	6.3	5.2			57.4
23.0				15.3	2.3	67	195	2.5	2.2			52.4
16.2				12.6	1.9	78	95	2.5	1.0			44.0
17.4				14.1	1.4	81	68	0.5	2.2			34.0
23.2				15.7	3.2	68	36.3	0.3	0.7			51.3
29.1				11.3	0.8	39	11.0	0.1	0.6			48.3

1/ Percent of the whole soil

ROSAMOND SANDY CLAY LOAM
S55Calif-36-6

Sampled by: Fred Eggers, W.G. Harper, R. E. Nelson.
Described by: W. G. Harper. Sampling date: January, 1955.
Location: 1/8 mile W and 100 feet N of SE corner, Sec. 30, T10N, R2W, about 1 mile ENE of Barstow, San Bernardino County, California.
Elevation: About 2500 ft. Annual precipitation about 4 inches
Classification: Typic Torriorthent, fine-loamy, mixed, calcareous, thermic.
Vegetation: Shadscale and inkweed 12 to 20 inches high. 90 percent of surface barren
Parent Material: Alluvium from mixed rocks but dominantly from granitic formations
Physiography: Old stream terrace of Mojave River coalescing with alluvial fan; slope less than 1 percent
Drainage: Runoff very slow and internal permeability slow

HORIZON		DESCRIPTION
S55Calif-36-6-1 A_{1v}	0- 2"	Brown (10YR 5.5/3 dry, 4.5/3 moist) clay loam; moderate to strong, medium to fine platy; slightly hard when dry, friable when moist; very strongly calcareous with common very fine white salt flecks; slowly permeable; micaceous; very few plant roots; pH on 1 to 5 dilution with thymol blue 9.0; abrupt and smooth lower boundary.
S55Calif-36-6-2 A	2- 4"	Pale brown (10YR 6/3 dry, brown 5/3 moist) clay loam; very weakly defined coarse platy and moderate to fine subangular blocky; slightly hard when dry, friable when moist; very strongly calcareous with a few fine white flecks of salt; micaceous; slowly permeable; few fine plant roots; pH on dilution 9.2; abrupt and smooth lower boundary.
S55Calif-36-6-3 B_1	4- 9"	Same color as horizon above; clay loam; very weak coarse platy and moderately medium subangular blocky; hard when dry, firm to friable when moist; very strongly calcareous with a few fine salt flecks; very few fine roots; slowly permeable; micaceous; pH on dilution 9.4; lower boundary abrupt and smooth.
S55Calif-36-6-4 B_{21}	9-17"	Same color as horizon above; clay loam; moderate to weak medium subangular blocky; extremely hard when dry, firm when moist; micaceous; very strongly calcareous with a few medium to fine distinct white salt flecks; slowly to very slowly permeable; pH on dilution 9.6; very few fine plant roots; lower boundary abrupt and smooth.
S55Calif-36-6-5 B_{22}	17-23"	Same color as horizon above; clay loam; weak medium to fine subangular blocky; extremely hard dry, firm when moist; very strongly calcareous with many fine distinct white flecks of salt; pH on dilution 9.6+; micaceous; very slowly permeable; lower boundary abrupt and smooth.
S55Calif-36-6-6 C	23-30"	Same color as horizon above; loam; massive; hard when dry friable when moist; micaceous; very strongly calcareous with very few fine white salt flecks; moderately permeable; pH on dilution 9.6+; lower boundary abrupt and smooth.
S55Calif-36-6-7 B_{1b}	30-34"	Brown (10YR 5/3 dry, 4/3 moist) sandy clay loam; massive; hard when dry, friable when moist; very strongly calcareous; with a few medium flecks of lime; moderately permeable; pH on dilution 9.6+; devoid of plant roots; lower boundary abrupt and smooth.
S55Calif-36-6-8 B_{2b}	34-60"	Brown (10YR 5/ 3 dry and moist) clay loam; weak fine subangular blocky; extremely hard when dry, very firm when moist; very strongly calcareous with a few medium distinct white lime veins; pH on dilution 9.6+; very slowly permeable; lower boundary abrupt and smooth.
S55Calif-36-6-9 C_{ca_b}	60-64"	Very pale brown (10YR 8/3 dry, 7/3 moist) silty clay loam; massive; extremely hard when dry, very firm when moist; very strongly calcareous with many medium to fine distinct flecks of lime; pH on dilution 9.5; very slowly permeable.

REMARKS: Like other Rosamond soil sampled, this soil probably developed under well drained conditions and subsequently became impregnated with salts high in sodium. A buried Rosamond profile occurred below 30 inches. The type name is taken from the Barstow soil survey report. This soil was shown in the Barstow survey to be moderately affected by alkali. Today the phase name would include "strongly saline-alkali".

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE San Emigdio loam (taxadjunct) **LOCATION** Riverside County, California

SOIL FAMILY: Typic Xerorthent, coarse-loamy, mixed, calcareous, thermic.

SOIL NOS. S55Calif-33-13 **LAB. NOS.** 55589-592

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0-8	Ap	2.1	4.1	5.7	22.3	20.2	37.1	8.5	54.2	18.3	0	vfsl
8-22	C1	1.5	4.6	6.1	23.2	19.9	36.5	8.2	53.0	18.9	7	vfsl
22-42	C2	1.6	4.3	6.3	24.1	19.7	36.2	7.8	55.1	16.9	7	vfsl
42-60	C3	1.5	4.3	5.7	21.6	19.6	38.2	9.1	52.5	19.9	6	vfsl

		pH	ORGANIC MATTER				8A1a Elec. Conduc. EC×10³ MILLIMHOS PER CM @25°C.	6E1b	6F1a	MOISTURE TENSIONS		
8C1b SATURATED PASTE 1:1	8C1a 1:5	8C1a 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)		$CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	4B1a 1/10 ATMOS. %	4B1a 1/3 ATMOS. %	4B2 15 ATMOS. %
7.6		8.2	0.61	0.060	10.2		0.84	<1		25.9	14.2	5.0
7.8		8.9	0.24	0.028			0.62	1		22.1	13.1	4.9
8.0		9.0	0.16				0.42	2		21.5	13.3	4.8
8.0		8.9	0.12				0.46	3				5.4

5A2a	EXTRACTABLE CATIONS 5B					5D1	SATURATION EXTRACT SOLUBLE 8A1					8A
CATION EXCHANGE CAPACITY (Na)	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	EXCH. Na %	6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg		6K1a	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
13.8	13.1	1.0		0.2	0.6	1	0.5	0.4	7.9			28.0
14.7	19.4	4.2		0.2	0.3	1	0.6	0.1	5.1			26.2
14.7	19.1	6.0		0.2	0.2	1	0.7	0.1	3.5			26.2
16.3	19.4	6.1		0.3	0.2	2	1.0	0.1	3.5			26.6

1/ Percent of the whole soil

SAN EMIGDIO LOAM (taxadjunct) 1/
S55Calif-33-13

Sampled by: Fred Eggers, Arnold Knecht, F. G. Stephens, W. G. Harper, R. E. Nelson and F. F. Harradine. Description by: W. G. Harper

Location: 100' NE of State Hwy. 79, 800' E and 400' S of NW corner Sec. 16, T3S, R2W, about 3 miles E of Moreno, Riverside County, California.

Sampling date: December 6, 1955.

Elevation: 1600 feet

Precipitation: 14 inches

Classification: Typic Xerorthent, coarse-loamy, mixed, calcareous, thermic.

California Group: I

Vegetation: Rabbitbrush, cheat grass and much alfileria.

Parent Material: Alluvium from San Timoteo Badlands.

Physiography: Gently sloping, alluvial fan; slightly convex.

Drainage: Good.

HORIZON		DESCRIPTION
Ap	0- 8"	Pale brown (10YR 6/3 dry, very dark grayish brown 3.5/2.5 moist) fine sandy loam; weakly defined medium to fine crumb structure; hard, very friable; moderately permeable; many roots; pH 8.2; effervesces slightly with weak acid; abrupt smooth boundary.
C 1	8-22"	Pale brown (10YR 6/3 dry, grayish brown 5/2 moist) fine sandy loam; massive; hard, very friable; moderately permeable; few roots; effervesces strongly; contains mycelium-like lime; pH 8.2; clear smooth boundary.
C 2	22-42"	Pale brown (10YR 6/3 dry, dark grayish brown 4/2 moist) fine sandy loam; massive; slightly hard, very friable; moderately permeable; few roots; effervesces strongly; contains mycelium-like lime; pH 8.2; clear smooth boundary.
C 3	42-60"	Pale brown (10YR 6/3 dry, dark grayish brown 4.5/2.5 moist) fine sandy loam; massive; slightly hard, very friable; moderately permeable; effervesces strongly with acid; contains mycelium-like lime; pH 8.2

Remarks: This profile contains some mica throughout. It has a slightly compacted tillage pan between 8 and 22 inches.

1/ The San Emigdio series is in a coarse-loamy, mixed, calcareous, thermic family of Typic Xerofluvents. This pedon has a regular decrease in organic carbon.

U. S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Xerorthent, coarse-loamy, mixed, nonacid, thermic
SOIL Hanford gravelly sand loam (taxadjunct) SOIL Nos. 84557-2 LOCATION Tehama County, California

SOIL SURVEY LABORATORY _____ LAB. Nos. _____

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	Coarse fragments: ≥ 2 Pct.	Coarse fragments: 2–19 Pct. of < 76mm	Coarse fragments: 19–76 Pct. of < 76mm
		Pct. of < 2 mm														
0-8	Ap	57.4	35.2	7.4	8.4	11.1	7.6	14.8	15.5	17.1	18.1		41.9			
8-13	A11	55.4	35.9	8.7	6.7	11.0	7.9	14.9	14.9	16.5	19.4		40.5			
13-18	B21	55.6	35.1	9.3	7.6	11.2	8.1	15.0	13.7	16.2	18.9		41.9			
18-22	B22	56.5	34.1	9.4	5.8	10.5	8.4	17.2	14.6	15.3	18.8		41.9			
22-27	B23	59.6	30.5	9.9	6.3	11.1	9.7	19.1	13.4	12.4	18.1		59.6			
27-36	IIC1	72.6	18.3	9.1	16.0	23.8	12.2	13.5	7.1	6.3	12.0		65.5			
36-44	IIC2	75.5	16.4	8.1	14.2	28.4	14.0	12.7	6.2	6.6	9.8		69.3			

Depth (In.)	6A2a Organic carbon	6B1a Nitrogen	C/N		Carbonate as $CaCO_3$		Bulk density				Water content				pH	
																8C1a
	Pct	Pct.			Pct.		g/cc	g/cc	g/cc		Pct.	Pct.	Pct			(1:1)
0-8	0.44	0.053														5.5
8-13	0.35	0.048														5.8
13-18	0.22	0.038														6.3
18-22	0.13	0.032														6.8
22-27	0.13	0.030														6.9
27-36	0.09	0.023														7.1
36-44	0.10	0.020														7.1

Depth (In.)	Extractable bases: Ca 6N2b	Mg 6O2b	Na 1/	5B1a K 2/	Sum of bases	6H2a Ext. Acidity	5A3a CEC Sum								Base saturation: 5C3 Sum	
	meq/100 g														Pct	Pct.
0-8	2.2	0.6	tr	0.21	3.0	3.1	6.1								49	
8-13	2.9	0.8	0.01	0.19	3.9	2.7	6.6								59	
13-18	4.4	1.3	<0.01	0.13	5.8	2.1	7.9								74	
18-22	5.0	1.8	0.01	0.08	6.9	2.0	8.9								77	
22-27	5.1	2.7	0.01	0.07	7.9	2.3	10.2								77	
27-36	4.6	3.2	0.02	0.02	7.8	1.8	9.6								82	
36-44	4.2	3.2	0.02	0.01	7.4	1.8	9.2								81	

Depth (In.)

1/ Gravimetrically as sodium uranyl magnesium acetate

2/ Precipitated as potassium sodium cobaltinitrite and titrated as potassium permanganate

HANFORD GRAVELLY SANDY LOAM (taxadjunct) 1/
S4557-2

Location: Tehama County, California. Pit located 0.1 mile south of the N¼ corner, Sec. 32, T25N, R3W, MDB&M. Date of Sampling: April 1, 1945.
Description by: R. C. Roberts and R. A. Gardner. Collectors: R. C. Roberts, F. O. Youngs, R. A. Gardner, L. T. Alexander, H. Jenny and R. E. Storie.
Classification: Typic Xerorthent, coarse-loamy, mixed, nonacid, thermic.

Vegetation: Cultivated - grain. Climate: Average annual precipitation is about 19 inches. Average annual temperature is about 62°F., January 45°F., and July 82°F. Parent Material: Alluvium from sedimentary rocks. Topography: Nearly level fans adjacent to stream channels on general slope of about 1 or 2 percent. Elevation: 310 feet. Drainage: Well drained, moderate permeability, slow runoff. Soil Moisture: Moist throughout.

HORIZON	DESCRIPTION
Ap	0 to 8 inches, brown (10YR 5/3) gravelly sandy loam, grayish brown (10YR 4/2) moist; very weak blocky structure; slightly hard, very friable, nonplastic; moderate number of roots; strongly acid (pH 5.5); abrupt smooth boundary.
A11	8 to 13 inches, brown (10YR 5/3) gravelly sandy loam, grayish brown (10YR 4/2) moist; weak blocky structure; slightly more compact than layer above; slightly hard, very friable, nonplastic; moderate number of roots; medium acid (pH 5.8); very gradual boundary.
B21	13 to 18 inches, light yellowish brown (10YR 6/4) gravelly sandy loam, brown (10YR 4/3) moist; weak blocky structure; slightly hard, friable, nonplastic; moderate number of roots; slightly acid (pH 6.3); gradual boundary.
B22	18 to 22 inches, light yellowish brown sandy loam, brown (10YR 4/3) moist; weak blocky structure; slightly hard, friable, slightly plastic; moderate number of roots; neutral (pH 6.8); gradual boundary.
B23	22 to 27 inches, light yellowish brown gravelly sandy loam, brown (10YR 4/3) moist; weak blocky structure; slightly compact; moderate number of roots present but less than in layer above; neutral (pH 6.9); abrupt wavy boundary.
IIC1	27 to 36 inches, light yellowish brown (10YR 6/4) very gravelly coarse sandy loam, dark yellowish brown (10YR 4/4) moist; structureless; single grain; loose, moist or dry, nonplastic; a few gravel weathered and very slightly coated or cemented in upper part of layer; very few roots present; neutral (pH 7.1); very gradual boundary.
IIC2	36 to 44 inches, light yellowish brown (10YR 6/4) very gravelly coarse sandy loam (near gravelly loamy coarse sand); yellowish brown (10YR 5/4) moist; structureless; single grain; loose moist and dry, nonplastic; very few roots present; neutral (pH 7.1).

1/ The Hanford series is in a coarse-loamy, mixed, nonacid, thermic family of Typic Xerorthents. This pedon is in the same family and subgroup but is a taxadjunct because it has B and C horizons with chroma above 3.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Xerorthent, coarse-loamy, mixed, nonacid, thermic

SOIL Hanford sandy loam SOIL Nos. S65Calif-27-12 LOCATION Monterey County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65449 - 65455

Depth (in.)	Horizon	1B1b Size class and particle diameter (mm) Total: Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	* Coarse fragments 1A2a: > 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76mm	
0-3	Ap1	76.6	15.4	8.0	16.6	21.8	12.6	17.7	7.9	8.4	7.0	25.2	68.7	0	8	16	16	0 **
3-12	Ap2	73.4	17.4	9.2	15.9	19.0	12.4	18.0	8.1	9.5	7.9	26.7	65.3	0	9	17	17	0 **
12-26	A13	72.9	17.0	10.1	14.5	23.5	13.0	15.4	6.5	9.0	8.0	22.4	66.4	0	10	16	16	0 **
26-38	A14	73.3	18.2	8.5	21.4	22.8	10.3	12.9	5.9	10.2	8.0	22.4	67.4	0	9	20	20	0 **
38-52	C1	79.0	14.2	6.8	24.1	25.0	10.7	14.0	5.2	7.5	6.7	19.1	73.8	0	7	24	24	0 **
52-73	C2	87.9	5.8	6.3	20.6	33.1	15.2	15.6	3.4	3.1	2.7	12.6	84.5	0	6	25	25	0 **
73-91+	C3	90.3	3.0	6.7	20.1	34.5	17.4	15.9	2.4	1.5	1.5	9.5	87.9	0	7	36	36	0 **

Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Bulk density: 4A1f 1/3 bar	4A1h Oven dry		3B2 Cm	Water content:	4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility COLE f in./in.	4D1 Extensibility COLE in./in.	pH: 8C1a H_2O 1:1		
	Pct.	Pct.		Pct.	Pct.	g/cc	g/cc	g/cc		Pct.	Pct.	Pct.					
0-3	0.55	0.047	12	0.4	-							3.4			7.3		
3-12	0.51	0.044	12	0.4	-	1.67	1.67		0.89		8.7	3.9	0.001	0.001	7.2		
12-26	0.41				-	1.50	1.51		0.90		9.5	4.1	0.003	0.003	7.8		
26-38	0.22			0.4	-	1.70	1.71		0.81		9.2	3.7	0.002	0.002	8.0		
38-52	0.06			0.4	-	1.75	1.76		0.83		7.5	2.7	0.002	0.001	7.6		
52-73	0.03			0.3	-							2.4			7.7		
73-91+	0.03			0.4	-							2.5			7.6		

Depth (in.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	5A3a Sum		6G1d KCl Ext. Al^{+++}		Atterberg limits: Plastic limit	Liquid limit	Plastic index	5D2 Exch. Na		Base saturation: 5C1 NH_4OAc	
	meq/100 g											Pct.	of <0.4 mm		Pct.		Pct.	Pct.
0-3	4.2	1.3	0.2	0.3	6.0		5.4										100+	
3-12	4.5	1.3	0.2	0.3	6.3		5.8										100+	
12-26	5.2	1.7	0.2	0.3	7.4		6.5					16	17	1			100+	
26-38	3.6	1.3	0.2	0.2	5.3		4.9										100+	
38-52	2.7	1.1	0.2	0.2	4.2		4.0								5		100+	
52-73	2.6	1.0	0.2	0.2	3.8		3.4						-	N.P.	6		100+	
73-91+	2.7	1.3	0.2	0.0	4.2		4.1								5		100+	

Depth (in.)	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Mica	Kaolin	
	X-ray				
0-3					
3-12			xxxx	x	
12-26					
26-38					
38-52					
52-73					
73-91+		x	xxxx	x	

* From characterization sample (5Kg) (except as noted).

** 2-19 mm. from characterization sample, 19-76 mm. from field volume estimate.

'-' = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

HANFORD SANDY LOAM
S65Calif-27-12

Location: Monterey County, California, adjacent to south edge at dirt road, 0.7 mile from Old Stage Road, 0.33 mile from intersection Old Stage Road and Chualar Road, Salinas Valley. Date of Sampling: May 20, 1965.
Description by: Lewis C. Leifer. Collectors: W. D. Nettleton and B. R. Brasher, C. J. Weisel, R. D. Waggoner, F. J. Pecarich. Site selection by T. D. Cook.
Classification: Typic Xerorthent, coarse-loamy, mixed, nonacid, thermic. (brunizemic Alluvial).
Vegetation: Irrigated cropland. Sugar beets. Climate: Precipitation is 12 inches; mean annual temperature 58°F., mean January 50°F., mean July 65°F. Parent Material: Alluvium from phaneritic, intermediate igneous rocks. Topography: Nearly flat, slightly convex ridge on alluvial fan surface having a west-facing slope of one percent. Elevation: 160 feet. Drainage: Well to somewhat excessively drained, moderately rapid permeability, medium runoff. Soil Moisture: Moist, near field capacity throughout.
Remarks: Field pH determinations by Truog Kit. Reaction much higher than typical for series. No satisfactory explanation. No paired profile. Classification assumes that this soil series as a whole has structure or is only slightly hard when dry. Only a few areas have had structure destroyed by excessive tillage. Asterisks indicate horizons sampled for California Division of Highways.

HORIZON	DESCRIPTION
Ap1 RSL 65449	0 to 3 inches, dark grayish brown (10YR 4/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; plentiful very fine roots; many very fine interstitial and few fine tubular pores; neutral (pH 7.0); clear smooth boundary.
Ap2 RSL 65450	3 to 12 inches, dark grayish brown (10YR 4/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; massive; hard, very friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial, few very fine and fine tubular pores; moderately alkaline (pH 8.0), noncalcareous; gradual smooth boundary.
*A13 RSL 65451	12 to 26 inches, dark grayish brown (10YR 4/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; moderate coarse granular structure; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial, few very fine and fine tubular pores; moderately alkaline (pH 8.0), noncalcareous; gradual smooth boundary.
A14 RSL 65452	26 to 38 inches, brown (10YR 5/3) coarse sandy loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; very few very fine roots; many very fine interstitial pores; possible few thin clay films in bridges; moderately alkaline (pH 8.0), noncalcareous; gradual smooth boundary.
C1 RSL 65453	38 to 52 inches, brown (10YR 5/3) coarse sandy loam, dark brown (7.5YR 3/4) moist; massive; soft, very friable, nonsticky and nonplastic; no roots; many very fine interstitial pores; moderately alkaline (pH 8.0), noncalcareous; gradual smooth boundary.
*C2 RSL 65454	52 to 73 inches, brown (10YR 5/3) loamy coarse sand, brown (7.5YR 4/4) moist; massive; soft, loose, nonsticky and nonplastic; many very fine interstitial pores; 3 clay bands 1/4 inch thick continuous across top 1/2 of horizon 3 inches apart, 3 somewhat weaker and more branched bands lower part; moderately alkaline (pH 8.0), noncalcareous; gradual smooth boundary.
C3 RSL 65455	73 to 91 inches, brown (7.5YR 5/4) loamy coarse sand, darker brown (7.5YR 4/4) moist; massive; soft, loose, nonsticky and nonplastic; many very fine interstitial pores; 3 clay bands about 1/2 inch thick, clay films slightly thicker than in C2, all bands dark reddish brown (5YR 3/4) moist; moderately alkaline (pH 8.0).

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Honcut fine sandy loam **LOCATION** Riverside County, California

SOIL FAMILY: Typic Xerorthent, coarse-loamy, mixed, nonacid, thermic.

SOIL NOS. S55Calif. 33-12 **LAB. NOS.** 55584-588

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)								3A1	2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0- 8	Ap	6.2	10.5	8.4	20.7	20.0	27.2	7.0	52.1	8.6	6	fsl
8-22	C1	6.6	10.5	8.7	23.4	19.1	25.2	6.5	50.3	9.1	11	fsl
22-34	C2	5.2	9.6	9.3	25.2	17.7	25.1	7.9	50.3	8.8	11	fsl
34-58	C3	7.1	11.9	9.3	24.1	17.5	23.9	6.2	46.6	10.1	15	fsl
58-64+	C4	7.5	10.4	9.2	25.2	19.2	23.6	4.9	48.6	10.3	18	fsl

pH			ORGANIC MATTER				8A1a	6E1b	6F1a	MOISTURE TENSIONS		
8C1b SATURATED PASTE 1:1	8C1a 1:5	8C1a 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	Elec. Conduc. EC×10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	4B1a 1/10 ATMOS. %	4B1a 1/3 ATMOS. %	4B2 15 ATMOS. %
6.7		7.2	0.46	0.047	9.8		2.7			22.5	10.6	3.8
7.6		7.9	0.17	0.023			0.7			18.7	9.2	3.1
7.7		8.0	0.14				0.7			18.7	9.0	3.5
7.8		7.8	0.06				0.6			18.9	8.8	3.3
7.8		7.9	0.03				0.6			18.4	8.1	3.0

5A2a	EXTRACTABLE CATIONS 5B					BASE SAT. %	SATURATION EXTRACT SOLUBLE 8A				8A
CATION EXCHANGE CAPACITY (- Na)	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	5C3	6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg	6K1a	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil						milliequivalents per liter				
7.5	4.9	1.3	0.9	0.3	0.8	89	8.9	2.4	17.4		24.6
8.1	5.3	1.2	0.8	0.3	0.5	90	3.3	0.4	3.3		21.3
8.5	6.1	1.3	0.5	0.2	0.4	94	2.6	0.2	3.6		21.8
8.3	6.1	1.7	0.4	0.2	0.3	95	0.8	0.2	4.1		21.4
7.3	5.8	1.5	0.3	0.2	0.2	96	1.1	0.2	4.2		21.8

1/ Percent of the whole soil

HONCUT FINE SANDY LOAM
S55Calif-33-12

Sampled by: Fred Eggers, Arnold Knecht, F. G. Stephens, W. G. Harper, R. E. Nelson and F. F. Harradine. Description by: W. G. Harper

Location: On N side of Juniper Avenue 1320' N and 500' E of the SW corner of Sec. 36, T2S, R3W, about 3 miles north of Moreno, Riverside County, California. Sampling date: December 6, 1955.

Elevation: 1840 feet

Precipitation: 15 inches

Classification: Typic Xerorthent, coarse-loamy, mixed, nonacid, thermic.

California Group: I

Vegetation: This has been in potatoes and is now planted to wheat. It is irrigated with Colorado River water. Orange grove across the road looks good.

Parent Material: Alluvium from San Timoteo Badlands.

Physiography: Gently sloping alluvial fan.

Drainage: Good.

HORIZON		DESCRIPTION
Ap	0- 8"	Pale brown (10YR 6/3 dry, dark grayish brown 4/2 moist) fine sandy loam; weakly defined medium to fine crumb structure; hard, friable; moderately permeable; does not effervesce with weak acid; many roots; pH 7.5; clear smooth boundary.
C1	8-22"	Pale brown (10YR 6/3 dry, dark grayish brown 4/2 moist) fine sandy loam; massive; hard, friable; does not effervesce; moderate amount of roots; pH 7.8; abrupt smooth boundary.
C2	22-34"	Pale brown (10YR 6/3 dry, dark grayish brown 4/2 moist) coarse fine sandy loam; massive; slightly hard, very friable; very slight effervescence; moderate amount of roots; pH 7.8; clear smooth boundary.
C3	34-58"	Pale brown (10YR 6/3 dry, grayish brown 5/2 moist) coarse fine sandy loam; massive; slightly hard, very friable; very slight effervescence; few roots; pH 7.8; clear smooth boundary.
C4	58-64"+	Pale brown (10YR 6/3 dry, grayish brown 5/2 moist) sandy loam; massive; slightly hard, very friable; very slight effervescence; pH 7.8.

Remarks: The C1 horizon has characteristics of a tillage pan. Profile contains some mica throughout. It contains a moderate number of angular white quartz fragments up to 1/8" in diameter and angular and subangular fine pebbles of other mixed rock.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Xerorthent, fine-loamy, mixed, calcareous, thermic
SOIL Shedd silty clay loam (taxadjunct) SOIL Nos. S65Calif-27-9 LOCATION Monterey County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65546 - 65551

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	1A2a Coarse fragments >2	1A2a 2 – 19	1A2a 19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76 mm	
0-5	A11	22.0	47.9	30.1	1.3	4.1	3.3	6.5	6.8	19.0	28.9	29.3	15.2	4	26			
5-15	A12	21.2	47.8	31.0	1.2	3.2	2.9	6.2	7.7	18.6	29.2	29.9	13.5	2	29			
15-26	A13	23.3	42.2	34.5	1.2	3.7	3.2	6.4	8.8	17.9	24.3	30.5	14.5	4	31			
26-50	C1ca	35.4	40.9	23.7	0.9	8.0	5.7	9.0	11.8	16.4	24.5	33.2	23.6	2	22			
50-60+	C2	70.4	20.2	9.4	0.2	2.1	2.1	13.2	52.8	7.8	12.4	71.9	17.6	0	9			
50-60+	C2 2/																	

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Bulk density 4A1f 1/3 bar	Bulk density 4A1h Oven dry	Water content 4B1c 1/3 bar	Water content 4B2 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH 8C1b Saturated Paste	pH 8C1a H_2O 1:1	pH 8C1a H_2O 1:10
	Pct.	Pct.		Pct.	Pct.	g/cc	g/cc	Pct	Pct.	in./in.	in./in.			
0-5	2.34	0.230	10		17				25.8				7.8	
5-15	1.32	0.071	19		18				24.6				8.0	
15-26	1.14				19				25.2				8.0	
26-50	0.22				15				34.2				7.9	
50-60+	0.03				1				16.5				8.1	
50-60+									17.0					

Depth (In.)	Extractable bases 6N2a Ca	6O2a Mg	6P2a Na	5B1a 6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 8A1 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K	6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter								mmho/cm
0-5	40.2	6.3	0.6	0.7	47.8			32.5	8.8	2.2	2.1	0.3	0.8	7.4	3.0		1.15
5-15	40.7	7.2	0.4	0.3	48.6			32.2	4.6	1.4	1.8	0.1	-	4.3	2.3		0.72
15-26	39.6	8.1	0.8	0.3	48.8			33.6	10.9	2.1	3.5	0.1	-	3.7	7.1		1.19
26-50	36.0	10.5	3.3	0.4	50.2			32.4	18.2	8.5	27.9	0.2	-	4.4	42.0	1.9	2.85
50-60+	19.4	7.3	3.2	0.2	30.1			18.2	6.4	3.2	20.2	0.1	-	1.8	21.8	2.1	3.02
50-60+								18.6	5.4	2.7	18.9	0.1	-	2.0	19.3		2.68

Depth (In.)	8A Water at Saturation	5D2 Exchangeable Na	5B1b Exch. Na meq./100g.	Gypsum	5C1 Base Sat. NH_4OAc	Clay mineralogy (<0.002 mm.) 7A Mont.	Verm.	Mica	Kaolin.
	Pct.	Pct		Pct.	Pct.	< X-ray >			
0-5	64.6		0.5		100+				
5-15	66.3		0.3		100+				
15-26	65.6		0.6		100+				
26-50	83.0		1.0		100+				
50-60+	56.3	11	2.0		100+				
50-60+	57.4								

1/ Apparent coarse fragments dispersed readily. Hence the characterization sample was ground whole and all chemical and physical data are on a whole soil basis.

2/ C2 horizon material (shale) from which lime coatings were removed.

SHEDD SILTY CLAY LOAM (taxadjunct) 1/
S65Calif-27-9

Location: Monterey County, California, center NE¼ SE¼ NW¼ Sec. 24, T20S, R9E at the top of the watershed at Hamilton Canyon about 10 miles SE of King City. Date of Sampling: May 19, 1965.
Description by: Lewis C. Leifer. Collectors: W. D. Nettleton, B. R. Brasher, C. J. Weisel, R. D. Waggoner, F. J. Pecarich; site selection by T. D. Cook.
Classification: Typic Xerorthent, fine-loamy, mixed, calcareous, thermic. (brunizemic Regosol).
Vegetation: Range, wild oats, soft chess, bur clover, foxtail, brome. Climate: Precipitation 10 inches; mean annual temperature 62°F., January mean 59°F., July mean 68°F. Parent Material: Soft calcareous sandstone and shale, Plio-Pleistocene non-marine. Topography: Moderately steep uplands. Moderately steep, slightly convex, 20 percent slope on south exposure, about 150 feet down from broad ridge top. Elevation: 1250 feet. Drainage: Well drained, permeability moderately slow, runoff medium. Soil Moisture: Very slightly moist, near wilting point or below.
Remarks: The paired samples for Shedd are S65Calif-27-8-1 through 6.

HORIZON	DESCRIPTION
A11 RSL 65546	0 to 5 inches, gray (5Y 6/1) light silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak coarse angular blocky structure; hard, very friable, sticky and plastic; abundant very fine roots, mostly on ped exteriors; many very fine interstitial and few very fine and fine tubular pores; moderately alkaline (pH 8.0), strongly effervescent with disseminated lime; horizon considerably compacted by trampling of cattle, about 1 percent by volume fine shale fragments; gradual smooth boundary.
A12 RSL 65547	5 to 15 inches, gray (5Y 6/1) light silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderately fine subangular blocky structure; slightly hard, very friable, sticky and plastic; plentiful very fine roots; many very fine interstitial, few very fine and common fine tubular pores; moderately alkaline (pH 8.0), violently effervescent with disseminated lime; 1 percent fine shale fragments, A12 and A13 mixed by rodent activity, soil in rodent holes has strong granular structure and somewhat more roots than adjacent soil; gradual smooth boundary.
A13 RSL 65548	15 to 26 inches, gray (5Y 6/1) light silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderate fine subangular blocky structure; slightly hard, very friable, sticky and plastic; plentiful very fine roots; many very fine interstitial and few fine and very fine tubular pores; moderately alkaline (pH 8.0), violently effervescent with disseminated lime; 10 percent by volume fine shale fragments; abrupt irregular boundary with considerable mixing of A13 and C1ca by rodents.
C1ca RSL 65549	26 to 50 inches, white (5Y 8/2) soft shale and sandstone, light olive gray (5Y 6/2) moist; many lime coatings on rock joints; gradual smooth boundary.
C2 RSL 65550	50 to 60 inches, shale as above with few lime coatings on rock joints; shale can be chipped with a spade with some difficulty.

1/ The Shedd series is in a fine-silty, mixed, calcareous, thermic family of Typic Xerorthents. This pedon has more sand coarser than very fine sand than representative of the series.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Xerorthent, fine-silty, mixed, calcareous, thermic
SOIL Shedd silty clay loam SOIL Nos. S65Calif-27-8 LOCATION Monterey County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65538 - 65545

Depth (in.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Noncarbonate clay	* Coarse fragments 1A2a: ≥ 2 Pct.	2 – 19 Pct. of < 76 mm	19 – 76 Pct. of < 76 mm
		Pct. of < 2 mm																
0-5	A11	10.0	58.5	31.5	0.5	0.9	1.0	3.7	3.4	24.2	34.3	30.2	6.1	0	34			
5-12	A12	10.0	56.4	33.6	0.3	0.6	0.8	3.7	4.6	23.1	33.3	30.0	5.4	1	33			
12-23	A13	11.9	54.9	33.2	0.4	0.9	1.1	4.3	5.2	21.8	33.1	29.6	6.7	2	31			
23-30	A14	13.0	54.7	32.3	0.4	1.0	1.6	5.1	4.9	20.8	33.9	28.6	8.1	2	30			
30-50	C1ca	7.9	55.7	36.4	0.1	0.3	0.6	4.9	2.0	17.3	38.4	22.2	5.9	0	36			
50-67+	C2	9.5	56.1	34.4	0.2	1.0	1.1	4.8	2.4	15.9	40.2	21.1	7.1	0	34			
50-67+	C2**																	

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6E1b Carbonate as $CaCO_3$ Pct.	Atterberg limits: Plastic limit Pct. of <0.4 mm	Liquid limit	Plastic index	Bulk density: 4A1g 1/3 bar g/cc	4A1h Oven dry g/cc	3B2 Cm	Water content: Pct.	4B1c 1/3 bar Pct.	4B2 15 bar Pct.	4D1 Extensibility COLEF in./in.	4D1 Extensibility COLE in./in.	pH: 8C1b Saturated Paste	8C1a H_2O 1:1	8C1a H_2O 1:10
0-5	2.10	0.200	11	4				1.18	1.30	1.00		33.6	27.5	0.033	0.033		7.8	
5-12	1.18	0.118	10	6				1.04	1.19	1.00		37.0	23.2	0.045	0.045		8.0	
12-23	1.00			8	37	52	15	0.98	1.12	1.00		38.4	24.4	0.044	0.044		8.0	
23-30	0.71			8				1.00	1.13	1.00		40.0	28.2	0.043	0.043		8.0	
30-50	0.10			2				1.15	1.30	1.00		48.8	38.4	0.042	0.042		7.9	
50-67+	0.06			tr.	48	81	33	1.17	1.33	1.00		47.0	36.2	0.043	0.043		7.8	
50-67+													30.6				7.7	

Depth (in.)	Extractable bases: 6N2a Ca	6O2a Mg	6P2a Na	5B1a 6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 8A1: 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K		6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0-5	46.5	6.3	0.3	0.6	53.7			43.1	6.7	1.3	1.5	0.2		0.8	5.5	1.5		0.81
5-12	46.8	7.1	0.4	0.4	54.7			42.4	4.0	0.9	1.6	0.1		-	4.0	1.2		0.56
12-23	44.9	7.9	0.4	0.4	53.6			38.0	3.6	1.3	1.6	0.1		-	3.6	1.1		0.57
23-30	44.8	9.3	0.8	0.3	55.2			39.9	3.8	1.2	2.7	0.1		-	2.9	3.4		0.76
30-50	38.6	12.6	4.0	0.6	55.8			43.0	6.7	2.9	12.7	0.2		-	2.4	17.5	0.9	2.33
50-67+	32.8	13.4	4.6	0.7	51.5			48.2	7.3	3.9	18.4	0.2		-	1.6	24.0	1.1	3.03
50-67+								43.6										

Depth (in.)	8A Water at Saturation Pct.	5D2 Exchangeable Na Pct.	5B1b Exch. Na meq./100g.	Gypsum Pct.	5C1 Base Sat. NH_4OAc Pct.	Clay mineralogy (<0.002 mm.) 7A: Mont.	Verm.	Mica	Kaolin.	
						< X-ray >				
0-5	66.0		0.2		100+	xxxx			t	
5-12	65.6		0.3		100+					
12-23	68.8		0.3		100+					
23-30	71.8		0.6		100+					
30-50	102	6	2.7		100+					
50-67+	100	6	2.8		100+	xxxx			t	
50-67+										

* Apparent coarse fragments dispersed readily. Hence the characterization sample was ground whole and all of the chemical and physical data are on a whole soil basis.

** C2 horizon material (shale) from which lime coatings were removed.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

SHEDD SILTY CLAY LOAM
S65Calif-27-8

Location: Monterey County, California, center of SE¼ of NW¼ Sec. 11, T20S, R9E, about 9 miles east of King City up Wild Horse Canyon. Coordinate Grid (C65 J10) about 30 feet down from ridge top. Date of Sampling: May 19, 1965.
Described by: Lewis C. Leifer. Collectors: W. D. Nettleton, B. R. Brasher, C. J. Weisel, R. D. Waggoner, F. J. Pecarich; site selection by T. D. Cook.
Classification: Typic Xerorthent, fine-silty, mixed, calcareous, thermic. (brunizemic Regosol).
Vegetation: Range - wild oats, soft chess, bur clover, ripgut brome, small thistles.
Climate: Precipitation 10 inches; mean annual temperature 62°F., January mean 59°F., July mean 68°F. Parent Material: Soft calcareous sandstone and shale, Plio-Pleistocene, non-marine. Topography: Upland. Moderately steep slightly convex slope of 20 percent on south to southwest exposure. Slope becomes much steeper 100 feet below sample site. Elevation: 1250 feet. Drainage: Well drained, permeability is moderately slow, runoff is medium. Soil Moisture: Very slightly moist, near wilting point or below.
Remarks: The paired samples for Shedd are samples #S65Calif-27-9-1 through 5. Slight erosion at sample site but steeper slopes are moderately eroded in the general vicinity. About 3 percent shale fragments throughout. Asterisks indicate horizons sampled for California Division of Highways.

HORIZON	DESCRIPTION
A11 RSL 65538	0 to 5 inches, gray (5Y 6/1) light silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium angular blocky structure with some tendency to weak coarse platy structure due to cattle trampling; hard, very friable, sticky and plastic; plentiful very fine roots, moist on exterior of peds; common very fine interstitial and common very fine tubular pores; moderately alkaline (pH 8.0), strongly effervescent with disseminated lime; about 3 percent fine shale fragments in an A11 and A12; clear smooth boundary.
A12 RSL 65539	5 to 12 inches, gray (5Y 6/1) toward (5Y 5/1) light silty clay loam, very dark grayish brown (2.5Y 3/2) moist; strong medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; plentiful very fine roots mostly on exterior of peds; many very fine interstitial, common very fine, fine and medium tubular pores; moderately alkaline (pH 8.0), strongly effervescent with disseminated lime. A12 and A13 show considerable rodent activity; gradual smooth boundary.
*A13 RSL 65540	12 to 23 inches, gray (5Y 6/1) light silty clay loam, very dark grayish brown (2.5Y 3/2) moist; strong medium subangular blocky structure; slightly hard, very friable, sticky and plastic; few very fine roots; many very fine interstitial and common very fine, fine and medium tubular pores; moderately alkaline (pH 8.0), violently effervescent with disseminated lime; abrupt wavy boundary. 30 percent shale fragments.
A14 RSL 65541	23 to 30 inches, light gray (2.5Y 7/2) light silty clay loam, very dark grayish brown (2.5Y 3/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, sticky and plastic; very few very fine roots; many very fine interstitial and few fine and medium tubular pores; moderately alkaline (pH 8.0), violently effervescent with disseminated lime; gradual smooth boundary.
C1ca RSL 65542	30 to 50 inches, light gray (5Y 7/2) soft shale and sandstone, light olive gray (5Y 6/2) moist; rock, firm but can be broken by hands; joints have many thin lime coatings and are strongly calcareous; interior very weakly calcareous.
*C2 RSL 65543	50 to 67 inches, similar to above but fewer and thinner lime coatings on shale fragments.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Daulton gravelly loam **LOCATION** Riverside County, California

SOIL FAMILY: Lithic Xerorthent, loamy, mixed, nonacid, thermic

SOIL NOS. S57Calif-33-4 **LAB. NOS.** 57488 - 57490

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0- 3	A11	5.4	9.1	5.7	14.4	13.9	43.5	8.0	45.5	21.5	38	1
3- 8	A12	4.0	8.4	6.0	15.0	14.2	41.8	10.6	45.4	20.4	40	1
8-19+	C1	Parent Material										

	pH		ORGANIC MATTER			6I1a	8A1a	6E1b	6J1a	MOISTURE TENSIONS		
8C1b SATURATED PASTE 1:1	1:5	8C1a 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	CO_3 meq/l	Elec. Conduc. mmhos/cm. at 25°C.	$CaCO_3$ equivalent %	HCO_3 meq/l	4B1a 1/10 ATMOS. %	4B1a 1/3 ATMOS. %	4B2 15 ATMOS. %
6.4		6.3	1.07	0.096	11.1	0.0	0.6	0	3.8			5.1
6.2		6.3	0.52	0.048	10.7	0.0	0.4	0	2.0	21.3	15.7	4.9
		Parent Material										

5A2a CATION EXCHANGE CAPACITY (+ Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
12.4	7.5	2.3	2.0	0.5	0.7	85	1.2	0.6	3.5	1.4	1.3	32.2
13.6	7.1	2.8	2.0	0.5	0.3	84	1.3	0.2	1.8	1.1	0.9	24.5
	Parent Material											

1/ Percent of the whole soil

DAULTON GRAVELLY LOAM
S57Calif-33-4

Sampled by: George Borst, R. E. Nelson, Clifford Henry, Arnold Knecht and Fred Eggers. Date: June 4, 1957.

Description by: Fred Eggers.

Location: 150' E of W 1/4 corner of Sec. 27,T5S,R4W, about 4 miles NE of Elsinore, Riverside County, California.

Elevation: 1640'

Precipitation: 10"

Classification: Lithic Xerorthent, loamy, mixed, nonacid, thermic.

California Group: VIII

Vegetation: California sage, wild buckwheat, annual grasses and weeds, and scattered cactus.

Parent Material: Bedford Canyon formation (known locally as Elsinore metamorphic) metamorphic fine grain sandstone.

Physiography: Low rolling hills.

Drainage: Well drained.

HORIZON		DESCRIPTION
S57Calif-33-4-1 A11	0-3"	Brown to dark brown (10YR 5/3-4/3 dry, dark brown 3/3 moist) gravelly loam; moderately defined medium angular blocky with slight indication of platy structure; breaks to weakly defined fine granular; slightly hard when dry, friable when moist; nonsticky and slightly plastic when wet; moderately permeable; many roots; pH 6.0; non-calcareous; many fine pores; clear smooth lower boundary.
S57Calif-33-4-2 A12	3-8"	Brown (7.5YR 5/4 dry, dark yellowish brown 10YR 3/4 moist) gravelly loam; moderately medium angular blocky; to weakly defined fine granular; hard when dry, friable when moist; nonsticky and slightly plastic when wet; moderate permeability; many plant roots; pH 6.2; non-calcareous; many fine pores; diffused irregular lower boundary.
S57Calif-33-4-3 C1	8-19"+	Decomposing metamorphic fine grain sandstone containing a small amount of soil. There are occasional fragmentary weak clay skins; pH 6.2.

CONSECUTIVE PEDON NUMBER C 68 72 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CAGWIN SOIL NO. S68 CALI. 9-21 SAMPLE NO. 8 576-8 583 TAHOE BASIN AREA

SOIL FAMILY TYPIC CRYOPSAMMENT MIXED RIVERSIDE SOIL SURVEY LABORATORY

SAMPLE NO.	DEPTH CM.	HORZ.	SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION 2- .05	SILT .05- .002	CLAY LT .002	SANDS VCS 2-1	CS 1- .5	MS .5- .25	FS .25- .10	VFS .1- .05	CSI .05- .02	FSI .02- .002	SILTS CO. 2- .2U	CLAYS FINE LT .2U	1A2A INT. CARBO NATE 3A1A	-COARSE FRAGMENTS- II PCT. .2-.02 WHOLE SOIL	I OF 75-20 PCT.	II OF LT 75	III 5-2
			PERCENT OF LESS THAN 2MM														--A	--Z	
8 576	5- 0	01															--	--	
8 577	0- 8	A11	81.1	14.7	4.2	11.9	23.5	14.2	21.4	10.1	8.2	6.5				28.8	17A	--	17Z	N
8 578	8- 20	A12	79.2	16.3	4.5	10.2	22.7	13.9	21.3	11.1	8.9	7.4				30.5	14A	--	14Z	N
8 579	20- 46	AC	85.4	10.3	4.3	15.6	28.0	14.7	19.5	7.6	5.6	4.7				22.5	26*	--	19Z	N
8 580	46- 69	C 1	83.6	11.6	4.8	11.7	25.3	15.3	21.8	9.5	6.4	5.2				26.3	30*	--	23Z	N
8 581	69- 91	C 2	83.2	12.2	4.6	16.3	26.9	13.9	17.9	8.2	6.8	5.4				23.8	38*	--	32Z	N
8 582	91-120	C 3	88.9	8.6	2.5	28.0	28.8	12.5	13.2	6.4	5.1	3.5				18.0	43A	--	43Z	N
8 583	0- 20	A															19A	--	19Z	N

SAMPLE NO.	DEPTH CM.	ORG.MATTER CAR- BON 6A1A -PERCENT-	NITRO GEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	2-20 6E1B	SESQUIOXIDES DI-CIT FE 6C2B -PERCENT-	EXT AL 6G7A	PYROP EXT FE 6C5A	AL 6G5A	ATTERBERG L I M I T LL 4F2 PCT.	PL 4F1 NO.40	BULK DENSITY EST. 1/3 BAR 4A1F GRAMS	DRY 4A1F PER CC 4A1H	CM 3B2	WATER CONTENT 1/10 BAR 4B1C -PERCENT-	1/3 BAR 4B1C	15 BAR 4B2	EXTNSBLTY LEF 4D1 -PERCENT-	LE 4D1
8 576	5- 0											0.40		1.00					
8 577	0- 8	1.92	0.068							NP	NP		1.24 1.24	0.91		14.5	3.6		
8 578	8- 20	1.16	0.046										1.05 1.05	0.94		13.5	2.7		
8 579	20- 46	0.80								NP	NP		1.35 1.35	0.85		7.1	2.8		
8 580	46- 69	0.37											1.37 1.37	0.82		6.6	2.5		
8 581	69- 91	0.20											1.34 1.34	0.76		6.8	2.3		
8 582	91-120												1.81 1.81	0.66		8.8	1.3		
8 583	0- 20		0.058									1.15		0.91			3.3		

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6O2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACI- DITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 5A3A	NH4- OAC 5A6A	BASE SATURATION SUM+ ACI- DITY	SUM+ AL	NH4- OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA- CL2 8C1E
		MEQ/100G									PERCENT					
8 576	5- 0															
8 577	0- 8	3.6	0.3	TR	0.3	4.2	3.2		7.4	8.0	57		53		6.2	5.5
8 578	8- 20						6.5		6.5						6.1	5.4
8 579	20- 46						4.5		4.5						6.0	5.2
8 580	46- 69	1.3	0.2	TR	0.2	1.7	2.8		4.5	4.2	38		41		5.8	5.0
8 581	69- 91	1.1	0.1	0.1	0.2	1.5	2.2		3.7	3.5	41		43		5.8	5.0
8 582	91-120	0.2	0.1	0.1	0.1	0.5			0.5	1.7	100+		29		5.9	5.2
8 583	0- 20														6.2	5.4

SAMPLE NO	DEPTH CM.	CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I	7A2E II	7A2E III	7A2E IV	DTA 7A3 -PERCENT-	7A3	LT. 0.0002 MM X RAY 7A2E I	7A2E II	7A2E III	MINERAL CODE	RELATIVE AMOUNT
8 576	5- 0											1 TRACE
8 577	0- 8	VR	3	KK	2						VR VERMICLT	2 SMALL
8 578	8- 20										KK KAOLINIT	3 MODERATE
8 579	20- 46	VR	3	KK	2							4 ABUNDANT
8 580	46- 69	VR	3	KK	3							5 DOMINANT
8 581	69- 91											6 INDETER.
8 582	91-120											
8 583	0- 20											

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.
N=NOT DETERMINED.
*=THE 75-250MM FRACTION IS INCLUDED.

CAGWIN LOAMY SAND
S68Calif-9-21

Location: Tahoe Basin, El Dorado County, California; northwest corner of SW¼ of sec. 8, T. 12 N., R. 18 E., ½ mile north of Tahoe Blvd., 50 feet east of old logging road on Tahoe Mountain. Date of Sampling: August 5, 1968.
Description by: G. M. Kennedy. Collectors: L. N. Langan, G. L. Anderson, L. I. Larsen, D. Palmquist, B. R. Brasher, W. D. Nettleton, J. H. Rogers.
Classification: Typic Cryopsamment, mixed.
Vegetation: Not cultivated; Jeffrey pine, incense cedar, white fir, squaw carpet, greenleaf manzanita, mountain whitethorn, chinquapin, lupine. Climate: Precipitation is 35 inches. Mean annual temperature is 42°F., to 45°F., January 26°F., July 61°F. Parent Material: Granodiorite residuum. Topography: Mountainous uplands, 35 percent east slope. Elevation: 6550 feet. Drainage: Somewhat excessively drained; runoff is rapid; permeability is rapid. Soil Moisture: Dry throughout.
Remarks: Field determinations for pH by Hellige-Truog triplex indicator. Composite A taken from 20 satellite samples.

HORIZON	DESCRIPTION
	(5-0 cm.)
O1 RSL 68576	2 to 0 inches, squaw carpet and pine needle litter.
	(0-8 cm.)
A11 RSL 68577	0 to 3 inches, brown (10YR 5/3) loamy sand, dark brown (10YR 3/3) moist; moderate fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine, few fine interstitial pores; 10 percent ½ inch minus gravel; slightly acid (pH 6.3); clear wavy boundary.
	(8-20 cm.)
A12 RSL 68578	3 to 8 inches, brown (10YR 5/3) loamy sand, dark brown (10YR 3/3) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine, common coarse roots; many very fine, few fine interstitial pores; 10 percent ½ inch minus gravel; medium acid (pH 6.0); clear wavy boundary.
	(20-46 cm.)
AC RSL 68579	8 to 18 inches, yellowish brown (10YR 5/4) light loamy sand, dark yellowish brown (10YR 3/4) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, medium and coarse roots; many very fine, few fine interstitial pores; 10 percent 1½ inch minus gravel; 5 percent fragments greater than 3 inches; medium acid (pH 6.0); gradual smooth boundary.
	(46-69 cm.)
C1 RSL 68580	18 to 27 inches, light yellowish brown (10YR 6/4) sand, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine, fine, medium and coarse roots; many very fine, few fine interstitial pores; 10 percent ½ inch minus gravel; 5 percent fragments greater than 3 inches; medium acid (pH 6.0); clear wavy boundary.
	(69-91 cm.)
C2 RSL 68581	27 to 36 inches, light yellowish brown (10YR 6/4) gravelly coarse sand, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine, common medium and coarse roots; many very fine, few fine interstitial pores; 30 percent gravel; 5 percent fragments greater than 3 inches; strongly acid (pH 5.5); abrupt wavy boundary.
	(91-120 cm.)
C3 RSL 68582	36 to 48 inches, white (10YR 8/1, 8/2) grus; massive; few very fine, fine and medium roots in cracks; medium acid (pH 6.0).

CONSECUTIVE PEDON NUMBER C 68 73 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CAGWIN SOIL NO. S68 CALI. 9-24 SAMPLE NO. 8 584-8 592 TAHOE BASIN AREA

SOIL FAMILY TYPIC CRYOPSAMMENT MIXED RIVERSIDE SOIL SURVEY LABORATORY

SAMPLE NO.	DEPTH CM.	HORZ.	SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2-.05	SILT .05-.002	CLAY LT .002	SANDS VCS 2-1	CS 1-.5	MS .5-.25	FS .25-.10	VFS .1-.05	SILTS CSI .05-.02	FSI .02-.002	CLAYS CO. 2-.2U	FINE LT .2U	CARBONATE 3A1A.02	1A2A INT. II .2-.02	COARSE FRAGMENTS PCT. OF WHOLE 20 I 75-20	II 20-5	III 5-2
			PERCENT OF LESS THAN 2MM														SOIL PCT. OF LT 75		
																	--A	--	--
8 584	3- 0	O1+O2															---	---	---
8 585	0- 10	A11	83.7	13.4	2.9	24.1	22.7	9.9	16.9	10.1	7.2	6.2				26.2	23A	---	23Z	N
8 586	10- 20	A12	84.8	12.4	2.8	25.4	23.5	10.0	17.3	8.6	6.3	6.1				24.3	39A	---	39Z	N
8 587	20- 30	AC	84.9	12.1	3.0	23.3	23.1	10.3	18.5	9.7	6.4	5.7				26.1	33A	---	33Z	N
8 588	30- 51	C 1	85.1	12.3	2.6	28.6	24.0	9.4	15.7	7.4	6.4	5.9				22.1	39A	---	39Z	N
8 589	51- 66	C 2	88.4	8.9	2.7	34.9	25.1	8.8	13.5	6.1	4.4	4.5				17.3	44A	---	44Z	N
8 590	66- 94	C 3															43A	---	43Z	N
8 591	94-110	C 4															56A	---	56Z	N
8 592	0- 25	A															32A	---	32Z	N

SAMPLE NO.	DEPTH CM.	ORG.MATTER CARBON 6A1A -PERCENT-	NITROGEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	2-20 6E1B	SESQUIOXIDES DI-CIT FE 6C2B -PERCENT-	EXT AL 6G7A	PYROP FE 6C9A	EXT AL 6G5A	ATTERBERG LIMIT LL 4F2 PCT.	PL 4F1 NO.40	EST. 1/3 4A1F GRAMS	BULK DENSITY 1/3 BAR 4A1F PER CC	DRY 4A1H	CM 3B2	WATER CONTENT 1/10 BAR 4B1C -PERCENT-	1/3 BAR 4B1C	15 BAR 4B2	EXTNSBLTY LEF 4D1 -PERCENT-	LE 4D1
8 584	3- 0																			
8 585	0- 10	3.39	0.109										0.92	1.03	0.90		20.1	5.2	3.8	3.4
8 586	10- 20	1.65	0.054										1.28	1.28	0.77		10.6	3.2		
8 587	20- 30	1.17								NP	NP		1.29	1.31	0.80		9.6	3.0	0.5	0.4
8 588	30- 51	0.66											1.32	1.32	0.76		6.5	2.4		
8 589	51- 66	0.37											1.39	1.39	0.71		4.6	2.2		
8 590	66- 94												1.53	1.53	0.70		2.8	1.6		
8 591	94-110												1.74	1.74	0.54		4.8	1.3		
8 592	0- 25	2.74										1.25			0.82			4.3		

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6O2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACI-DITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 5A3A	NH4-OAC 5A6A	BASE SUM+ ACI-DITY	SATURATION SUM+ AL	NH4-OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA-CL2 8C1E
		MEQ/100G									PERCENT					
8 584	3- 0															
8 585	0- 10	4.0	0.7	0.1	0.4	5.2	9.0		14.2	12.5	37		42		5.8	4.9
8 586	10- 20	2.5	0.3	TR	0.3	3.1	8.5		11.6	9.4	27		33		5.8	4.9
8 587	20- 30	1.6	0.1	TR	0.2	1.9	7.1		9.0	7.2	22		27		5.7	5.0
8 588	30- 51	1.2	0.2	TR	0.2	1.6	6.3		7.9	5.9	21		28		5.7	5.0
8 589	51- 66	0.7	0.1	0.1	0.2	1.1	4.1		5.2	4.0	21		27		5.8	5.1
8 590	66- 94	0.1	0.1	0.1	0.2	0.5			0.5	2.5	100+		20		5.9	5.2
8 591	94-110	0.2	0.1	0.1	0.2	0.6	2.8		3.4	2.7	18		22		5.8	5.0
8 592	0- 25														5.6	4.8

SAMPLE NO	DEPTH CM.	CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I	7A2E II	7A2E III	7A2E IV	DTA 7A3 -PERCENT-	7A3	LT. 0.0002 MM MINERAL X RAY 7A2E I	7A2E II	7A2E III	CODE	RELATIVE AMOUNT
8 584	3- 0											1 TRACE
8 585	0- 10										VR VERMICLT	2 SMALL
8 586	10- 20										KK KAOLINIT	3 MODERATE
8 587	20- 30	VR 3 KK 3										4 ABUNDANT
8 588	30- 51											5 DOMINANT
8 589	51- 66											6 INDETER.
8 590	66- 94											
8 591	94-110											
8 592	0- 25											

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

CAGWIN LOAMY COARSE SAND
S68Calif-9-24

Location: Tahoe Basin, El Dorado County, California; 0.7 miles east and 0.2 miles north of the southwest corner, sec. 12, T. 12 N., R. 18 E., 80 feet north of High Meadow Road, 4 miles south of Stateline. Date of Sampling: August 8, 1968.
Description by: L. N. Langan. Collectors: L. I. Larsen, B. R. Brasher, W. D. Nettleton, J. H. Rogers.
Classification: Typic Cryopsamment, mixed.
Vegetation: Not cultivated. Jeffrey pine, white fir, greenleaf manzanita. Climate: Precipitation is 35 inches. Mean annual temperature is 42°F., January 26°F., July is 60°F. Parent Material: Granodiorite residuum. Topography: Mountainous upland, 40 percent southwest slope. Elevation: 6500 feet. Drainage: Somewhat excessively drained; runoff is rapid; permeability is rapid. Soil Moisture: Dry.
Remarks: Field determinations for pH by Hellige-Truog triplex indicator. Composite A taken from 10 satellite samples.

HORIZON	DESCRIPTION
	(3-0 cm.)
01 & 02 RSL 68584	1 to 0 inches, pine litter and duff, abrupt smooth boundary.
	(0-10 cm.)
A11 RSL 68585	0 to 4 inches, dark grayish brown (10YR 4/2) loamy coarse sand, very dark brown (10YR 2/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and fine interstitial pores; strongly acid (pH 5.5); clear smooth boundary.
	(10-20 cm.)
A12 RSL 68586	4 to 8 inches, grayish brown (10YR 5/2) loamy coarse sand, very dark brown (10YR 2/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine, few medium and coarse roots; many very fine and fine interstitial pores; medium acid (pH 5.7); clear wavy boundary.
	(20-30 cm.)
AC RSL 68587	8 to 12 inches, grayish brown (10YR 5/2) loamy coarse sand, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine, few medium and coarse roots; many very fine and fine interstitial pores; medium acid (pH 5.8); clear wavy boundary.
	(30-51 cm.)
C1 RSL 68588	12 to 20 inches, pale brown (10YR 6/3) coarse sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine, few fine and medium roots; many very fine and fine interstitial pores; medium acid (pH 5.9); clear smooth boundary.
	(51-66 cm.)
C2 RSL 68589	20 to 26 inches, pale brown (10YR 6/3) gravelly coarse sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine, few fine and medium roots; many very fine and fine interstitial pores; medium acid (pH 5.8); abrupt wavy boundary.
	(66-94 cm.)
C3 RSL 68590	26 to 37 inches, white and gray (10YR 8/2, 5/1) grus; very few very fine roots; strongly acid (pH 5.5).
	(94-110 cm.)
C4 RSL 68591	37 to 44 inches, white and gray (10YR 8/2, 6/1) less weathered grus.

CONSECUTIVE PEDON NUMBER C 68 70 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CAGWIN DEEP VARIANT SOIL NO. S68 CALI. 9-27 SAMPLE NO. 8 553-8 564 TAHOE BASIN AREA

SOIL FAMILY TYPIC CRYOPSAMMENT MIXED RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 181B,3A1 1A2A

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION SAND 2- .05	SILT .05- .002	CLAY LT .002	SANDS VCS 2-1	CS 1- .05	MS .5- .25	FS .25- .10	VFS .1- .05	SILTS CSI .05- .02	FSI .02- .002	CLAYS CO. 2- .2U	FINE LT .2U	CARBONATE 3A1A.02	INT. II .2- OF WHOLE SOIL	COARSE FRAGMENTS I 75- PCT.	II 20-5 PCT. OF	III 5-2 LT 75
			PERCENT OF LESS THAN 2MM													--A			
8 553	3- 0	01																	
8 554	0- 5	A11	86.5	9.3	4.2	28.6	30.8	11.2	11.9	4.0	4.1	5.2				13.1	4A	--	4Z	N
8 555	5- 15	A12	80.8	13.5	5.7	14.7	24.2	13.7	19.2	9.0	6.9	6.6				25.1	23A	5	18Z	N
8 556	15- 20	A13	79.3	13.7	7.0	20.0	26.0	12.2	14.7	6.4	6.3	7.4				19.4	22A	--	22Z	TR
8 557	20- 33	C 1	77.3	14.4	8.3	14.8	26.7	13.8	16.5	5.5	6.5	7.9				19.5	22A	--	22Z	N
8 558	33- 51	C 2	78.7	13.1	8.2	19.1	26.3	12.4	14.5	6.4	5.6	7.5				18.8	29A	6	23Z	N
8 559	51- 89	C 3	78.8	12.7	8.5	19.3	26.3	12.9	14.5	5.8	5.4	7.3				17.8	54A	32	22Z	N
8 560	89-140	C 4	89.9	5.6	4.5	18.3	45.5	13.4	10.2	2.5	2.3	3.3				8.7	47A	17	30Z	N
8 561	140-185	2C 5	89.1	7.4	3.5	18.4	30.9	17.5	17.1	5.2	3.2	4.2				16.4	28A	13	15Z	N
8 562	185-200	3C 6	91.7	5.7	2.6	27.2	36.5	11.3	12.6	4.1	2.8	2.9			--	13.2	43A	7	36Z	N
8 563	0- 20	A															27A	--	27Z	N
8 564	0- 20	2C 5															--A	--	--	--

SAMPLE NO.	DEPTH CM.	ORG.MATTER CAR- BON 6A1A	NITRO GEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B	2-20 6E1B	SESQUIOXIDES DI-CIT EXT FE 6C2B	PYROP EXT AL 6G7A	FE 6C5A	AL 6G5A	ATTERBERG LIMIT EST. LL 4F2	PL 4F1	BULK DENSITY 1/3 BAR 4A1F	DRY 4A1F	CM 4A1H	WATER CONTENT 1/10 BAR 3B2	1/3 BAR 4B1C	15 BAR 4B1C	EXTNSBLITY LEF 4B2	LE 4D1	4D1
		-PERCENT-		-PERCENT-		-----PERCENT------				PCT.		NO.40 GRAMS PER CC						-----PERCENT---		-PERCENT-
8 553	3- 0											0.40								
8 554	0- 5	5.85	0.190				TR			NP	NP		0.45	0.60	0.99		60.7	8.2	10.1	10.0
8 555	5- 15	1.42	0.063										1.47	1.47	0.86		11.5	3.9		
8 556	15- 20	1.25	0.052							NP	NP		1.40	1.40	0.87		10.0	4.7		
8 557	20- 33	0.48											1.45	1.45	0.86		10.9	4.7		
8 558	33- 51	0.47											1.35	1.36	0.82		11.0	4.6	0.2	0.2
8 559	51- 89	0.27											1.35	1.35	0.63		12.1	5.0		
8 560	89-140	0.12								NP	NP		1.45	1.47	0.67		10.5	3.3	0.5	0.3
8 561	140-185	0.07										1.45			0.82			3.0		
8 562	185-200											1.45			0.71			2.4		
8 563	0- 20	2.49										1.45			0.83			5.2		
8 564	0- 0																			

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6O2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACI- DITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 5A3A	NH4- OAC 5A6A	BASE SATURATION SUM+ ACI- DITY	SUM+ AL	NH4- OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA- CL2 8C1E
		MEQ/100G									PERCENT					
8 553	3- 0															
8 554	0- 5	4.5	0.8	0.1	0.3	5.7	8.8	0.5	14.5	15.6	39	92	37		5.0	4.4
8 555	5- 15	2.1	0.3	TR	0.3	2.7	6.3		9.0	8.4	30		33		5.8	4.9
8 556	15- 20	1.9	0.2	TR	0.3	2.4	7.7		10.1	8.6	24		28		5.8	5.0
8 557	20- 33	1.4	0.1	0.1	0.2	1.8	5.3		7.1	6.1	25		30		5.8	4.9
8 558	33- 51	1.6	0.1	0.1	0.2	2.0	5.1		7.1	6.7	28		30			
8 559	51- 89	2.3	0.2	0.1	0.2	2.8	4.5		7.3	6.9	38		41		5.8	5.1
8 560	89-140	1.6	0.2	0.1	0.3	2.2	2.6		4.8	5.0	46		44		6.2	5.3
8 561	140-185	1.4	0.2	0.1	0.3	2.0	1.0		3.0	3.9	67		51		6.0	5.3
8 562	185-200	1.1	0.1	0.1	0.2	1.5	1.0		2.5	3.9	60		38		5.9	5.1
8 563	0- 20														6.0	5.2
8 564	0- 0															

SAMPLE NO	DEPTH CM.	CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I	7A2E II	7A2E III	7A2E IV	DTA 7A3 -PERCENT-	L.T. 0.0002 MM X RAY 7A3	7A2E I	7A2E II	7A2E III	MINERAL CODE	RELATIVE AMOUNT
8 553	3- 0											1 TRACE
8 554	0- 5	VR 3	KK 2								VR VERMICLT	2 SMALL
8 555	5- 15										KK KAOLINIT	3 MODERATE
8 556	15- 20	VR 3	KK 2								MI MICA	4 ABUNDANT
8 557	20- 33										VM VM/MICA	5 DOMINANT
8 558	33- 51											6 INDETER.
8 559	51- 89											
8 560	89-140	MI 2	KK 2	VM 2								
8 561	140-185											
8 562	185-200											
8 563	0- 20											
8 564	0- 0											

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

CAGWIN LOAMY COARSE SAND, DEEP VARIANT
S68Calif-9-27

Location: Tahoe Basin, El Dorado County, California; 900 feet west and 500 feet north of southwest corner, sec. 21, T. 12 N., R. 18 E., 1 mile northeast of Meyers, north of Pioneer Trail Road. Date of Sampling: August 9, 1968.
Description by: L. N. Langan. Collectors: J. H. Rogers, L. I. Larsen, G. M. Kennedy, G. L. Anderson, D. Palmquist, B. R. Brasher, W. D. Nettleton.
Classification: Typic Cryopsamment, mixed. (Pedon lacks a paralithic contact.)
Vegetation: Not cultivated. Jeffrey pine, white fir, lodgepole pine, big sagebrush, mules ear, mountain whitethorn, greenleaf manzanita, bitterbrush, gooseberry, squirrel tail.
Climate: Precipitation is 30 to 35 inches. Mean annual temperature is 43°F., January is 27°F., July 61°F. Parent Material: Mixed alluvium. Topography: Crest of lateral moraine, pre-Tahoe?, 1 percent slope. Elevation: 6528 feet. Drainage: Somewhat excessively drained; runoff is very slow; permeability is rapid. Soil Moisture: Dry.
Remarks: Field determinations for pH by Hellige-Truog triplex indicator. Pit dug 40 feet west of Elmira S67-Calif-9-12. Composite A taken from 10 satellite samples. Bottom three horizons highly weathered, bottom horizon the most.

HORIZON	DESCRIPTION
	(3-0 cm.)
O1	1 to 0 inches, pine needle litter.
RSL 68553	(0-5 cm.)
A11	0 to 2 inches, dark grayish brown (10YR 4/2) loamy coarse sand, dark brown (10YR 3/3)
RSL 68554	moist; moderate very fine and fine granular structure; soft, very friable, nonsticky, and nonplastic; many very fine roots; many very fine and fine interstitial pores; horizon contains partially decomposed pine litter; strongly acid (pH 5.5); clear wavy boundary.
	(5-15 cm.)
A12	2 to 6 inches, grayish brown (10YR 5/2) loamy coarse sand, very dark grayish brown
RSL 68555	(10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; 10 percent gravel; medium acid (pH 5.8); abrupt smooth boundary.
	(15-20 cm.)
A13	6 to 8 inches, brown (10YR 5/3) loamy coarse sand, dark brown (10YR 3/3) moist; weak
RSL 68556	fine and medium platy structure; soft, very friable, nonsticky and nonplastic; many very fine, few fine and medium roots; many very fine and fine interstitial pores; 10 percent gravel; medium acid (pH 5.8); abrupt wavy boundary.
	(20-33 cm.)
C1	8 to 13 inches, pale brown (10YR 6/3) loamy coarse sand, brown (10YR 4/3) moist; massive;
RSL 68557	soft, very friable, nonsticky and nonplastic; many very fine and fine, common medium and coarse roots; many very fine and fine interstitial pores; 10 percent gravel; medium acid (pH 5.8); clear wavy boundary.
	(33-51 cm.)
C2	13 to 20 inches, pale brown (10YR 6/3) loamy coarse sand, brown (10YR 4/3) moist;
RSL 68558	massive; soft, very friable, nonsticky and nonplastic; many very fine and fine, common medium and coarse roots; many very fine and fine interstitial pores; 10 percent gravel; medium acid (pH 5.8); gradual smooth boundary.
	(51-89 cm.)
C3	20 to 35 inches, pale brown (10YR 6/3) gravelly heavy coarse sand, brown (10YR 4/3)
RSL 68559	moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine, common medium and coarse roots; many very fine and fine interstitial pores; 15 percent gravel; medium acid (pH 5.8); clear wavy boundary.
	(89-140 cm.)
C4	35 to 55 inches, light yellowish brown (10YR 6/4) gravelly coarse sand, brown (10YR
RSL 68560	4/3) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine, common fine, medium and coarse roots; many very fine and fine interstitial pores; 20 percent gravel; medium acid (pH 5.8); abrupt smooth boundary.
	(140-185 cm.)
IIC5	55 to 72 inches, pale brown (10YR 6/3) gravelly coarse sand, brown (10YR 4/3) moist;
RSL 68561	massive; soft, very friable, nonsticky and nonplastic; many very fine, common fine, few medium and coarse roots; many very fine and fine interstitial pores; 20 percent gravel; medium acid (pH 5.8); abrupt smooth boundary.
	(185-200 cm.)
IIIC6	72 to 78 inches, very pale brown (10YR 7/3) very gravelly coarse sand, grayish brown
RSL 68562	(10YR 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine, common fine, few medium and coarse roots; many fine, few very fine interstitial pores; 55 percent gravel and 5 percent cobbles; some gravel and cobbles have silica and clay coatings on underside; medium acid (pH 5.8).

CONSECUTIVE PEDON NUMBER C 68 74 CHARACTERIZATION DATA

SOIL SERIES CAGWIN SOIL NO. S68 CALI. 9-32 SAMPLE NO. 8 593-8 601 TAHOE BASIN AREA

SOIL FAMILY TYPIC CRYOPSAMMENT MIXED RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION <2 SAND 2-.05	SILT .05-.002	CLAY <.002	SANDS VCS 2-1	SANDS CS 1-.5	SANDS MS .5-.25	SANDS FS .25-.10	SILTS VFS .1-.05	SILTS CSI .05-.02	SILTS FSI .02-.002	CLAYS CO. 2-.2U	CLAYS FINE LT .2U	CARBONATE 3A1A	1A2A INT. II .2-.02	COARSE FRAGMENTS PCT. OF WHOLE 20 I 75-20	II 20-5	III 5-2
			PERCENT OF LESS THAN 2MM														SOIL PCT. OF LT 75		
8 593	0- 5	A11	86.7	10.6	2.7	26.4	21.9	10.7	18.9	8.8	5.2	5.4				24.0	19A --	19Z	N
8 594	5- 13	A12	81.2	15.4	3.4	23.3	19.0	9.9	18.3	10.7	7.5	7.9				28.4	14A --	14Z	N
8 595	13- 33	C 1	82.4	14.3	3.3	20.4	21.4	10.7	19.9	10.0	6.8	7.5				27.2	17A --	17Z	N
8 596	33- 51	C 2	82.9	13.7	3.4	22.6	21.8	10.4	19.0	9.1	1.5	12.2				20.1	19A --	19Z	N
8 597	51- 66	C 3	81.7	15.0	3.3	18.4	21.3	10.7	21.4	9.9	7.3	7.7				28.0	20A --	20Z	N
8 598	66- 76	C 4															15A --	15Z	N
8 599	76- 97	C 5													--	--	21A --	21Z	N
8 600	97-115	C 6															16A --	16Z	N
8 601	0- 13	A															13A --	13Z	N

SAMPLE NO.	DEPTH CM.	ORG.MATTER CARBON 6A1A -PERCENT-	NITROGEN 6B1A -PERCENT-	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	CARBONATE AS CACO3 2-20 6E1B -PERCENT-	SESQUIOXIDES DI-CIT EXT FE 6C2B -PERCENT-	SESQUIOXIDES DI-CIT EXT AL 6G7A -PERCENT-	SESQUIOXIDES PYROP EXT FE 6C5A -PERCENT-	SESQUIOXIDES PYROP EXT AL 6G5A -PERCENT-	ATTERBERG L I M I T LL 4F2 PCT.	ATTERBERG PL 4F1 NO.40	BULK DENSITY EST. 1/3 BAR 4A1F GRAMS PER CC	BULK DENSITY 1/3 BAR 4A1F GRAMS PER CC	BULK DENSITY DRY 4A1H GRAMS PER CC	CM 3B2	WATER CONTENT 1/10 BAR 4B1C -PERCENT-	WATER CONTENT 1/3 BAR 4B1C -PERCENT-	WATER CONTENT 15 BAR 4B2 -PERCENT-	EXTNSBLTY LEF 4D1 -PERCENT-	EXTNSBLTY LE 4D1 -PERCENT-
8 593	0- 5	2.25	0.074										1.00	1.10	0.92		12.0	3.7	3.2	3.0
8 594	5- 13	1.18	0.042										1.17	1.18	0.93		8.2	3.2	0.3	0.3
8 595	13- 33	0.52								NP	NP		1.35	1.35	0.90		4.9	2.4		
8 596	33- 51	0.24											1.39	1.39	0.89		5.5	2.4		
8 597	51- 66	0.27											1.44	1.44	0.88		5.8	2.4		
8 598	66- 76	0.23					0.1						1.39	1.39	0.91		5.4	2.9		
8 599	76- 97						TR						1.49	1.49	0.87		4.3	2.1		
8 600	97-115												2.15	2.15	0.86		1.7	1.8		
8 601	0- 13	1.92										1.10			0.94			3.5		

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6O2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACI-DITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 5A3A	C NH4-OAC 5A6A	BASE SATURATION SUM+ ACI- DITY	BASE SATURATION SUM+ AL	BASE SATURATION NH4-OAC 5C1	PH NAF 2 MIN 8C1D	PH H2O 1/1 8C1A	PH CA-CL2 8C1E
		MEQ/100G									PERCENT					
8 593	0- 5	3.6	0.3	0.1	0.2	4.2	7.7		11.9	9.8	35		43		5.8	5.0
8 594	5- 13	2.1	0.1	TR	0.2	2.4	6.5		8.9	8.3	27		29		5.8	5.1
8 595	13- 33	0.7	0.1	0.1	0.1	1.0	5.5		6.5	5.6	15		18		5.7	4.9
8 596	33- 51	0.8	0.1	TR	0.1	1.0	3.9		4.9	4.0	21		26		5.7	5.0
8 597	51- 66	0.5	0.1	TR	0.2	0.8	3.7		4.5	4.3	19		20		5.7	5.0
8 598	66- 76	0.5	0.1	0.1	0.2	0.9	2.6	0.6	3.5	4.7	26	60	19		5.5	4.8
8 599	76- 97	0.5	0.1	TR	0.2	0.8	2.8	0.4	3.6	3.6	23	68	24		5.6	4.8
8 600	97-115	0.1	TR	0.1	0.1	0.3	2.0	0.3	2.3	2.9	14	52	11		5.5	4.8
8 601	0- 13														5.9	5.1

CLAY MINERALOGY

SAMPLE NO	DEPTH CM.	LESS THAN 0.002 MM X RAY 7A2E I	7A2E II	7A2E III	7A2E IV	DTA 7A3 -PERCENT-	7A3	L.T. 0.0002 MM MINERAL X RAY 7A2E I	7A2E II	7A2E III	CODE	RELATIVE AMOUNT
8 593	0- 5											1 TRACE
8 594	5- 13										VR VERMICLT	2 SMALL
8 595	13- 33	VR 3		KK 3							KK KAOLINIT	3 MODERATE
8 596	33- 51											4 ABUNDANT
8 597	51- 66											5 DOMINANT
8 598	66- 76											6 INDETER.
8 599	76- 97											
8 600	97-115											
8 601	0- 13											

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

CAGWIN LOAMY SAND
S68Calif-9-32

Location: Tahoe Basin, El Dorado County, California; 1.3 miles south and 0.8 miles east of the northwest corner sec. 1, T.12N., R.18E., 125 feet south of apex of access road to Heavenly Valley Ski Lodge. Date of Sampling: August 13, 1968.
Description by: J. H. Rogers. Collectors: L. I. Larsen, L. C. Leifer, B. R. Brasher, W. D. Nettleton, J. H. Rogers.
Classification: Typic Cryopsamment, mixed.
Vegetation: Red fir, western white pine, Jeffrey pine, prostrate manzanita. Climate: Precipitation is 40 inches. Mean annual temperature is 41°F., January 25°F., July 60°F. Parent Material: Granodiorite residuum. Topography: Mountainous uplands, 25 percent north 65° west slope. Elevation: 8000 feet. Drainage: Somewhat excessively drained; runoff is medium; permeability is rapid. Soil Moisture: Moist to 2 inches, dry below.
Remarks: Field determinations for pH by Hellige-Truog triplex indicator. Composite A taken from 10 satellite samples. Soil temperature at 20 inches 60°F., air 62°F. 10 percent rock outcrops.

HORIZON	DESCRIPTION
	(0-5 cm.)
A11 RSL 68593	0 to 2 inches, dark grayish brown (10YR 4/2) loamy sand, very dark grayish brown (10YR 3/2) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine and fine interstitial pores; strongly acid (pH 5.5); abrupt smooth boundary.
	(5-13 cm.)
A12 RSL 68594	2 to 5 inches, grayish brown (10YR 5/2) loamy sand, very dark grayish brown (10YR 3/2) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; medium acid (pH 6.0); abrupt smooth boundary.
	(13-33 cm.)
C1 RSL 68595	5 to 13 inches, pale brown (10YR 6/3) loamy sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine, fine, medium and coarse roots; many very fine and fine interstitial pores; medium acid (pH 6.0); clear smooth boundary.
	(33-51 cm.)
C2 RSL 68596	13 to 20 inches, very pale brown (10YR 7/3) loamy sand, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine, fine, medium and coarse roots; many very fine and fine interstitial pores; medium acid (pH 6.0); clear smooth boundary.
	(51-66 cm.)
C3 RSL 68597	20 to 26 inches, light gray (2.5Y 7/2) loamy coarse sand, light brownish gray (2.5Y 6/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine, fine, medium and coarse roots; many very fine and fine interstitial pores; medium acid (pH 6.0); clear smooth boundary.
	(66-76 cm.)
C4 RSL 68598	26 to 30 inches, light gray (2.5Y 7/2) loamy coarse sand, light brownish gray (2.5Y 6/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine, fine, medium and few coarse roots; many very fine and fine interstitial pores; medium acid (pH 6.0); abrupt wavy boundary.
	(76-97 cm.)
C5 RSL 68599	30 to 38 inches, white (5Y 8/1) coarse sand, with black and white mineral grains, light olive gray (5Y 6/2) moist; has rock structure; soft, very friable, nonsticky and nonplastic; few very fine, fine, and medium roots pores not visible; digs easily; medium acid (pH 6.0); clear wavy boundary.
	(97-115 cm.)
C6 RSL 68600	38 to 46 inches, white (N 8/) grus with black mineral grains, light gray (5Y 7/2) moist; has rock structure; few fine and medium roots in cleavage planes; digs with moderate difficulty; medium acid (pH 5.6).

CONSECUTIVE PEDON NUMBER C 68 85 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES TOEM SOIL NO. S68 CALI. 9-20 SAMPLE NO. S 697-S 703 TAHOE BASIN AREA

SOIL FAMILY TYPIC CRYOPSAMMENT MIXED,SHALLOW RIVERSIDE SOIL SURVEY LABORATORY

SAMPLE NO.	DEPTH CM.	HORZ.	SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION 2- .05	SILT .05- .002	CLAY LT .002	SANDS VCS 2-1	CS 1- .5	MS .5- .25	FS .25- .10	VFS .1- .05	CSI .05- .02	FSI .02- .002	CLAYS CO. 2- .2U	FINE LT .2U	CARBO NATE 3A1A.02	INT. 1A2A II PCT. OF WHOLE SOIL	COARSE FRAGMENTS- I 75- 20 PCT. OF	II 20-5 LT 75	III 5-2
			PERCENT OF LESS THAN 2MM														--A		
S 697	2- 0	O1																	
S 698	0- 13	A11	88.2	9.1	2.7	18.1	29.5	15.1	19.0	6.5	5.3	3.8				20.5	33A	--	33Z	N
S 699	13- 20	A12	87.8	9.6	2.6	13.6	26.2	15.7	22.9	9.4	5.4	4.2				25.9	45A	--	45Z	N
S 700	20- 48	C 1	82.2	15.0	2.8	11.9	24.0	14.5	20.9	10.9	7.9	7.1				29.3	55A	--	55Z	N
S 701	48- 76	C 2	80.7	15.9	3.4	13.4	23.8	14.4	19.0	10.1	8.6	7.3				28.7	56A	--	56Z	N
S 702	76- 84	C 3	82.5	15.4	2.1	24.2	24.3	11.9	14.2	7.9	8.4	7.0				23.7	65A	--	65Z	N
S 703	0- 20	A															33A	--	33Z	N

SAMPLE NO.	DEPTH CM.	ORG.MATTER CAR- BON 6A1A -PERCENT-	NITRO GEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B	2-20 6E1B	SESQUIOXIDES DI-CIT FE 6C2B	EXT AL 6G7A	PYROP FE 6C5A	EXT AL 6G5A	ATTERBERG L I M I T LL 4F2	PL 4F1	EST. 1/3 BAR 4A1F	BULK DENSITY 1/3 BAR 4A1F	DRY 4A1H	CM 3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2	EXTNSBLTY LEF 4D1	LE 4D1
						PERCENT				PCT.	NO.40	GRAMS PER CC				PERCENT			-PERCENT-	
S 697	2- 0													1.00						
S 698	0- 13	2.43	0.091			0.5				NP	NP		1.33	1.34	0.80		8.9	4.0	0.2	0.2
S 699	13- 20	2.12	0.047										1.38	1.38	0.70		9.7	3.2		
S 700	20- 48	0.62				0.5				NP	NP		1.28	1.30	0.63		9.8	2.6	0.5	0.3
S 701	48- 76	0.33										1.50			0.58			2.1		
S 702	76- 84	0.13											1.70	1.70	0.46		13.3	2.1		
S 703	0- 20	1.89	0.081									1.35			0.80			3.9		

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6Q2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACI- DITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 5A3A	NH4- OAC 5A6A	BASE SATURATION SUM ACI- DITY	SUM AL	NH4- OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA- CL2 8C1E
		MEQ/100G									PERCENT					
S 697	2- 0															
S 698	0- 13	3.6	0.5	0.1	0.3	4.5	9.1		13.6	11.0	33		41		5.6	4.9
S 699	13- 20	1.9	0.3	0.1	0.2	2.5	6.5		9.0	7.3	28		34		5.6	4.9
S 700	20- 48	1.6	0.3	0.1	0.2	2.2	4.9		7.1	5.6	31		39		5.7	5.0
S 701	48- 76	1.6	0.3	0.1	0.2	2.2	2.6	0.6	4.8	5.3	46	79	42		5.5	4.7
S 702	76- 84	0.8	0.2	0.1	0.1	1.2	3.0	1.1	4.2	4.2	29	52	29		5.4	4.6
S 703	0- 20														5.7	5.0

SAMPLE NO	DEPTH CM.	CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I	7A2E II	7A2E III	7A2E IV	DTA 7A3 -PERCENT-	7A3	L.T. 0.0002 MM X RAY 7A2E I	7A2E II	7A2E III	MINERAL CODE		RELATIVE AMOUNT
S 697	2- 0												1 TRACE
S 698	0- 13	VR 3	MI 2	KK 2							VR	VERMICLT	2 SMALL
S 699	13- 20										MI	MICA	3 MODERATE
S 700	20- 48	VR 2	MI 2	KK 2							KK	KAOLINIT	4 ABUNDANT
S 701	48- 76												5 DOMINANT
S 702	76- 84												6 INDETER.
S 703	0- 20												

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

TOEM GRAVELLY LOAMY COARSE SAND
S68Calif-9-20

Location: Tahoe Basin, El Dorado County, California. 300 feet south and 50 feet east of west ¼ corner sec. 17, T.12N., R.18E., 2 miles north of Meyers. Compass bearing S 89°W on Mt. Tallac, S 48°W on Angora Peak. Date of Sampling: August 5, 1968. Description by: G. M. Kennedy. Collectors: J. H. Rogers, G. L. Anderson, B. R. Brasher, W. D. Nettleton.
Classification: Typic Cryopsamment, mixed, shallow.
Vegetation: Not cultivated. Jeffrey pine, white fir, greenleaf manzanita, bitterbrush, mountain whitethorn, squaw carpet, huckleberry,oak and some perennial grasses. Climate: Precipitation is 35 inches. Mean annual temperature is 42°F. to 45°F., January 27°F., July 61°F. Parent Material: Granodiorite residuum. Topography: Mountainous uplands, 20 percent southwest slope. Elevation: 6500 feet. Drainage: Excessively drained; runoff is medium; permeability is rapid. Soil Moisture: Dry.
Remarks: Field determinations for pH by Hellige-Truog indicator. Composite A was sampled on 20 satellites. 10 percent rock outcrop.

HORIZON	DESCRIPTION
	(2-0 cm.)
O1 RSL 68697	3/4 to 0 inches, pine litter.
	(0-13 cm.)
A11 RSL 68698	0 to 5 inches, dark grayish brown (10YR 4/2) gravelly loamy coarse sand, very dark brown (10YR 2/2) moist; moderate fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine, common medium roots; many very fine interstitial pores; 20 percent gravel; strongly acid (pH 5.5); clear smooth boundary.
	(13-20 cm.)
A12 RSL 68699	5 to 8 inches, grayish brown (10YR 5/2) gravelly loamy coarse sand, dark brown (10YR 3/3) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine, common medium roots; many very fine interstitial pores; 20 percent gravel; strongly acid (pH 5.5); clear smooth boundary.
	(20-48 cm.)
C1 RSL 68700	8 to 19 inches, yellowish brown (10YR 5/4) gravelly loamy coarse sand, dark yellowish brown (10YR 3/4) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine, fine and medium, common coarse roots; many very fine interstitial pores; 25 percent gravel; strongly acid (pH 5.5); gradual wavy boundary.
	(48-76 cm.)
C2 RSL 68701	19 to 30 inches, white and brownish yellow (10YR 8/2, 6/6) grus with black micro crystals; common very fine, fine, medium and coarse roots; strongly acid (pH 5.5); clear wavy boundary.
	(76-84 cm.)
C3 RSL 68702	30 to 33 inches, grus with few fine, medium and coarse roots in fractures.

CONSECUTIVE PEDON NUMBER C 68 86 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES TOEM SOIL NO. S68 CALI. 9-23 SAMPLE NO. 8 704-8 712 TAHOE BASIN AREA

SOIL FAMILY TYPIC CRYOPSAMMENT MIXED,SHALLOW RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION 2- .05	SILT .05- .002	CLAY LT .002	SANDS VCS 2-1	CS 1- .05	MS .5- .25	FS .25- .10	VFS .1- .05	SILTS CSI .05- .02	FSI .02- .002	CLAYS CO. 2- .2U	FINE LT .2U	CARBONATE 3A1A.02	INT. II .2- .02	COARSE FRAGMENTS I OF 75- 20 WHOLE SOIL	II PCT. 20-5 PCT.	III 5-2 OF LT 75
			PERCENT OF LESS THAN 2MM													1A2A			
8 704	3- 0	O1														--A	--	--	--
8 705	0- 5	A11	88.6	8.8	2.6	41.2	25.2	8.1	10.4	3.7	4.4	4.4				13.0	35A	--	35Z N
8 706	5- 23	A12	85.5	10.9	3.6	26.0	25.0	10.9	16.5	7.1	5.7	5.2				21.2	33A	--	33Z N
8 707	23- 36	C 1	85.6	11.4	3.0	27.0	24.6	9.8	16.1	8.1	5.9	5.5				22.7	41A	--	41Z N
8 708	36- 43	C 2	88.9	8.7	2.4	29.6	25.7	11.3	15.7	6.6	5.0	3.7				19.7	48A	--	48Z N
8 709	43- 69	C 3															43A	--	43Z N
8 710	69- 79	C 4															27A	--	27Z N
8 711	0- 23	A															44A	--	44Z N
8 712	0- 0																--A	--	-- --

SAMPLE NO.	DEPTH CM.	ORG.MATTER CAR- BON 6A1A -PERCENT-	NITRO GEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	2-20 6E1B	SESQUIOXIDES DI-CIT EXT FE 6C2B	AL 6G7A	PYROP EXT FE 6C5A	AL 6G5A -PERCENT-	ATTERBERG LIMIT EST. LL 4F2	PL 4F1	1/3 BAR 4A1F PCT.	BULK DENSITY 1/3 BAR 4A1F	DRY 4A1H	CM 3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2 -PERCENT-	EXTNSBLTY LEF 4D1	LE 4D1 -PERCENT-
										NO.40 GRAMS PER CC										
8 704	3- 0											0.40								
8 705	0- 5	4.63	0.168			0.4				NP	NP		1.04	1.09	0.82	12.6	7.1	1.6	1.3	
8 706	5- 23	1.40	0.520										1.22	1.22	0.82	10.1	4.0			
8 707	23- 36	0.58				0.3				NP	NP		1.49	1.50	0.72	5.8	2.9	0.2	0.2	
8 708	36- 43	0.42										1.56			0.65		2.7			
8 709	43- 69	0.08											1.65	1.65	0.68	5.2	1.6			
8 710	69- 79												1.64	1.64	0.82	5.8	1.6			
8 711	0- 23	1.97	0.067									1.18			0.74		3.7			
8 712	0- 0																			

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6Q2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACI- DITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 5A3A	NH4- OAC 5A6A	BASE SATURATION SUM+ ACI- DITY	SUM+ AL	NH4- OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA- CL2 8C1E
		MEQ/100G									PERCENT					
8 704	3- 0															
8 705	0- 5	8.3	0.9	TR	0.4	9.6	8.0		17.6	17.4	55		55		5.8	5.1
8 706	5- 23	6.1	0.8	TR	0.5	7.4	5.3		12.7	11.2	58		66		6.5	5.6
8 707	23- 36	2.4	0.4	TR	0.3	3.1	4.3		7.4	6.6	42		48		6.1	5.3
8 708	36- 43						3.2		3.2						6.1	5.2
8 709	43- 69														6.2	5.6
8 710	69- 79	0.6	0.1	0.1	0.2	1.0			1.0	2.7	100+		37		6.1	5.4
8 711	0- 23														5.8	5.1
8 712	0- 0															

CLAY MINERALOGY

SAMPLE NO	DEPTH CM.	LESS THAN 0.002 MM X RAY 7A2E I	7A2E II	7A2E III	7A2E IV	DTA 7A3 -PERCENT-	L.T. 0.0002 MM X RAY 7A3	7A2E I	7A2E II	7A2E III	MINERAL CODE	RELATIVE AMOUNT
8 704	3- 0											1 TRACE
8 705	0- 5	VR 3	MI 2	KK 2							VR VERMICLT	2 SMALL
8 706	5- 23										MI MICA	3 MODERATE
8 707	23- 36	VR 2	KK 2								KK KAOLINIT	4 ABUNDANT
8 708	36- 43											5 DOMINANT
8 709	43- 69											6 INDETER.
8 710	69- 79											
8 711	0- 23											
8 712	0- 0											

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

TOEM GRAVELLY LOAMY COARSE SAND
S68Calif-9-23

Location: Tahoe Basin, El Dorado County, California, 0.7 miles east and 0.2 miles north of southwest corner sec. 12, T. 12 N., R. 18 E., 100 feet north of High Meadow Road, 4 miles south of Stateline. Date of Sampling: August 7, 1968.
Description by: L. N. Langan. Collectors: L. I. Larsen, B. R. Brasher, W. D. Nettleton.
Classification: Typic Cryopsamment, mixed, shallow.
Vegetation: Not cultivated. Jeffrey pine, white fir, greenleaf manzanita. Climate: Precipitation is 35 inches. Mean annual temperature 42°F., January 26°F., July 60°F.
Parent Material: Granodiorite residuum. Topography: Mountainous uplands, 35 percent south slope. Elevation: 7000 feet. Drainage: Excessively drained; runoff is rapid; permeability is rapid. Soil Moisture: Dry.
Remarks: Field determinations for pH by Hellige-Truog triplex indicator. Composite A was sampled on 10 satellites.

HORIZON	DESCRIPTION
	(3-0 cm.)
01 RSL 68704	1 to 0 inches, pine litter-undecomposed.
	(0-5 cm.)
A11 RSL 68705	0 to 2 inches, grayish brown (10YR 5/2) gravelly coarse sand, very dark brown (10YR 2/2) moist; very dark grayish brown pockets; weak very fine and fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine and fine interstitial pores; 20 percent ½ inch minus gravel; medium acid (pH 6.0); clear wavy boundary.
	(5-23 cm.)
A12 RSL 68706	2 to 9 inches, grayish brown (10YR 5/2) gravelly loamy coarse sand, very dark grayish brown (10YR 3/2) moist; dark gray and very dark grayish brown pockets and seams adjacent to coarse roots or old root channels; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine, few coarse roots; many very fine and fine interstitial pores; 30 percent 3/4 inch minus gravel; slightly acid (pH 6.5); abrupt wavy boundary.
	(23-36 cm.)
C1 RSL 68707	9 to 14 inches, pale brown (10YR 6/3) gravelly loamy coarse sand, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine, few fine, medium and coarse roots; many very fine and fine interstitial pores; 40 percent ½ inch minus gravel; medium acid (pH 6.0); clear wavy boundary.
	(36-43 cm.)
C2 RSL 68708	14 to 17 inches, pale brown (10YR 6/3) very gravelly coarse sand, dark grayish brown (10YR 4/2) moist; single grained; soft, very friable, nonsticky and nonplastic; many very fine, fine and medium roots; many very fine and fine interstitial pores; 55 percent ½ inch minus gravel; medium acid (pH 6.0); abrupt wavy boundary.
	(43-69 cm.)
C3 RSL 68709	17 to 27 inches, weathering granodiorite grus; medium acid (pH 6.0).
	(69-79 cm.)
C4 RSL 68710	27 to 31 inches, grus, less weathered than C3.

CONSECUTIVE PEDON NUMBER C 68 87 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES TOEM SOIL NO. S68 CALI. 9-31 SAMPLE NO. 8 713-8 720 TAHOE BASIN AREA

SOIL FAMILY TYPIC CRYOPSAMMENT MIXED,SHALLOW RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION SAND 2- .05	SILT .05- .002	CLAY LT .002	SANDS VCS 2-1	CS 1- .5	MS .5- .25	FS .25- .10	VFS .1- .05	SILTS CSI .05- .02	FSI .02- .002	CLAYS CO. 2- .2U	FINE LT .2U	CARBONATE 3A1A	INT. II .2- .02	COARSE FRAGMENTS PCT. OF WHOLE SOIL	I 75- 20 PCT.	II 20-5 OF LT 75	III 5-2
			PERCENT OF LESS THAN 2MM																	
8 713	0- 8	A11	89.1	8.4	2.5	32.1	27.8	10.4	13.6	5.2	4.4	4.0				16.2	19A	--	19Z	N
8 714	8- 15	A12	91.2	6.9	1.9	44.6	25.7	8.3	9.4	3.2	3.6	3.3				11.2	20A	--	20Z	N
8 715	15- 25	AC	88.8	9.2	2.0	32.1	26.7	10.6	14.5	4.9	4.8	4.4				16.5	24A	--	24Z	N
8 716	25- 33	C 1	84.0	13.4	2.6	24.7	25.7	9.0	16.8	7.8	7.6	5.8				24.1	25A	--	25Z	N
8 717	33- 41	C 2	86.2	11.1	2.7	27.7	24.7	10.1	16.2	7.5	5.8	5.3				21.3	30A	--	30Z	N
8 718	41- 61	C 3											--	--			35A	--	35Z	N
8 719	61- 99	C 4															37A	--	37Z	N
8 720	3- 25	A															18A	--	18Z	N

SAMPLE NO.	DEPTH CM.	ORG.MATTER CARBON 6A1A -PERCENT-	NITROGEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	2-20 6E1B	SESQUIOXIDES DI-CIT FE 6C2B	EXT AL 6G7A	PYROP FE 6C5A	EXT AL 6G5A	ATTERBERG LIMIT LL 4F2 PCT.	PL 4F1 NO.40	BULK DENSITY EST. 1/3 BAR 4A1F GRAMS	1/3 BAR 4A1F PER	DRY 4A1H CC	CM 3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C -PERCENT-	15 BAR 4B2	EXTNSBLTY LEF 4D1 -PERCENT-	LE 4D1
8 713	0- 8	2.29	0.077			0.3				NP	NP		1.12	1.14	0.91		10.1	3.9	0.6	0.5
8 714	8- 15	0.94	0.034										1.19	1.21	0.90		6.5	3.0	0.6	0.5
8 715	15- 25	0.82	0.032			0.3				NP	NP		1.28	1.28	0.87		7.6	2.9		
8 716	25- 33	0.66				0.3				NP	NP		1.31	1.31	0.86		7.1	2.5		
8 717	33- 41	0.34											1.43	1.43	0.81		4.9	1.7		
8 718	41- 61	0.15											1.37	1.37	0.78		5.6	1.6		
8 719	61- 99												1.49	1.49	0.75		6.0	1.3		
8 720	3- 25	1.92	0.070									1.20			0.91			3.4		

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 584A 6N2E	MG 584A 6O2D	NA 584A 6P2A	K 584A 6Q2A	SUM	EXT. ACI- DITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 5A3A	NH4- OAC 5A6A	BASE SATURATION SUM+ ACI- DITY	SUM+ AL	NH4- OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA- CL2 8C1E
		MEQ/100G									PERCENT					
8 713	0- 8	3.1	0.3	0.1	0.3	3.8	5.0		8.8	11.4	43		33		5.6	5.0
8 714	8- 15	1.4	0.2	0.1	0.3	2.0	3.2		5.2	7.0	38		29		5.8	5.1
8 715	15- 25	0.9	0.2	TR	0.2	1.3	5.9		7.2	5.2	19		26		5.7	5.1
8 716	25- 33	0.6	0.1	0.1	0.2	1.0	4.5		5.5	4.8	18		21		5.6	5.0
8 717	33- 41	0.2	0.1	0.1	0.2	0.6			0.6	2.4	100+		25		5.8	5.2
8 718	41- 61	0.1	TR	0.1	0.1	0.3	1.6		1.9	2.4	18		14		5.6	5.0
8 719	61- 99	0.1	0.3	0.1	0.1	0.6			0.6	2.2	100+		27		5.5	4.9
8 720	3- 25														5.7	5.1

CLAY MINERALOGY

SAMPLE NO	DEPTH CM.	LESS THAN 0.002 MM X RAY 7A2E I	7A2E II	7A2E III	7A2E IV	DTA 7A3 -PERCENT-	7A3	L.T. 0.0002 MM X RAY 7A2E I	7A2E II	7A2E III	MINERAL CODE	RELATIVE AMOUNT
8 713	0- 8	VR 2	KK 2								VR VERMICLT	1 TRACE
8 714	8- 15										KK KAOLINIT	2 SMALL
8 715	15- 25	VR 2	MI 2	KK 2								3 MODERATE
8 716	25- 33	VR 2	MI 2	KK 2							MI MICA	4 ABUNDANT
8 717	33- 41											5 DOMINANT
8 718	41- 61											6 INDETER.
8 719	61- 99											
8 720	3- 25											

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

TOEM LOAMY COARSE SAND
S68Calif-9-31

Location: Tahoe Basin, El Dorado County, California, 1.3 miles south and 0.8 mile east of northwest corner, sec. 1, T. 12 N., R. 18 E., 210 feet upslope from apex of switchback on access road to Heavenly Valley Ski Lodge. Date of Sampling: August 13, 1968. Description by: L. I. Larsen. Collectors: L. C. Leifer, B. R. Brasher, W. D. Nettleton. Classification: Typic Cryopsamment, mixed, shallow.
Vegetation: Red fir, western white pine, prostrate manzanita. Climate: Precipitation is 40 inches. Mean annual temperature is 41°F., January 25°F., July 60°F. Parent Material: Granodiorite residuum. Topography: Mountainous uplands, 14 percent northeast slope. Elevation: 8000 feet. Drainage: Excessively drained; runoff is medium; permeability is rapid. Soil Moisture: Top 2 inches moist, dry below.
Remarks: Field determinations for pH by Hellige-Truog triplex indicator. Composite A was taken from 10 satellite samples. 15 to 18 percent rock outcrops.

HORIZON	DESCRIPTION
	(1-0 cm.)
01	½ to 0 inches, nearly continuous 01 horizon from manzanita litter at immediate site; in vicinity more than half of surface lacks a thin 0 horizon but has a thin coat of "white" fine gravel and coarse sand grains.
	(0-8 cm.)
A11 RSL 68713	0 to 3 inches, dark grayish brown (10YR 4/2) loamy coarse sand, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine and fine interstitial pores; slightly acid (pH 6.3); clear smooth boundary.
	(8-15 cm.)
A12 RSL 68714	3 to 6 inches, brown (10YR 5/3) loamy coarse sand, very dark grayish brown (10YR 3/2) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and fine interstitial pores; slightly acid (pH 6.3); clear smooth boundary.
	(15-25 cm.)
AC RSL 68715	6 to 10 inches, light yellowish brown (10YR 6/4) light loamy coarse sand, dark grayish brown (10YR 4/2) moist; massive; soft with slightly hard lumps making up about 15 percent of the horizon, lumps have some accommodation and some pores, particularly tubular, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and fine interstitial pores; medium acid (pH 6.0); clear smooth boundary.
	(25-33 cm.)
C1 RSL 68716	10 to 13 inches, light gray (2.5Y 7/2) coarse sand, dark grayish brown (2.5Y 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine, few fine roots; many very fine and fine interstitial pores; slightly acid (pH 6.2); clear wavy boundary.
	(33-41 cm.)
C2 RSL 68717	13 to 16 inches, light gray (5Y 7/2) coarse sand, with black and white sand grains, grayish brown (2.5Y 5/2) moist; single grained; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; common very fine interstitial pores; 25 percent gravel; has weak rock structure; medium acid pH (6.0); clear wavy boundary.
	(41-61 cm.)
C3 RSL 68718	16 to 24 inches, light gray (5Y 7/1) coarse sand, with white and black sand grains, light gray (5Y 7/2) moist; massive; slightly hard, few very fine roots; medium acid (pH 5.8); clear smooth boundary.
	(61-86 cm.)
C4 RSL 68719	24 to 34 inches, white (5Y 8/1) gravelly grus, with black and white minerals, light olive gray (5Y 6/2) moist; massive; hard in place; very few very fine roots; medium acid (pH 5.7).

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Xeric Torripsamment, mixed, mesic

SOIL Ormsby coarse sandy loam **variant** SOIL Nos. S61Calif-32-17 LOCATION Sierra Valley, Plumas County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 61718 - 61723

Depth (in.)	Horizon	1B1b Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.2)			Coarse fragments 2A2: ≥ 2 Pct.	2 – 19 Pct. of < 76 mm	19 – 76 Pct. of < 76 mm
		Pct. of < 2 mm																
0–2	A11	88.1	7.2	4.7	8.5	22.0	16.1	32.4	9.1	3.8	3.4	30.0	61.9			8		
2–14	A12	84.4	9.8	5.8	6.3	19.0	15.5	33.3	10.3	6.0	3.8	35.4	55.0			9		
14–22	AC	85.2	7.8	7.0	6.1	13.2	16.2	37.7	12.0	3.9	3.9	37.0	52.1			7		
22–33	C1	85.7	7.8	6.5	5.3	13.4	15.6	39.4	12.0	5.6	3.2	39.0	51.3			7		
33–45	C2	84.8	8.2	7.0	10.2	15.9	14.5	31.5	12.7	4.8	3.4	36.1	53.5			12		
45–58+	C3	92.0	4.2	3.8	18.2	21.3	18.0	28.5	6.0	2.4	1.8	22.5	71.9			21		

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N		6E1b Carbonate as $CaCO_3$ Pct.		Bulk density g/cc	g/cc	g/cc		Water content Pct.	Pct.	4B2 15 bar Pct.			pH 8C1b Sat. Paste	8C1a 1:10
0–2	1.02	0.081	13		–								3.8			5.7	6.3
2–14	0.57	0.049	12		–								4.2			6.2	6.6
14–22	0.43	0.036	12		–								4.2			6.7	6.7
22–33	0.16				–								3.9			7.2	7.4
33–45	0.09				tr.								4.3			8.2	8.8
45–58+	0.05				tr.								2.7			8.5	9.0

Depth (in.)	Extractable bases 5B1a: 6N2c Ca	6O2c Mg	6P2a Na	6Q2a K	6H2a Ext. Acidity	Cat. Exch. Cap. NaOAc 5A2a		5B1b Exch. Na	Water extract from saturated paste 8A1: 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K		6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0–2	3.7	1.9	0.1	0.7	2.9	8.8		0.1	4.4	3.2	0.3	1.9		–	1.7	0.1		1.16
2–14	4.9	1.6	0.2	0.6	2.4	10.4		0.2	1.0	0.6	0.4	0.4		–	0.8	0.1		0.26
14–22	4.6	1.9	0.1	0.6	1.7	10.0		0.1	1.0	0.6	0.7	0.3		–	1.0	–		0.24
22–33	4.0	4.7	0.2	0.4	0.8	8.6		0.2	1.0	1.1	0.6	0.2		–	1.2	–		0.16
33–45	8.4	4.7	0.2	0.3	–	9.1		0.2	0.9	2.2	1.5	0.1		0.2	3.1	0.1		0.10
45–58+	5.2	3.2	0.6	0.1	–	6.1		0.5	0.6	1.1	4.6	–		0.5	3.1	0.5		0.60

Depth (in.)	8A Water at Saturation Pct.	Exchangeable Na Pct.		Gypsum Pct.	5C3 Base Sat. (Sum) Pct.		
0–2	25.6				69		
2–14	22.4				75		
14–22	21.9				81		
22–33	21.8				92		
33–45	20.9				100		
45–58+	19.4				100		

ORMSBY LOAMY COARSE SAND variant 1/
S61Calif-32-17

Location: Sierra Valley, Plumas County, California. 0.6 mile north and 0.3 mile west of southeast corner of section 21, T. 22 N., R. 15 E. 0.1 mile north of road. About 4.7 miles north and 3.3 miles west of Loyalton. Date of Sampling: September 15, 1961.
Collectors: Grant Kennedy, Reuben Nelson, John Rogers, Paul Nazar, James McLaughlin, Eugene Begg.
Vegetation: The vegetation was silver sage and dryland sedge. This area has been sprayed resulting in almost 100 percent kill of the existing vegetation. Climate: Estimated annual precipitation 15 inches. Nearest weather station (Portola): Mean annual temperature 45.1° F.; January average 28.7° F.; July average 62.6° F.; mean annual precipitation 20.62 inches. Parent Material: Coarse textured alluvium dominantly from granitic sources. Relief: Flood plain with relatively smooth topography and a slope of less than 1 percent. Elevation: 4880 feet. Drainage: Moderately well drained; very slow runoff; rapidly permeable. Soil Moisture: Profile moist below three inches.
Remarks: This is an alluvial soil. It is associated in a complex with Beckwourth coarse sandy loam. It is located 500 feet northwest of the Beckwourth sample S61Calif-32-15. This soil was sampled but not paired. It was felt that the Beckwourth pair and this sample would give adequate information to characterize these two soils. The AC and C1 have krotavinas formed by rodent tunnels. The lack of roots could be a result of killing all vegetation by spraying the silver sage. This soil is underlain by fine textured lake sediments at 78 inches. Water was standing in the pit at 58 inches at the time of sampling. The C3 horizon is very slightly cemented.
Classification: Xeric Torripsamment, mixed, mesic.

HORIZON	DESCRIPTION
A11	0 to 2 inches, dark grayish brown (10YR 4/2) loamy coarse sand, very dark brown (10YR 2/2) when
RSL No.	moist; moderate very fine, platy structure; soft, very friable, nonsticky and nonplastic;
61718	abundant very fine and few fine and medium roots; many very fine tubular and interstitial and common fine to medium tubular pores; strongly acid (pH 5.5); noncalcareous; clear smooth boundary.
A12	2 to 14 inches, dark gray (10YR 4/1) loamy coarse sand, very dark brown (10YR 2/2) when moist;
RSL No.	massive; soft, very friable, nonsticky and nonplastic; few very fine to medium roots; common very
61719	fine tubular and interstitial and common fine and few medium tubular pores; medium acid (pH 6.0); noncalcareous; gradual, slightly wavy boundary.
AC	14 to 22 inches, dark gray (10YR 4/1) loamy sand, very dark grayish brown (10YR 3/2) when moist;
RSL No.	massive, slightly hard, very friable, nonsticky and nonplastic; few very fine to medium roots;
61720	common very fine tubular and interstitial and few fine to medium tubular pores; slightly acid (pH 6.5); noncalcareous; clear, smooth boundary.
C1	22 to 33 inches, brown (10YR 5/3) loamy sand, dark brown (10YR 4/3) when moist; massive; slightly
RSL No.	hard, friable, nonsticky and nonplastic; very few fine to medium roots; many very fine interstitial
61721	and few fine to medium tubular pores; neutral (pH 7.0); noncalcareous; gradual, smooth boundary.
C2	33 to 45 inches, pale brown (10YR 6/3) loamy sand, dark brown (10YR 4/3) when moist; massive;
RSL No.	hard, friable, nonsticky and nonplastic; very few fine to medium roots; many very fine inter-
61722	stitial and few fine to medium tubular pores; moderately alkaline (pH 8.0); slightly effervescent, lime is disseminated; clear, smooth boundary.
C3	45 to 58 inches +, pale brown (10YR 6/3) coarse sand, dark brown (10YR 4/3) when moist; massive;
RSL No.	friable, nonsticky and nonplastic; weakly cemented; no roots; many very fine to medium inter-
61723	stitial pores; moderately alkaline (pH 8.0) noncalcareous.

1/ **The Ormsby series is in a mixed, mesic family of Aquic Durorthidic Xeropsamments. This pedon lacks mottles with chromas of two or less, is dry for slightly longer periods and is not cemented with silica.**

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE La Posta loamy coarse sand (taxadjunct) **LOCATION** San Diego County, California

SOIL FAMILY: Typic Xeropsamment, mixed, mesic.

SOIL NOS. S60Calif-37-3 **LAB. NOS.** 60406 - 60410

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0-1½	A11	12.4	30.7	12.1	22.3	7.1	10.6	4.8	24.8	4.4	23	lcos
1½-6	A12	9.6	20.2	13.4	27.3	11.1	11.6	6.8	33.3	5.2	14	lcos
6-19	C1	12.3	26.7	11.4	21.2	7.9	11.9	8.6	25.8	5.3	27	lcos-cosl
19-30	C2	12.6	26.9	11.9	21.3	8.8	11.8	6.7	26.8	5.2	33	lcos
30-48+	C3	17.4	34.0	11.6	18.9	6.2	8.5	3.4	21.3	3.4	40	cos

pH 8C1a H_2O 1:1	pH 8C1c KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	Atterberg limits Plastic limit Pct.	Liquid limit of 0.4	Plastic index mm.	Free Fe_2O_3 6C1b %	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
6.8	6.2	1.55	0.133	11.7				0.5			4.[illegible]
6.5	5.3	0.73	0.062	11.8				0.6			3.8
6.7	4.7	0.33	0.028		N.P.	-	N.P.	0.7			5.4
6.9	4.3	0.14	0.015					0.6			5.3
6.8	4.3	0.06			N.P.	-	N.P.	0.5			3.8

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K	BASE SAT. % 5C3	Sum of Cations me./100 g. soil 5A3a	K	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →							milliequivalents per liter →	
9.1	7.6	1.0	1.5	0.1	0.5	86	10.7		
9.1	6.2	0.8	2.1	0.1	0.2	78	9.4		
15.8	12.7	1.4	1.8	0.2	0.1	89	16.2		
14.3	12.4	1.7	1.6	0.2	0.1	90	16.0		
10.9	8.4	2.9	0.8	0.1	<0.1	93	12.2		

1/ Percent of the whole soil

LA POSTA LOAMY COARSE SAND (taxadjunct) 1/

S60Calif-37-3

Description: George Borst
Date of Sampling: November 9, 1962
Collectors: Reuben Nelson, Lothair Grant, Fred C. Eggers, John Wachtell, and George Borst
Location: Approximately 1000 feet west of southeast corner, sec. 18, T. 11 S., R. 5 E., 75 feet north of Montezuma Valley Road at entrance to Chimney Rock Ranch, San Diego County, California.
Elevation: 4,150 feet
Relief: Strongly sloping, 10 percent
Use: Range
Vegetation: Native chaparral
Drainage: Somewhat excessively drained
Parent Material: Deeply weathered granitic rock
Climate: This soil occurs under about 17" annual rainfall. The mean annual temperature is about 57°, the mean January temperature about 44°, and the mean July temperature about 73°.
Remarks: A layer of angular quartz fragments, 2 to 6 mm. in size, occurs on the surface. This soil is somewhat shallower and has less prominent clay films than is considered representative of the series.
Reaction: pH is determined in the field with a Truog (Hellige) soil reaction kit
Classification: Typic Xeropsamment, mixed, mesic.

HORIZON		DESCRIPTION
A11	0-1½"	Grayish brown (10YR 5/2) loamy coarse sand, containing light gray (10YR 7/2) angular quartz fragments, very dark grayish brown (10YR 3/2) when moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; micaceous; abundant fine random roots; neutral (pH 7.0); clear wavy boundary.
A12	1½-6"	Dark grayish brown (10YR 4/2) loamy coarse sand, very dark grayish brown (10YR 3/2) when moist; weak fine crumb structure; soft, friable, nonsticky and nonplastic; abundant fine random pores; micaceous; slightly acid (pH 6.2); abrupt wavy boundary.
C1	6-19"	Brown (10YR 5/3) loamy coarse sand, containing very pale brown (10YR 7/3) and dark gray (10YR 4/1) mineral particles, brown (10YR 4/3), pale brown (10YR 6/3), and black (10YR 2/1) when moist; massive; hard, friable, nonsticky and nonplastic; plentiful medium random roots; common fine random tubular pores; colloid in bridges between mineral grains; micaceous; medium acid (pH 6.0); gradual smooth boundary.
C2	19-30"	Brown (10YR 5/3), very pale brown (10YR 7/3), and dark gray (10YR 4/1) disintegrated granite with loamy coarse sand texture, dark brown (10YR 4/3) pale brown (10YR 6/3), and very dark gray (10YR 3/1) when moist; massive; hard, friable, nonsticky and nonplastic; few medium random roots; medium acid (pH 6.0); gradual smooth boundary.
C3	30-48"+	Very pale brown (10YR 7/3) brown (10YR 5/3), and dark gray (10YR 4/1) disintegrated granite with coarse sand texture, pale brown (10YR 6/3) dark brown (10YR 4/3), and very dark gray (10YR 3/1) when moist; massive; hard, friable, nonsticky and nonplastic; very few coarse random roots; medium acid (pH 6.0).

1/ This pedon has slightly less organic carbon and slightly paler moist colors than the La Posta series.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Cieneba very fine sandy loam variant **LOCATION** Riverside County, California

SOIL FAMILY: Typic Xeropsamment, mixed, shall w, thermic

SOIL NOS. S55Calif-33-8 **LAB. NOS.** 55565-568

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 1B1b							3A1		2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0-1	A11	4.6	9.9	9.8	35.0	19.0	16.7	5.0	55.2	3.0	9	lfs
1-13	A12	3.8	10.5	12.5	39.6	16.3	11.9	5.4	49.4	2.3	39	ls
13-32	C	3.0	14.8	19.3	43.4	10.5	6.9	2.1	40.2	0.2	35	s
32-50	Dr	6.2	15.6	14.7	34.3	14.2	13.0	2.0	43.7	3.4	22	ls

8C1b SATURATED PASTE 1:1	pH 8C1a 1:5	8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	8A1a Elec. Condc. EC x 10³ MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equiv. %	6F1a GYPSUM me./100g. SOIL	MOISTURE TENSIONS 4B1a 1/10 ATMOS. %	4B1a 1/3 ATMOS. %	4B2 15 ATMOS. %
5.9		6.0	0.80	0.074	10.8		0.32			19.0	9.4	3.1
6.5		6.5	0.30	0.029	10.3		0.26			14.6	7.3	3.3
6.9		6.3	0.06				0.12			7.5	4.4	2.2
6.8		6.4	0.02				0.11			16.2	8.5	2.8

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →				
8.5	4.5	1.2	2.7	0.2	0.4	70	0.6	0.5	2.0		32.2
10.7	7.4	2.2	1.4	0.2	0.1	88	0.6	Tr.	1.8		30.9
6.9	4.6	1.6	0.9	0.1	0.1	88	0.3	Tr.	0.8		30.3
8.1	4.4	1.9	1.0	0.3	0.1	87	0.6	Tr.	0.4		31.8

1/ Percent of the whole soil

CIENEBA VERY FINE SANDY LOAM variant 1/
S55Calif-33-8

Collectors: George Borst, Arnold Knecht, and R. E. Nelson.

Date of Sampling: December 5, 1955. Description by: W. G. Harper

Location: Searl Bros. Ranch in Diamond Valley on rocky knob, N. side of Newport Road near N 1/4 corner of Sec. 5, T6S, R1W, 2 miles W of State St., about 5 miles SW of Hemet, Riverside County, California.

Elevation: 1650 feet

Precipitation: 13 inches

Classification: Typic Xeropsamment, mixed, shallow, thermic.

Vegetation: California sage, wild buckwheat, cheat grass, wild oats and some squirrel tail.

Parent Material: Mica schist, triassic marine meta-sediments.

Physiography: On top of narrow ridge in rolling hills with moderate amount of rock outcrop 3 to 4 feet above surface and 3 to 10 feet across.

Drainage: Well drained Remarks: This soil is inusually high in mica.

HORIZON		DESCRIPTION
A11	0- 1"	Brown (10YR 5/3 dry, very dark grayish brown, 3/2 moist) very fine sandy loam; weakly defined very fine crumb structure; soft, loose; moderately permeable; many plant roots and much organic matter; pH 7.0; abrupt smooth boundary.
A12	1-13"	Brown (10YR 5/3 dry, dark brown 3/3 moist) very fine sandy loam; weakly defined very fine crumb structure to nearly massive; soft, very friable; moderately permeable; few roots and medium to low content of organic matter; pH 6.5; clear smooth boundary.
C	13-32"	Soft decomposing rock containing salt and pepper-like material composed of many gray (10YR 5/1) nearly colorless quartz fragments; massive; extremely hard, extremely firm; slowly permeable; very few roots, all in seams or crevices; pH 6.5; clear smooth boundary.
Dr	32-50"	A mixture of gray and pale brown (10YR 5/1 and 6/3, dry, 3/1 and 4/3 moist) mica schist; massive; very slowly permeable; no roots; pH 6.5.

1/ The Cieneba series is in a loamy, mixed, nonacid, thermic, shallow family of Typic Xerorthents. This pedon has a sandy control section.

CONSECUTIVE PEDON NUMBER C 68 80 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES ELMIRA SOIL NO. S68 CAL1. 9-22 SAMPLE NO. S 664-S 673 TAHOE BASIN AREA

SOIL FAMILY ALFIC XEROPSAMMENT MIXED,FRIGID RIVERSIDE SOIL SURVEY LABORATORY

SAMPLE NO.	DEPTH CM.	HORZ.	SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION <2 MM SAND 2-.05	SILT .05-.002	CLAY LT .002	VCS 2-1	CS 1-.05	MS .5-.25	FS .25-.10	VFS .1-.05	CSI .05-.02	FSI .02-.002	CO. CLAYS 2-.2U	FINE CLAY LT .2U	CARBONATE 3A1A	1A2A INT. II .2-.02	COARSE FRAGMENTS- PCT. OF WHOLE SOIL I 75-20	II 20-5	III 5-2
			PERCENT OF LESS THAN 2MM														PCT. OF LT 75		
S 664	0- 3	A11	90.7	7.3	2.0	26.9	33.6	13.4	12.5	4.3	3.7	3.6				13.7	11A --	11Z	N
S 665	3- 10	A12	88.9	8.0	3.1	31.9	24.5	11.6	14.7	6.2	4.2	3.8				18.0	15A --	15Z	N
S 666	10- 23	A3	86.5	9.9	3.6	20.6	25.6	13.6	18.0	8.7	5.0	4.9				23.4	15A --	15Z	N
S 667	23- 36	B2	87.3	9.0	3.7	16.4	27.7	16.3	19.3	7.6	3.9	5.1				21.3	14A --	14Z	N
S 668	36- 63	B3	86.0	10.3	3.7	20.8	26.5	13.8	17.4	7.5	5.5	4.8				22.1	14A --	14Z	N
S 669	63- 99	C 1	86.0	10.6	3.4	12.2	26.7	16.7	21.1	9.3	4.9	5.7				25.2	13A --	13Z	N
S 670	99-135	C 2	89.1	8.1	2.8	18.0	29.6	14.0	19.8	7.7	3.9	4.2				22.3	16A --	16Z	N
S 671	135-155	2C 3	78.1	17.9	4.0	9.6	19.1	11.5	24.8	13.1	8.4	9.5				36.3	4A --	4Z	N
S 672	155-175	2C 4	75.9	19.4	4.7	4.1	11.1	9.0	31.9	19.8	10.5	8.9				49.1	1A --	1Z	N
S 673	0- 23	A															18A --	18Z	N

SAMPLE NO.	DEPTH CM.	ORG. CAR- BON 6A1A -PERCENT-	NITRO GEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	2-20 6E1B	DI-CIT FE 6C2B	SESQUIOXIDES EXT AL 6G7A	PYROP FE 6C5A	PYROP AL 6B5A	ATTERBERG LIMIT EST. LL 4F2 PCT.	PL 4F1 NO.	BULK DENSITY 1/3 BAR 4A1F GRAMS PER CC	15 BAR 4A1H	DRY 3B2	WATER CONTENT 1/10 BAR 4B1C -PERCENT-	1/3 BAR 4B1C	15 BAR 4B2	EXTNSBLTY LEF 4D1 -PERCENT-	LE 4D1
S 664	0- 3	2.65	0.091			0.5						1.30		0.94			4.2		
S 665	3- 10	1.32	0.044			0.5				NP	NP		1.39	1.41 0.91		8.1	2.7	0.5	0.4
S 666	10- 23	0.78	0.028			0.6							1.49	1.49 0.91		8.0	2.9		
S 667	23- 36	0.42				0.6				NP	NP		1.53	1.53 0.91		6.4	2.7		
S 668	36- 63	0.29				0.6							0.78	1.25 0.91		78.0	2.4	17.0	0.2
S 669	63- 99	0.20				0.6							1.54	1.54 0.92		6.4	2.3		
S 670	99-135	0.06											1.55	1.55 0.90		5.6	1.7		
S 671	135-155												1.53	1.53 0.98		9.7	2.7		
S 672	155-175									NP	NP		1.50	1.50 0.99		9.7	3.6		
S 673	0- 23	1.40	0.054									1.45		0.89			2.7		

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES MEQ/100G CA 5B4A 6N2E	MG 5B4A 6O2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACI- DITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 5A3A	NH4-OAC 5A6A	BASE SATURATION SUM+ ACI- DITY	SUM+ AL	NH4-OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA-CL2 8C1E
											PERCENT					
S 664	0- 3	2.2	0.3	0.1	0.2	2.8		0.4	2.8	8.8	100+	88	32		5.4	4.5
S 665	3- 10	1.8	0.2	0.1	0.2	2.3	6.5	0.5	8.8	7.1	26	82	32		5.7	4.8
S 666	10- 23	1.8	0.2	0.1	0.3	2.4	5.5		7.9	6.0	30		40		6.0	5.1
S 667	23- 36	1.5	0.1	TR	0.2	1.8	6.5		8.3	5.1	22		36		6.0	5.2
S 668	36- 63	1.2	0.1	0.1	0.2	1.6	3.8		5.4	4.3	30		37		5.9	5.2
S 669	63- 99	0.5	0.3	0.1	0.2	1.1	2.4		3.5	3.5	31		31		5.9	5.1
S 670	99-135	1.3	0.3	0.1	0.1	1.8			1.8	1.6	100+		100+		6.0	5.2
S 671	135-155	3.4	0.5	0.1	0.1	4.1			4.1	5.3	100+		77		5.9	5.2
S 672	155-175	4.6	0.7	0.1	0.1	5.5			5.5	7.2	100+		76		5.9	5.2
S 673	0- 23	2.5	0.3	0.1	0.3	3.2	6.5		9.7	8.6	33		37		5.9	5.1

SAMPLE NO	DEPTH CM.	CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I	7A2E II	7A2E III	7A2E IV	DTA 7A3 -PERCENT-	7A3	L.T. 0.0002 MM X RAY 7A2E I	7A2E II	7A2E III	MINERAL CODE	RELATIVE AMOUNT
S 664	0- 3											1 TRACE
S 665	3- 10	VR 3 KK 2 MI 1									VR VERMICLT	2 SMALL
S 666	10- 23										KK KAOLINIT	3 MODERATE
S 667	23- 36	VR 3 KK 3									MI MICA	4 ABUNDANT
S 668	36- 63											5 DOMINANT
S 669	63- 99											6 INDETER.
S 670	99-135											
S 671	135-155											
S 672	155-175	KK 3 MI 2 VR 1										
S 673	0- 23											

- SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

ELMIRA LOAMY COARSE SAND
S68Calif-9-22

Location: Tahoe Basin, El Dorado County, California. 0.7 miles east and 0.4 miles south of northwest corner, sec. 3, T. 12 N., R. 18 E., 300 feet from intersection of Happy Home Cemetery Road, 70 feet northeast of Al Tahoe Blvd., 1 mile south of Bijou. Date of Sampling: August 7, 1968.
Description by: L. N. Langan. Collectors: J. H. Rogers, G. M. Kennedy, R. C. Huff, B. R. Brasher, W. D. Nettleton.
Classification: Alfic Xeropsamment, mixed, frigid.
Vegetation: Not cultivated; Jeffrey pine, big sagebrush, bitterbrush, squirrel tail, and other scattered perennials, lupine. Climate: Precipitation is 25 to 30 inches. Mean annual temperature is 43°F., January 27°F., July 61°F. Parent Material: Mixed, predominantly granitic, alluvium. Topography: Nearly level glacial outwash, 1 percent slope. Elevation: 6265 feet. Drainage: Somewhat excessively drained; runoff is slow; permeability is very rapid. Soil Moisture: Essentially dry.
Remarks: Field determination for pH by Hellige-Truog triplex indicator. Composite A taken from 10 satellite samples. Thin mat of pine needles on surface.

HORIZON	DESCRIPTION
	(0-3 cm.)
A11 RSL 68664	0 to 1 inch, dark grayish brown (10YR 4/2) loamy coarse sand, very dark brown (10YR 2/2) moist; single grained; loose, very friable, nonsticky and nonplastic; common very fine roots; many very fine and fine interstitial pores; strongly acid (pH 5.2); abrupt smooth boundary.
	(3-10 cm.)
A12 RSL 68665	1 to 4 inches, dark grayish brown (10YR 4/2) loamy coarse sand, very dark grayish brown (10YR 3/2) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine, common fine and medium roots; many very fine and fine interstitial pores; strongly acid (pH 5.5); clear wavy boundary.
	(10-23 cm.)
A3 RSL 68666	4 to 9 inches, brown (10YR 5/3) loamy coarse sand, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine, few fine and medium roots; many very fine interstitial pores; medium acid (pH 6.0); clear wavy boundary.
	(23-36 cm.)
B2 RSL 68667	9 to 14 inches, light yellowish brown (10YR 6/4) loamy coarse sand, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine, few fine and medium roots; many very fine interstitial pores; slightly acid (pH 6.2); clear wavy boundary.
	(36-63 cm.)
B3 RSL 68668	14 to 25 inches, light yellowish brown (10YR 6/4) loamy coarse sand, strong brown (7.5YR 5/6) moist; massive; soft, very friable, nonsticky and nonplastic; many fine, medium and coarse, common very fine roots; many very fine interstitial pores; 10 percent gravel; slightly acid (pH 6.2); gradual smooth boundary.
	(63-99 cm.)
C1 RSL 68669	25 to 39 inches, pale brown (10YR 6/3) light loamy coarse sand, strong brown (7.5YR 5/6) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine, fine, medium and coarse roots; many very fine interstitial pores; 10 percent gravel; slightly acid (pH 6.2); gradual smooth boundary.
	(99-135 cm.)
C2 RSL 68670	39 to 53 inches, very pale brown (10YR 8/3) coarse sand with bands of coarse sandy loam, very pale brown (10YR 8/3) moist; massive; soft, very friable, nonsticky and nonplastic; coarse sandy loam bands slightly plastic; common very fine and fine roots; many very fine interstitial and few tubular pores; few 1/8 inch minus clay bands, wavy, discontinuous, and horizontal, other bands unoriented; bands have few moderately thick and many thin clay films in bridges; 5 percent gravel; slightly acid (pH 6.2); abrupt smooth boundary.
	(135-155 cm.)
IIC3 RSL 68671	53 to 61 inches, very pale brown (10YR 8/3) sand, very pale brown (10YR 8/3) moist; massive; soft and slightly hard, very friable; few very fine and fine roots; many very fine interstitial and few tubular pores; clay pockets and 3/4 inch minus discontinuous clay bands; pockets and bands have many moderately thick clay films in bridges; strongly acid (pH 5.5); clear smooth boundary.
	(155-175 cm.)
IIC4 RSL 68672	61 to 69 inches, very pale brown (10YR 8/3) fine sandy loam, very pale brown (10YR 8/3) moist; massive; slightly hard and very hard, very friable and friable; few very fine and fine roots; many very fine interstitial and few very fine tubular pores; common ½ inch minus clay bands and pockets of clay; common very coarse distinct strong brown (7.5YR 5/6) iron stains; many moderately thick clay films in bridges of bands and pockets; strongly acid (pH 5.5).

CONSECUTIVE PEDON NUMBER C 68 75 CHARACTERIZATION DATA

SOIL SERIES ELMIRA TAXADJUNCT SOIL NO. S68 CALI. 9-26 SAMPLE NO. 8 602-8 613 TAHOE BASIN AREA

SOIL FAMILY ALFIC XEROPSAMMENT MIXED,FRIGID RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION 2- .05 SAND	.05- .002 SILT	LT .002 CLAY	SANDS VCS 2-1	CS 1-.05	MS .5-.25	FS .25-.10	SILTS VFS .1-.05	CSI .05-.02	FSI .02-.002	CLAYS CO. 2-.2U	FINE LT .2U	CARBONATE 3A1A	INT. II .2-.02	COARSE FRAGMENTS I PCT. OF WHOLE 20	II 20-5	III 5-2
			PERCENT OF LESS THAN 2MM														SOIL --A	PCT. OF --Z	LT 75 --
8 602	0- 0	O1																	
8 603	0- 4	A11	84.2	10.6	5.2	28.5	26.1	12.5	13.1	4.0	4.6	6.0				14.2	20A	8	12Z	N
8 604	4- 13	A12	82.8	11.9	5.3	23.2	24.8	13.3	16.2	5.3	5.1	6.8				17.5	22A	6	16Z	N
8 605	13- 28	A3	81.3	12.7	6.0	16.1	23.3	15.2	20.1	6.6	5.5	7.2				21.2	24A	7	17Z	N
8 606	28- 48	B1 T	80.8	12.5	6.7	13.7	23.2	16.0	20.8	7.1	4.9	7.6				21.5	21A	12	9Z	N
8 607	48- 74	B21T	80.0	12.6	7.4	12.5	22.8	16.4	21.3	7.0	4.6	8.0	--	--		20.9	43A	36	7Z	N
8 608	74- 89	B22T	83.0	8.6	8.4	18.7	28.7	13.9	16.5	5.2	3.6	5.0				16.5	26A	17	9Z	N
8 609	89-100	B31T	86.3	7.8	5.9	17.5	36.8	14.4	14.9	4.7	2.9	4.9				14.3	27A	8	19Z	N
8 610	100-130	B32T	87.1	8.5	4.4	11.2	30.5	17.5	21.5	6.4	4.0	4.5				20.4	26A	15	11Z	N
8 611	130-160	C 1SI	86.6	8.5	4.9	7.9	21.9	20.7	27.7	8.4	4.4	4.1				26.2	36A	26	10Z	N
8 612	160-175	C 2	88.7	7.0	4.3	20.4	26.3	17.5	20.3	4.2	4.1	2.9				17.1	35A	12	23Z	N
8 613	0- 28	A															15A	--	15Z	N

SAMPLE NO.	DEPTH CM.	ORG.MATTER CARBON 6A1A -PERCENT-	NITROGEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	2-20 6E1B	DI-CIT EXT PYROP EXT FE 6C2B	AL 6G7A -PERCENT-	FE 6C5A	AL 6G5A	ATTERBERG LIMIT LL 4F2	PL 4F1	BULK DENSITY 1/3 BAR 4A1F	DRY 4A1H	CM 3B2	WATER CONTENT 1/10 BAR 4B1C -PERCENT-	1/3 BAR 4B1C	15 BAR 4B2	EXTNSBLTY LEF 4D1 -PERCENT-	LE 4D1
8 602	0- 0											0.40		1.00					
8 603	0- 4	3.48	0.119			2.1				NP	NP	0.52	0.65	0.95	31.9	5.0	7.7	7.3	
8 604	4- 13	1.78	0.063			2.2						1.22	1.23	0.89	8.5	3.8	0.3	0.2	
8 605	13- 28	1.01	0.042			2.8				NP	NP	1.35	1.35	0.86	7.6	4.0			
8 606	28- 48	0.59				2.9				NP	NP	1.46	1.46	0.87	8.3	3.8			
8 607	48- 74	0.21				3.0						1.61	1.61	0.69	7.5	3.8			
8 608	74- 89	0.11				2.4				NP	NP	1.48	1.48	0.84	8.4	4.2			
8 609	89-100	0.11				1.7				NP	NP	1.47	1.47	0.83	8.0	3.3			
8 610	100-130	0.13				1.8						1.36	1.36	0.85	11.7	2.9			
8 611	130-160					1.9						1.53	1.53	0.75	11.5	3.2			
8 612	160-175					2.2				NP	NP	1.63	1.63	0.75	9.9	3.3			
8 613	0- 28	1.52	0.066									1.20		0.93		4.1			

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6Q2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACIDITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 5A3A	NH4-OAC 5A6A	BASE SATURATION SUM+ ACIDITY	SUM+ AL	NH4-OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA-CL2 8C1E
		MEQ/100G									PERCENT					
8 602	0- 0															
8 603	0- 4	6.6	0.5	0.1	0.2	7.4	7.7		15.1	14.4	49		51		5.7	5.0
8 604	4- 13	5.2	0.4	0.1	0.2	5.9	6.9		12.8	10.3	46		57		6.0	5.3
8 605	13- 28	3.7	0.3	TR	0.2	4.2	4.9		9.1	7.6	46		56		6.3	5.6
8 606	28- 48	2.7	0.3	TR	0.2	3.2	4.5		7.7	5.7	42		57		6.2	5.4
8 607	48- 74	2.0	0.3	0.1	0.2	2.6			2.6	4.3	100+		60		6.2	5.5
8 608	74- 89	2.1	0.3	0.1	0.3	2.8			2.8	3.9	100+		72		6.2	5.6
8 609	89-100	1.7	0.3	0.1	0.2	2.3			2.3	3.5	100+		66		6.3	5.6
8 610	100-130	1.8	0.3	TR	0.2	2.3			2.3	3.7	100+		63		6.2	5.6
8 611	130-160	1.7	0.4	0.1	0.2	2.4			2.4	3.6	100+		67		6.2	5.5
8 612	160-175	1.6	0.6	0.1	0.1	2.4			2.4	3.7	100+		65		6.2	5.6
8 613	0- 28															

CLAY MINERALOGY

SAMPLE NO	DEPTH CM.	LESS THAN 0.002 MM X RAY 7A2E I	7A2E II	7A2E III	7A2E IV	DTA 7A3 -PERCENT-	7A3	L.T. 0.0002 MM X RAY 7A2E I	7A2E II	7A2E III	MINERAL CODE	RELATIVE AMOUNT
8 602	0- 0											1 TRACE
8 603	0- 4	VR 3	KK 3								VR VERMICLT	2 SMALL
8 604	4- 13										KK KAOLINIT	3 MODERATE
8 605	13- 28	VR 3	KK 3								MI MICA	4 ABUNDANT
8 606	28- 48	VR 3	KK 3	MI 2								5 DOMINANT
8 607	48- 74	KK 3	VR 2	MI 1								6 INDETER.
8 608	74- 89	KK 3	VR 1									
8 609	89-100											
8 610	100-130											
8 611	130-160											
8 612	160-175	KK 3										
8 613	0- 28											

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.
N=NOT DETERMINED.

ELMIRA LOAMY COARSE SAND (TAXADJUNCT)*
S68Calif-9-26

Location: Tahoe Basin, El Dorado County, California. 1600 feet east and 400 feet north of center sec. 11, T. 12 N., R. 18 E., east of Cold Creek Trail Road, 500 feet east of water tank, 3 miles south of Bijou. Date of Sampling: August 8, 1968.
Description by: L. N. Langan. Collectors: J. H. Rogers, G. M. Kennedy, D. Palmquist, B. R. Brasher, W. D. Nettleton, G. L. Anderson.
Classification: Alfic Xeropsamment, mixed, frigid.
Vegetation: Not cultivated; Jeffrey pine, white fir, red fir, greenleaf manzanita, mountain whitethorn, squaw carpet, mules ear. Climate: Precipitation is 30 inches. Mean annual temperature is 42°F. to 45°F., January 27°F., July 61°F. Parent Material: Mixed gravelly alluvium. Topography: Old glacial outwash terrace, 3 percent slope. Elevation: 6600 feet. Drainage: Well drained; runoff is slow; permeability is moderate over slow. Soil Moisture: Essentially dry.
Remarks: Field determinations for pH by Hellige-Truog triplex indicator. Composite A taken from 10 satellite samples. *Has weak cementation in lower part not included in current concept of series.

HORIZON	DESCRIPTION
	(1-0 cm.)
O1	1/8 to 0 inches, pine needles - intermittent, about 1 inch near trees.
RSL	
68602	(0-4 cm.)
A11	0 to 1½ inches, brown (7.5YR 4/4) loamy coarse sand, dark brown (7.5YR 3/2) moist;
RSL	weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic;
68603	common very fine roots; many very fine and fine interstitial pores; 10 percent 1 inch
	minus gravel; medium acid (pH 5.7); abrupt smooth boundary.
A12	1½ to 5 inches, brown (7.5YR 4/4) loamy coarse sand, dark brown (7.5YR 3/4) moist;
RSL	moderate fine and medium granular structure; soft, very friable, nonsticky and non-
68604	plastic; many very fine, few fine roots; many very fine and fine interstitial pores;
(4-13 cm.)	10 percent 1 inch minus gravel; medium acid (pH 6.0); clear wavy boundary.
A3	5 to 11 inches, reddish brown (5YR 5/4) loamy coarse sand, dark reddish brown (5YR
RSL	3/4) moist; weak fine and medium granular structure; soft, very friable, nonsticky
68605	and nonplastic; many very fine, common fine and medium roots; many very fine and fine
(13-28 cm.)	interstitial pores; 10 percent 1 inch minus gravel; medium acid (pH 6.0); clear wavy
	boundary.
B1t	11 to 19 inches, reddish brown (5YR 5/4) loamy coarse sand, reddish brown (5YR 4/4)
RSL	moist; weak fine and medium granular structure; soft, very friable, nonsticky and non-
68606	plastic; many very fine, fine, medium and coarse roots; many very fine and fine inter-
(28-48 cm.)	stitial pores; few thin clay films in bridges; 10 percent 1 inch minus gravel; medium
	acid (pH 6.0); abrupt wavy boundary.
IIB21t	19 to 29 inches, light reddish brown (5YR 6/4) very gravelly coarse sandy loam, yellow-
RSL	ish red (5YR 4/6, 5/6 crushed) moist; massive; hard, very friable, nonsticky and non-
68607	plastic; common very fine, few fine, medium and coarse roots; common very fine and
(48-74 cm.)	fine interstitial, few fine tubular pores; common thin clay films in bridges, many thin
	clay films coating grains; 45 percent gravel and 10 percent cobbles; clear wavy boundary.
IIIB22t	29 to 35 inches, strong brown (7.5YR 5/6) dry and moist, gravelly coarse sandy loam;
RSL	massive; hard, very friable, nonsticky and slightly plastic; few very fine, fine and
68608	medium roots; common very fine and fine interstitial pores; many moderately thick and
(74-89 cm.)	few thick yellowish red (5YR 5/6) clay films in bridges; 25 percent gravel; medium
	acid (pH 6.0); clear wavy boundary.
IIIB31t	35 to 40 inches, strong brown (7.5YR 5/6) gravelly loamy coarse sand, strong brown
RSL	(7.5YR 5/6) moist; massive; slightly hard, very friable, nonsticky and nonplastic;
68609	few very fine, fine and medium roots; many very fine and fine interstitial pores; thin
(89-100 cm.)	¼ inch minus reddish brown (5YR 4/4) clay bands with few thick and common thin clay
	films in bridges; 30 percent gravel; medium acid (pH 6.0); clear wavy boundary.
IIIB32t	40 to 51 inches, reddish yellow (7.5YR 6/6) gravelly light loamy coarse sand, strong
RSL	brown (7.5YR 5/6) moist; massive; soft, very friable, nonsticky and nonplastic; few
68610	very fine, fine and medium roots; many very fine and fine interstitial pores; thin
(100-130 cm.)	reddish brown (5YR 4/4) discontinuous clay bands with very few thin and moderately
	thick clay films in bridges and coating sand grains; 15 percent 1 inch minus gravel;
	medium acid (pH 6.0); abrupt wavy boundary.
IVC1si	51 to 63 inches, reddish yellow (7.5YR 6/6) very gravelly coarse sand, reddish yellow
RSL	(7.5YR 6/6) moist; massive; very hard with hard and slightly hard areas, very friable
68611	to firm, nonsticky and nonplastic; roots matted on top horizon; many very fine and
(130-160 cm.)	fine interstitial pores; few moderately thick strong brown (7.5YR 5/6) clay films in
	bridges and few thin and moderately thick clay films coating sand grains; 70 percent
	gravel; few pockets appear to be cemented by silica and clay; some clods do not slake
	in water, but most do; medium acid (pH 6.0); gradual wavy boundary.
IVC2	63 to 69 inches, reddish yellow (7.5YR 6/6) very gravelly coarse sand, strong brown
RSL	(7.5YR 5/6) moist; massive; slightly hard, very friable, nonsticky and nonplastic;
68612	few very fine, fine and medium roots; many very fine and fine interstitial pores;
(160-175 cm.)	50 percent gravel; medium acid (pH 6.0).

CONSECUTIVE PEDON NUMBER C 68 71 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES ELMIRA SOIL NO. S68 CALI. 9-28 SAMPLE NO. 8 565-8 575 TAHOE BASIN AREA

SOIL FAMILY ALFIC XEROPSAMMENT MIXED,FRIGID RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION SAND 2- .05	SILT .05- .002	CLAY LT .002	SANDS VCS 2-1	CS 1- .05	MS .5- .25	FS .25- .10	VFS .1- .05	CSI .05- .02	FSI .02- .002	SILTS-- CO. 2- .2U	CLAYS---- FINE LT .2U	CARBO NATE 3A1A	INT. II .2- .02	COARSE FRAGMENTS- PCT. OF WHOLE SOIL I 75- 20	II 20-5	III 5-2
			PERCENT OF LESS THAN 2MM														--A	--	--
8 565	4- 0	O 01															PCT. OF LT 75		
8 566	0- 5	A11	83.3	11.1	5.6	31.7	27.6	10.1	10.3	3.6	3.6	7.5				12.0	24A	--	24Z	N
8 567	5- 17	A12	81.0	12.0	7.0	28.4	27.4	10.4	10.6	4.2	4.0	8.0				13.2	25A	6	19Z	N
8 568	17- 48	C 1	79.7	12.4	7.9	19.2	29.2	13.0	13.2	5.1	4.4	8.0				15.8	18A	--	18Z	N
8 569	48- 69	C 2	78.2	12.7	9.1	18.2	26.6	12.7	14.5	6.2	4.6	8.1				17.9	31A	12	19Z	N
8 570	69- 79	2B1	79.8	11.0	9.2	17.2	31.7	13.7	12.9	4.3	3.2	7.8				13.8	47A	30	17Z	N
8 571	79- 89	2B2	79.8	11.1	9.1	19.6	29.5	12.4	13.5	4.8	3.7	7.4				15.0	45A	17	28Z	N
8 572	89-110	2B3	83.9	8.6	7.5	27.1	32.1	10.6	10.5	3.6	2.9	5.7				11.2	42A	26	16Z	N
8 573	110-150	2C 1															28A	7	21Z	N
8 574	150-185	3C2	87.1	8.7	4.2	23.9	33.0	13.9	13.0	3.3	4.3	4.4				13.2	28A	16	12Z	N
8 575	0- 17	A															20A	--	20Z	N

SAMPLE NO.	DEPTH CM.	ORG.MATTER CARBON 6A1A	NITROGEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B	2-20 6E1B	SESQUIOXIDES--- DI-CIT FE 6C2B	EXT AL 6G7A	PYROP FE 6C5A	EXT AL 6G5A	ATTERBERG LL 4F2	LIMIT PL 4F1	BULK EST. 1/3 BAR 4A1F	DENSITY 1/3 BAR 4A1F	DRY 4A1H	CM 3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2	EXTNSBLTY LEF 4D1	LE 4D1
		-PERCENT-		-PERCENT-		-PERCENT-				PCT.		NO.40 GRAMS	PER CC			-PERCENT-			-PERCENT-	
8 565	4- 0											0.40								
8 566	0- 5	3.77	0.137				0.1					0.45			0.95			5.7		
8 567	5- 17	1.94	0.070							NP	NP		1.27	1.28	0.86		11.1	4.6	0.3	0.2
8 568	17- 48	0.52											1.34	1.34	0.90		9.3	4.6		
8 569	48- 69	0.34											1.38	1.39	0.81		11.4	5.1	0.2	0.2
8 570	69- 79	0.15											1.36	1.37	0.69		14.6	4.8	0.2	0.2
8 571	79- 89	0.14								NP	NP		1.36	1.36	0.71		13.8	5.2		
8 572	89-110												1.23	1.24	0.74		14.3	4.4	0.3	0.2
8 573	110-150											1.45			0.82			2.7		
8 574	150-185									NP	NP	1.45			0.83			2.5		
8 575	0- 17	1.87	0.071									1.20			0.90			4.5		

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES---- CA 5B4A 6N2E	MG 5B4A 6Q2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACI- DITY 6H2A	KCL EXT. AL 6G1E	C E C-- SUM	NH4- 5A3A	BASE SATURATION SUM+ ACI- DITY	SUM+ AL	NH4- OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA- CL2 8C1E
		MEQ/100G								OAC 5A6A	PERCENT					
8 565	4- 0															
8 566	0- 5	2.8	0.4	0.1	0.4	3.7	7.9	0.8	11.6	13.3	32	82	28		5.3	4.5
8 567	5- 17	2.7	0.3	TR	0.3	3.3	7.1		10.4	10.1	32		33		5.9	5.0
8 568	17- 48	1.6	0.2	TR	0.2	2.0	5.1		7.1	6.8	29		30		5.9	5.1
8 569	48- 69	1.9	0.3	0.1	0.3	2.6	4.3		6.9	6.8	38		38		5.8	5.0
8 570	69- 79	2.0	0.3	TR	0.4	2.7	3.9		6.6	6.1	41		45		5.8	5.1
8 571	79- 89	2.2	0.4	0.1	0.5	3.2	3.3		6.5	6.6	49		48		5.8	5.2
8 572	89-110	1.6	0.3	0.1	0.5	2.5	3.2		5.7	5.1	44		49		5.7	5.0
8 573	110-150	1.4	0.3	0.1	0.2	2.0	1.8		3.8	4.6	53		43		5.8	4.9
8 574	150-185	1.3	0.3	0.1	0.2	1.9	2.2		4.1	4.2	46		45		5.8	5.0
8 575	0- 17															

SAMPLE NO	DEPTH CM.	CLAY MINERALOGY ---LESS THAN 0.002 MM--- X RAY 7A2E I	7A2E II	7A2E III	7A2E IV	DTA 7A3 -PERCENT-	7A3	L.T. 0.0002 MM X RAY 7A2E I	7A2E II	7A2E III	MINERAL CODE	RELATIVE AMOUNT
8 565	4- 0											1 TRACE
8 566	0- 5										VR VERMICLT	2 SMALL
8 567	5- 17	VR 3				KK 3					KK KAOLINIT	3 MODERATE
8 568	17- 48										VM VM/MICA	4 ABUNDANT
8 569	48- 69											5 DOMINANT
8 570	69- 79											6 INDETER.
8 571	79- 89	VR 3				KK 3					VM 2	
8 572	89-110											
8 573	110-150											
8 574	150-185	KK 3				VM 3		VR 2				
8 575	0- 17											

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

ELMIRA GRAVELLY LOAMY COARSE SAND

S68Calif-9-28

Location: Tahoe Basin, El Dorado County, California, 2800 feet east and 1700 feet south of the northwest corner of sec. 21, T. 12 N., R. 18 E., 3 miles south of Tahoe Valley, north of Pioneer Trail Road. Date of Sampling: August 8, 1968.
Description by: L. N. Langan. Collectors: J. H. Rogers, G. M. Kennedy, L. I. Larsen, D. Palmquist, B. R. Brasher, W. D. Nettleton.
Classification: Alfic Xeropsamments, mixed, frigid.
Vegetation: Not cultivated; Jeffrey pine, white fir, lodgepole pine, squaw carpet, greenleaf manzanita, mountain whitethorn. Climate: Precipitation is 30 to 35 inches. Mean annual temperature is 43°F., January 27°F., July 61°F. Parent Material: Mixed alluvium. Topography: Crest of lateral moraine, pre-Tahoe?, 1 percent slope. Elevation: 6,502 feet. Drainage: Somewhat excessively drained; runoff is slow; permeability is rapid. Soil Moisture: Dry.
Remarks: Field determinations for pH by Hellige-Truog triplex indicator. Composite A taken from 10 satellite samples.

HORIZON	(1-0 cm.) DESCRIPTION
O1 RSL 68565	1/2 to 0 inches, pine litter.
A11 RSL 68566	(0-5 cm.) 0 to 2 inches, grayish brown (10YR 5/2) gravelly loamy coarse sand, very dark grayish brown (10YR 3/2) moist; seams of dark gray (10YR 4/1) dry; moderate fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine and fine interstitial pores; 17 percent gravel; medium acid (pH 5.8); abrupt wavy boundary.
A12 RSL 68567	(5-17 cm.) 2 to 6½ inches, brown (10YR 5/3) gravelly loamy coarse sand, very dark grayish brown (10YR 3/2) moist; seams of grayish brown and dark grayish brown (10YR 5/2, 4/2) dry; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine, few fine roots; many very fine and fine interstitial pores; 17 percent gravel; medium acid (pH 6.0); clear wavy boundary.
C1 RSL 68568	(17-48 cm.) 6½ to 19 inches, pale brown (10YR 6/3) gravelly loamy coarse sand, brown (10YR 4/3) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, medium and coarse roots; many very fine and fine interstitial pores; 13 percent gravel; medium acid (pH 6.0); clear wavy boundary.
C2 RSL 68569	(48-69 cm.) 19 to 27 inches, pale brown (10YR 6/3) gravelly loamy coarse sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; many fine, medium and coarse roots; many very fine and fine interstitial pores; 22 percent gravel; medium acid (pH 6.0); clear wavy boundary.
IIB1 RSL 68570	(69-79 cm.) 27 to 31 inches, pale brown (10YR 6/3) gravelly loamy coarse sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; many fine and common very fine, medium and coarse roots; many very fine and fine interstitial pores; few very thin clay films in bridges and coating sand grains, occurring in pockets and thin bands; 32 percent gravel; medium acid (pH 6.0); abrupt wavy boundary.
IIB2 RSL 68571	(79-89 cm.) 31 to 35 inches, light yellowish brown (10YR 6/4) gravelly loamy coarse sand, dark yellowish brown (10YR 4/4) moist; massive; hard, very friable, nonsticky and nonplastic; many fine, common very fine and medium roots; common very fine and fine interstitial pores; common very thin clay films as bridges and coatings on sand grains in pockets and thin discontinuous bands; 31 percent gravel; medium acid (pH 5.8); abrupt wavy boundary.
IIB3 RSL 68572	(89-110 cm.) 35 to 44 inches, pale brown (10YR 6/3) gravelly loamy coarse sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; many fine, common very fine and medium roots; many very fine and fine interstitial pores; few very thin clay films as bridges, common very thin clay coatings on sand grains in pockets and thin discontinuous bands; 31 percent gravel; medium acid (pH 5.8); clear wavy boundary.
IIC1 RSL 68573	(110-150 cm.) 44 to 59 inches, pale brown (10YR 6/3) gravelly coarse sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; many fine, common very fine and medium roots; many very fine and fine interstitial pores; 20 percent gravel; strongly acid (pH 5.5); abrupt smooth boundary.
IIIC2 RSL 68574	(150-185 cm.) 59 to 72 inches, light gray (10YR 7/2) very gravelly coarse sand, grayish brown (10YR 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine, few fine roots; many fine and few very fine interstitial pores; some silica and clay coatings on bottom side of gravel; gravel strongly weathered; 19 percent gravel; medium acid (pH 5.8).

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Alfic Xeropsamment, mixed, thermic
SOIL Oceano sand SOIL Nos. S62Calif-42-1 LOCATION Santa Barbara County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 6269 - 6276

Depth (in.)	Horizon	1B1b Total: Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Size class and particle diameter (mm) 3A1 — Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	Coarse fragments 2A2: > 2 (Pct.)	2 – 19 (Pct. of < 76mm)	19 – 76 (Pct. of < 76mm)
		Pct. of < 2 mm														
0–1½	A11	84.9	11.9	3.2	0.2	29.1	39.7	13.5	2.4	8.3	3.6	14.2	82.5	0		
1½–4	A12	79.3	17.0	3.7	0.1	24.8	36.5	14.2	3.7	13.2	3.8	21.1	75.6	0		
4–15	A13	87.2	9.8	3.0	0.3	29.3	39.5	15.0	2.7	6.8	3.0	13.9	84.5	0		
15–20	AC	85.7	11.4	2.9	0.0	27.3	40.4	15.2	2.8	7.9	3.5	15.5	82.9	0		
20–39	C1	83.5	13.0	3.5	0.2	24.0	38.5	16.1	4.7	8.8	4.2	19.0	78.8	0		
39–55	C2	80.9	15.0	4.1	0.2	22.6	37.0	17.0	4.1	10.1	4.9	20.1	76.8	0		
55–75	C3	86.7	9.4	3.9	0.3	25.7	40.3	17.2	3.2	6.3	3.1	14.9	83.5	0		
75–90+	C4	93.8	4.0	2.2	0.3	27.4	45.3	18.5	2.3	2.1	1.9	10.0	91.5	0		

Depth (in.)	6A1a Organic carbon (Pct.)	6B1a Nitrogen (Pct.)	C/N	Carbonate as $CaCO_3$ (Pct.)	6C2a Ext. Iron as Fe (Pct.)	Bulk density: 4A3a Field moist cores (g/cc)			Water content: 4B1d 1/10 bar cores (Pct.)	4B1d 1/3 bar cores (Pct.)	4B2 15 bar (Pct.)	pH: 8C1a H_2O 1:1	8C1c 1 N KCl 1:1	(1:1)
0–1½	1.62	0.136	12		0.3	1.44			13.3	9.8	4.5	5.8	5.0	
1½–4	0.62	0.059	11		0.2	1.53			12.2	8.6	1.9	5.6	4.3	
4–15	0.32				0.3	1.58			6.7	4.4	1.7	5.5	4.0	
15–20	0.26				0.3	1.56			6.0	4.0	1.8	5.3	3.9	
20–39	0.10				0.2	1.54			5.7	3.8	1.8	5.0	3.8	
39–55	0.04				0.3	1.56			6.1	4.5	2.1	5.0	3.6	
55–75	0.03				0.3	1.55			5.0	3.8	2.0	5.2	3.7	
75–90+	0.02				0.2	1.54			3.6	2.8	1.6	5.3	3.9	

Depth (in.)	Extractable bases 5B1a: 6N2b Ca	6O2c Mg	6P2a Na	6Q2a K	6H2a Ext. Acidity	Cation Exch. Capacity: 5A3a Sum	Base saturation: 5C3 Sum (Pct.)	(Pct.)
	meq/100 g							
0–1½	3.4	0.8	0.1	0.5	3.3	8.1	59	
1½–4	1.4	0.5	0.2	0.4	2.8	5.3	47	
4–15	0.6	0.3	0.1	0.2	3.0	4.2	29	
15–20	0.4	0.3	0.2	0.1	2.8	3.8	26	
20–39	0.4	0.3	0.2	0.2	2.2	3.3	33	
39–55	0.6	0.5	0.1	0.1	2.2	3.5	37	
55–75	0.7	0.5	0.2	0.1	1.8	3.3	45	
75–90+	0.9	0.7	0.2	Tr.	1.3	3.1	58	

Depth (in.)					

OCEANO SAND
S62Calif-42-1

Location: Santa Barbara County, California. Central SE¼ of NW¼ Sec. 36, T.10N., R.34W.; 3.7 airline miles south, southeast of center of Santa Maria. Date of Sampling: March 13, 1962.
Description by: L. C. Leifer. Collectors: R. E. Nelson, B. R. Brasher, G. E. Shipman, C. J. Hilliker, L. C. Leifer.
Classification: Alfic Xeropsamment, mixed, thermic.
Vegetation: Annuals used for range; alfilaria, annual lupine, ripgut brome, other small weeds. Climate: Precipitation 14 inches. Mean annual temperature 57°F., January 50°F., July 63°F. Parent Material: Aeolian sands. Topography: Low rolling dune-like hills, locally plane 5 percent southwest slope. Elevation: 400 feet. Drainage: Excessively drained. Runoff is very slow. Permeability is rapid. Soil Moisture: Moist throughout.
Remarks: Field determinations of pH by Hellige-Truog triplex indicator. Paired site sample numbers are Oceano S62Calif-42-2-1 through 9 and 3A horizons only S62Calif-42-5-1 through 3.

HORIZON	DESCRIPTION
A11 RSL 6269	0 to 1½ inches, grayish brown (10YR 5/2) sand, dark grayish brown (10YR 4/2) when moist; single grain; soft, very friable, nonsticky and nonplastic; abundant very fine roots; many very fine interstitial pores; slightly acid (pH 6.1); clear smooth boundary.
A12 RSL 6270	1½ to 4 inches, grayish brown (10YR 5/2) sand, dark grayish brown (10YR 4/2) when moist; massive; soft, very friable, nonsticky and nonplastic; plentiful very fine roots; many very fine interstitial pores; medium acid (pH 5.9); gradual smooth boundary.
A13 RSL 6271	4 to 15 inches, light brownish gray (10YR 6/2) sand, brown (10YR 4/3) when moist; massive; weakly coherent, very friable, nonsticky, nonplastic; few very fine roots; many very fine interstitial pores, very few fine tubular pores; strongly acid (pH 5.5); gradual smooth boundary.
AC RSL 6272	15 to 20 inches, light brownish gray (10YR 6/2) sand, brown (10YR 4/3) when moist; massive; soft, very friable, nonsticky and nonplastic; very few very fine roots; many very fine interstitial and very few fine tubular pores; strongly acid (pH 5.5); gradual smooth boundary.
C1 RSL 6273	20 to 39 inches, pale brown (10YR 6/3) sand, yellowish brown (10YR 5/4) when moist; massive; soft, very friable, nonsticky and nonplastic; very few very fine roots; many very fine interstitial and very few fine tubular pores; strongly acid (pH 5.3); gradual smooth boundary.
C2 RSL 6274	39 to 55 inches, pale brown (10YR 6/3) sand, yellowish brown (10YR 5/4) when moist; massive; soft, very friable, nonsticky and nonplastic; very few micro roots; many very fine interstitial pores; several weak 1/8 inch thick lamellae (7.5YR 4/4m 5/4d) slightly hard, somewhat branched, upper lamella bends up into C1; slightly more firm and more harsh than C1; strongly acid (pH 5.1); gradual smooth boundary.
C3 RSL 6275	55 to 75 inches, light yellowish brown (10YR 6/4) sand, yellowish brown (10YR 5/4) when moist; massive; soft, very friable, nonsticky and nonplastic; no roots; many very fine interstitial pores; horizon of maximum lamellae ¼ inch thick, hard when dry, two continuous, several discontinuous lamellae, similar in color to lamellae above; black specks 1 to 5 mm manganese (?) about 1 percent of mass; strongly acid (pH 5.1); gradual smooth boundary.
C4 RSL 6276	75 to 90 inches +, light yellowish brown (10YR 6/4) sand, yellowish brown (10YR 5/4) when moist; massive; soft, very friable, nonsticky and nonplastic; no roots; many very fine interstitial pores; weak lamellae 1/4 inch to 3/8 inch thick, discontinuous, slightly wavy, sand grains very thinly coated; slightly more coarse than C3, strongly acid (pH 5.5).

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Alfic Xeropsamment, mixed, thermic
SOIL Oceano sand SOIL Nos. S62Calif-42-2 LOCATION Santa Barbara County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 6277 - 6285

Depth (in.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)			Coarse fragments 2A2: ≥ 2 (Pct.)	2 – 19 (Pct. of < 76mm)	19 – 76 (Pct. of < 76mm)
		Pct. of < 2 mm																
0–2½	A11	79.9	16.9	3.2	0.1	18.7	40.0	16.8	4.3	13.8	3.1	23.9	75.6			0		
2½–14	A12	89.7	7.8	2.5	0.1	21.4	46.8	17.4	4.0	4.9	2.9	14.8	85.7			0		
14–21	A13	87.8	9.8	2.4	0.0	21.0	45.0	17.9	3.9	7.4	2.4	17.5	83.9			0		
21–27	AC	87.8	10.1	2.1	0.0	22.2	44.0	17.2	4.4	7.4	2.7	17.9	83.4			0		
27–40	C1	87.8	10.6	1.6	0.0	24.7	42.5	16.8	3.8	7.1	3.5	16.9	84.0			0		
40–53	C2	87.0	11.3	1.7	0.0	24.5	42.1	16.4	4.0	7.1	4.2	16.9	83.0			0		
53–65	C3	84.9	13.0	2.1	0.0	26.9	40.0	14.2	3.8	8.5	4.5	17.3	81.1			0		
65–80	C4	82.5	12.5	5.0	0.0	26.4	37.7	14.0	4.4	8.0	4.5	17.5	78.1			0		
80–94+	C5	92.3	3.7	4.0	0.0	25.4	44.7	19.5	2.7	2.2	1.5	11.2	89.6			0		

Depth (in.)	6A1a Organic carbon (Pct.)	6B1a Nitrogen (Pct.)	C/N		Carbonate as $CaCO_3$ (Pct.)		Bulk density: 4A3a Field moist cores (g/cc)	Bulk density: 4A1h Oven-dry clods (g/cc)	Bulk density (g/cc)		Water content: 4B1d 1/10 bar cores (Pct.)	Water content: 4B1d 1/3 bar cores (Pct.)	Water content: 4B2 15 bar (Pct.)			pH: 8C1a H_2O 1:1	pH: 8C1c 1 N KCl 1:1	(1:1)
0–2½	0.87	0.078	11				1.41				8.3	6.0	2.7			6.2	5.0	
2½–14	0.36						1.56				6.8	4.2	1.6			6.0	3.4	
14–21	0.18						1.56				5.0	3.1	1.4			6.2	4.8	
21–27	0.11						1.58				4.7	3.0	1.4			6.2	4.6	
27–40	0.05						1.60				4.8	3.0	1.0			6.5	4.7	
40–53	0.03						1.60				5.3	3.4	1.1			6.7	4.7	
53–65	0.03						1.61				6.2	3.9	1.1			6.8	4.8	
65–80	0.02						1.64	1.86*			7.4	4.3	2.1			6.7	4.6	
80–94+	0.01						1.58				4.7	3.2	1.7			6.7	4.8	

Depth (in.)	Extractable bases 6N2b Ca (meq/100 g)	6O2c Mg (meq/100 g)	5B1a 6P2a Na (meq/100 g)	6Q2a K (meq/100 g)		6H2a Ext. Acidity (meq/100 g)	Cation Exch. Capacity 5A3a Sum (meq/100 g)								Base saturation 5C3 Sum (Pct.)	
0–2	2.2	0.6	0.1	0.3		2.2	5.4								59	
2 –14	1.4	0.5	0.1	0.2		1.9	4.1								46	
14–21	1.4	0.5	0.1	0.2		1.1	3.3								67	
21–27	1.2	0.4	0.1	0.1		0.9	2.7								67	
27–40	0.9	0.4	0.1	0.1		0.5	2.0								75	
40–53	1.1	0.5	0.1	0.1		0.6	2.4								75	
53–65	0.9	0.7	0.1	Tr.		0.5	2.2								77	
65–80	1.4	1.2	0.3	Tr.		0.7	3.6								81	
80–94+	1.4	1.1	0.2	Tr.		0.6	3.3								82	

Depth (in.)

* Lamella

OCEANO SAND
S62Calif-42-2

Location: Santa Barbara County, California. SE¼ of NW¼ Sec. 31, T9N, R33W; 1½ miles south of Betteravia Road on Telephone Road, 3400 feet west and northwest on oil well road, 100 feet up slope; 4.2 miles south southeast of center of Santa Maria. Date of Sampling: March 15, 1962.

Description by: L. C. Leifer. Collectors: R. E. Nelson, B. R. Brasher, G. E. Shipman C. J. Hilliker, L. C. Leifer.

Classification: Alfic Xeropsamment, mixed, thermic.

Vegetation: Annuals used for range; annual lupine, red brome, white stem alfilaria, fiddle neck, small weeds. Climate: Precipitation 14 inches. Mean annual temperature 57°F., January 50°F., July 63°F. Parent Material: Aeolian sands. Topography: Low rolling dune-like hills, 8 percent southwest slope. Elevation: 400 feet. Drainage: Excessively drained. Runoff is very slow. Permeability is rapid. Soil Moisture: Moist throughout.

Remarks: Field determinations of pH by Hellige-Truog triplex indicator. Paired site sample numbers are Oceano S62Calif-42-1-1 through 8 and 3 A horizons only, S62Calif-42-5-1 through 3.

HORIZON	DESCRIPTION
A11 RSL 6277	0 to 2½ inches, brown (10YR 5/3) sand, dark grayish brown (10YR 4/2) when moist; 0-1 inch single grain, 1-2½ inches very weak, coarse platy structure; soft, very friable, nonsticky and nonplastic; abundant very fine roots; many very fine interstitial pores; medium acid (pH 6.0); clear smooth boundary.
A12 RSL 6278	2½ to 14 inches, brown (10YR 5/3) sand, dark grayish brown (10YR 4/2) when moist; massive; soft, very friable, nonsticky and nonplastic; plentiful very fine roots; many very fine interstitial and very few fine tubular pores; medium acid (pH 5.6); gradual smooth boundary.
A13 RSL 6279	14 to 21 inches, brown (10YR 5/3) sand, darker brown (10YR 4/3) when moist; massive; soft, very friable, nonsticky and nonplastic; very few fine roots; many very fine interstitial and very few fine tubular pores; medium acid (pH 5.8); gradual smooth boundary.
AC RSL 6280	21 to 27 inches, pale brown (10YR 6/3) sand, brown (7.5YR 5/4) when moist; massive; soft, very friable, nonsticky and nonplastic; very few fine roots; many very fine interstitial pores; medium acid (pH 5.8); gradual smooth boundary.
C1 RSL 6281	27 to 40 inches, pinkish gray (7.5YR 7/3) sand; brown (7.5YR 5/4) when moist; massive; soft, very friable, nonsticky and nonplastic; very few very fine roots; many very fine interstitial pores; medium acid (pH 5.9); lower boundary of C horizons coincide with upper bands in each following horizon; clear smooth boundary.
C2 RSL 6282	40 to 53 inches, pinkish gray (7.5YR 7/3) sand, brown (7.5YR 5/4) when moist; massive; slightly hard, very friable, nonsticky and nonplastic; no roots; many very fine interstitial pores; one very thin weak lamella top of horizon, several short discontinuous lamellae, lower lamella 1/4 inch thick; medium acid (pH 6.0); clear wavy boundary.
C3 RSL 6283	53 to 65 inches, pinkish gray (7.5YR 7/2) sand, brown (7.5YR 5/4) when moist; massive; soft, very friable, nonsticky and nonplastic; no roots; many very fine interstitial pores; several continuous weak lamellae 1/8 inch to 1/4 inch thick near top, several very weak lamellae 4 to 6 inches long lower part; medium acid (pH 6.0); clear wavy boundary.
C4 RSL 6284	65 to 80 inches, very pale brown (10YR 7/3) sand, light yellowish brown (10YR 6/4) when moist; massive; soft, loose, nonsticky and nonplastic; many very fine interstitial pores; sharply wavy lamellae 1/2 inch to 1 inch thick top of horizon, similar one in middle with branches, strong lamella 1 inch thick bottom of horizon, firm when moist; medium acid (pH 6.0); clear wavy boundary.
C5 RSL 6285	80 to 94 inches +, very pale brown (10YR 7/3) sand, light yellowish brown (10YR 6/4) when moist; massive; soft, loose, nonsticky and nonplastic; many very fine interstitial pores; 3 lamellae about 1 inch thick somewhat wavy and branched, enclose lenses of sand, color contrast and firmness decrease with increasing depth; medium acid (pH 6.0).

NOTE: Major lamellae in C horizons are reddish brown (5YR 5/3) dry, and (5YR 4/3) moist; very hard when dry; lamellae are (pH 6.0).

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Aquic Duorthidic Xeropsamment, mixed, mesic
SOIL Tangair sand SOIL Nos. S62Calif-42-7 LOCATION Santa Barbara County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62111 - 62115

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)			Coarse fragments 2A2: > 2 Pct.	Coarse fragments 2A2: 2 – 19 Pct. of < 76mm	Coarse fragments 2A2: 19 – 76 Pct. of < 76mm
		Pct. of < 2 mm																
0–4	A1	87.8	10.1	2.1	0.7	23.8	36.2	24.2	2.9	5.3	4.8	15.7	84.9			0		
4–24	A2	88.3	10.4	1.3	0.7	19.8	36.9	27.4	3.5	5.2	5.2	18.0	84.8			0		
24–36	B21ir	87.9	7.2	4.9	0.3	16.2	37.5	30.5	3.4	2.5	4.7	15.9	84.5			0		
24–36	B21ir*																	
36–48	B22ir	89.0	8.0	3.0	0.9	24.4	37.1	23.8	2.8	4.3	3.7	13.7	86.2			0		
48–56	C	93.4	5.2	1.4	1.1	26.9	38.5	24.5	2.4	2.9	2.3	11.9	91.0			0		

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct.	6C2a Ext. Iron as Fe Pct.	Bulk density: 4A1f 1/3 bar clods g/cc	Bulk density: 4A1h Oven-dry clods g/cc	Bulk density g/cc		Water content: 4B1c 1/3 bar clods Pct.	Water content: 4B2 15 bar Pct.	4D1 Extensibility COLEF in/in.		pH: 8C1a H_2O 1:1	pH: 8C1c 1N KCl 1:1	pH (1:1)
0–4	1.06	0.061	17			0.1						2.7			6.0	4.9	
4–24	0.20					0.1						0.9			6.4	4.8	
24–36	0.18					0.6	1.78	1.78			6.4	1.7	0.000		5.3	4.0	
24–36						0.7											
36–48	0.00					0.2						1.0			5.5	4.2	
48–56	0.04					0.1						0.9			5.4	4.2	

Depth (In.)	Extractable bases 5B1a: 6N2b Ca	6O2c Mg	6P2a Na	6Q2a K	meq/100 g	6H2a Ext. Acidity	Cation Exch. Capacity: 5A3a Sum				Base saturation: 5C3 Sum Pct.	Pct.
0–4	2.3	1.0	0.2	0.2		2.3	6.0				62	
4–24	0.4	0.4	0.4	0.1		0.3	1.6				81	
24–36	0.4	0.6	0.3	0.1		2.2	3.6				39	
24–36	0.3	0.8	0.2	0.2		3.2	4.7				32	
36–48	0.3	0.5	0.2	0.1		0.6	1.7				65	
48–56	0.3	0.5	0.2	0.1		0.4	1.5				73	

Depth (In.)

* Concretion

TANGAIR SAND
S62Calif-42-7

Location: Santa Barbara County, California. 120° 34' 10" W., 34° 44' 50" N; Vandenberg Air Force Base; 1/4 mi. west of missile control center, 4.5 miles north northeast of Surf. Field Sheet SA23. Date of Sampling: April 18, 1962.
Described by: L. C. Leifer. Collectors: R. E. Nelson, Lothair Grant, G. E. Shipman, C. J. Hilliker, L. C. Leifer.
Classification: **Aquic Durorthidic Xeropsamment, mixed, mesic.**
Vegetation: Prostrate manzanita, sticky monkey flower, few small weeds, considerable bare ground and most shrubs only 2 to 3 feet high. Climate: Precipitation 14 inches. Mean annual temperature 55°F., July 61°F., January 49°F. Parent Material: Marine sands. Topography: Nearly level terrace, locally a little less than 1 percent slope. Elevation: 350 feet. Drainage: Imperfectly drained; in unusually rainy springs the soils are saturated to within a few inches of the surface for several months. Runoff is very slow. Permeability is rapid to a depth of 6 to 12 feet with slow or very slowly permeable material below. Soil Moisture: Moist, free water at 44 inches.
Remarks: Field pH determinations by Hellige-Truog triplex indicator. Pair site sample numbers are Tangair S62Calif-42-8-1 through 6.

HORIZON	DESCRIPTION
A1 RSL 62111	0 to 4 inches, light gray (10YR 6/1) sand, very dark grayish brown (10YR 3/2) when moist; weak coarse granular structure; loose, nonsticky and nonplastic; plentiful very fine and few fine horizontal roots; many very fine interstitial pores; medium acid (pH 6.0); clear wavy boundary.
A2 RSL 62112	4 to 24 inches, light gray (10YR 7/2d and 10YR 7/2m) sand; massive; loose, nonsticky and nonplastic; few fine and very few medium roots; many fine interstitial pores; incipient concretions 1/16 to 1/8" across make up less than 1/2 percent of mass, uniformly distributed, reddish brown (5YR 5/4 to 6/4m); medium acid (pH 6.0); gradual wavy boundary.
B21ir RSL 62113	24 to 36 inches, very pale brown (10YR 7/3) sand, light gray (10YR 7/2) when moist; massive; loose, nonsticky and nonplastic; very few fine roots; many very fine interstitial pores; concretions make up from 5 to 15 percent of mass and tend to occur in pockets 1 to 2 feet across, see horizon below for additional detail; very strongly acid (pH 4.5); gradual smooth boundary.
62113a	Concretions in B21ir analyzed separately.
B22ir RSL 62114	36 to 48 inches, light gray (10YR 7/2) sand, very pale brown (10YR 7/3) when moist; single grain; loose, nonsticky and nonplastic; very few fine roots upper portion; many very fine interstitial pores; concretions make up 15 to 35 percent of horizon and occur mostly in pockets several feet across, as small as 1/2 inch and as large as 3x6 inches, concretions are reddish brown in color (5YR 3/4, 4/4, 5/4m and 10YR 5/4 to 5YR 4/4d), shell of concretions redder than interior, small concretions and interior of larger ones have higher **chromas** and are softer, concretions in B21 similar to the preceding; concretions very hard when dry; very strongly acid (pH 5.0); gradual wavy boundary.
C RSL 62115	48 to 56 inches, white (10YR 8/2) sand, light gray (10YR 7/2) when moist; single grain; loose, nonsticky and nonplastic; no roots; many very fine interstitial pores; very few soft concretions similar to those in B21 and B22; strongly acid (pH 5.2).

NOTE: A1 has a layer 1 to 3 grains thick of light gray sand. One to two percent of sand grains in A2 and particularly B21 and B22 and C are light reddish brown (5YR 6/4m), not part of concretions.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Aquic Durorthidic Xeropsamment, mixed, mesic
SOIL Tangair sand SOIL Nos. S62Calif-42-8 LOCATION Santa Barbara County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62116 - 62121

Depth (in.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt (0.05–0.02)	Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.2)			Coarse fragments 2A2: > 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76mm	
0–4	A11	85.4	12.4	2.2	2.0	24.2	36.0	20.5	2.7	7.6	4.8	15.9	82.7			5		
4–11	A12	88.1	10.2	1.7	1.4	22.0	37.7	23.7	3.3	6.0	4.2	16.1	84.8			0		
11–29	A2	88.0	10.6	1.4	1.3	22.0	37.5	24.0	3.2	6.3	4.3	16.1	84.8			0		
29–44	B21ir	87.6	8.5	3.9	2.0	25.3	35.4	22.2	2.7	4.1	4.4	13.3	84.9			0		
29–44	B21irN																	
44–72	B22ir	89.4	7.4	3.2	0.9	20.5	39.4	25.6	3.0	4.1	3.3	14.3	86.4			0		
72–78	C1g	84.2	14.3	1.5	0.7	8.7	49.0	23.7	2.1	10.8	3.5	17.4	82.1			0		

Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N		Carbonate as $CaCO_3$	6C2a Ext. Iron as Fe	Bulk density: 4A1f 1/3 bar clods	Bulk density: 4A1h Oven-dry clods		Water content:	Water content: 4B1c 1/3 bar clods	Water content: 4B2 15 bar	4D1 Extensibility		pH: 8C1a	pH: 8C1c 1 N KCl	(1:1)
	Pct.	Pct.			Pct.	Pct.	g/cc	g/cc	g/cc	Pct.	Pct.	Pct.	COLE In./in.		H_2O 1:1	1:1	
0–4	2.49	0.156	16			0.1						6.4			5.9	5.0	
4–11	0.33					0.1						1.4			6.6	5.5	
11–29	0.10					0.1						1.0			6.7	5.5	
29–44	0.11					0.8	1.85	1.85			5.9	2.4	0.000		5.8	4.4	
29–44						0.7											
44–72	0.05					0.5						1.9			5.8	4.3	
72–78	0.03					0.1						1.0			5.5	4.4	

Depth (in.)	Extractable bases 5B1a: 6N2b Ca	6O2c Mg	6P2a Na	6Q2a K		6H2a Exch. Acidity	Cation Exch. Capacity: 5A3a Sum			Base saturation: 5C3 Sum	
	meq/100 g									Pct.	Pct.
0–4	5.9	2.1	0.1	0.2		5.0	13.3			62	
4–11	1.4	0.6	0.1	0.1		0.6	2.8			79	
11–29	0.7	0.5	0.1	0.1		0.2	1.6			88	
29–44	0.5	0.9	0.2	0.2		1.5	3.3			54	
29–44	0.6	0.8	0.2	0.2		1.7	3.5			51	
44–72	0.5	0.8	0.3	0.1		0.8	2.5			68	
72–78	0.3	0.5	0.3	Tr.		0.2	1.3			85	

Depth (in.)

* Concretion

TANGAIR SAND
S62Calif-42-8

Location: Santa Barbara County, California. 120° 34' 10" W. and 34° 43' 10" N; Vandenberg Air Force Base, 1000 feet southwest of south end of air strip; 200 feet west and 50 feet south of railroad siding intersection with old road to Lompoc Landing; 3 miles northeast of Surf. Field sheet SD13. Date of Sampling: April 18, 1962.
Description by: L. C. Leifer. Collectors: R. E. Nelson, Lothair Grant, G. E. Shipman, C. J. Hilliker, L. C. Leifer.
Classification: Aquic Durorthidic Xeropsamment, mixed, mesic.
Vegetation: Chamise, black sage (Salvia mellifera), low manzanita and low Ceanothus; brush fairly dense and much about 5 feet high. Climate: Precipitation 14 inches. Mean annual temperature 55°F., July 61°F., January 49°F. Parent Material: Marine sands. Topography: Nearly level terrace, locally a little less than 1 percent slope. Elevation: 360 feet. Drainage: Imperfectly drained; in unusually rainy springs the soils are saturated to within a few inches of the surface for several months. Runoff is very slow. Permeability is rapid to a depth of 6 to 12 feet with slow or very slowly permeable material below. Soil Moisture: Moist, free water at 75 inches.
Remarks: Field pH determination by Hellige-Truog triplex indicator. Pair site sample numbers are Tangair S62Calif-42-7-1 through 5.

HORIZON	DESCRIPTION
A11 RSL 62116	0 to 4 inches, gray (10YR 5/1) light loamy sand, very dark gray (10YR 3/1) when moist; weak medium platy and weak coarse granular structure; soft, very friable, nonsticky and nonplastic; plentiful very fine and very few medium roots; many very fine interstitial pores; medium acid (pH 5.8); clear smooth boundary.
A12 RSL 62117	4 to 11 inches, gray (10YR 6/1) sand, pale brown (10YR 6/3) when moist; massive; loose, nonsticky and nonplastic; few fine and medium roots; many very fine interstitial pores; 10 to 15 percent of soil is diffuse to clear, old root channels 1/8 to 1" across; filled with A1 soil material; medium acid (pH 6.0); diffuse smooth boundary.
A2 RSL 62118	11 to 29 inches, light gray (10YR 7/2d, 7/2m) sand; massive; loose, nonsticky and nonplastic; few fine and medium roots; many very fine interstitial pores; 1 percent of mass distinct to faint very dark gray organic filled old root channels; medium acid (pH 6.0); clear wavy boundary.
B21ir RSL 62119	29 to 44 inches, light gray (10YR 7/2d, 7/2m) sand; massive; loose, nonsticky and nonplastic; very few fine and medium roots; many very fine interstitial pores; 15 to 35 percent of horizon made up of round to oblong concretions 1 to 10" in diameter, tend to occur in pockets 2 to 3' across, reddish yellow to yellowish red (7.5YR 6/6m to 5YR 4/6m and 5YR 4/6d) in harder shell; interior of large concretions light yellowish brown (10YR 6/4d); concretions friable to very firm, usually firm; medium acid (pH 5.8); gradual wavy boundary.
62119a	Concretions in the B21ir analyzed separately.
B22ir RSL 62120	44 to 72 inches, light gray (10YR 7/2d, 7/2m) sand; massive; loose, nonsticky and nonplastic; very few fine and medium roots; many very fine interstitial pores; 35 percent of horizon made up of firm concretions 1/2 to 3" across, yellowish red (5YR 5/6d) with blotches of light brownish gray (2.5Y 6/2m) few concretions dark gray on outside and reddish on inside; medium acid (pH 5.6); gradual wavy boundary.
Cg? RSL 62121	72 to 78 inches +, white (10YR 8/1) sand, light gray (10YR 7/2) when moist; massive; loose, nonsticky and nonplastic; no roots; many very fine interstitial pores; medium acid (pH 5.6).

CONSECUTIVE PEDON NUMBER C 68 89 CHARACTERIZATION DATA

SOIL SERIES WACA SOIL NO. S68 CALI. 31- 1 SAMPLE NO. 8 727-8 734 TAHOE BASIN AREA

SOIL FAMILY TYPIC CRYANDEPT CINDERY RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION SAND 2- .05	SILT .05- .002	CLAY LT .002	SANDS VCS 2-1	CS 1- .05	MS .5- .25	FS .25- .10	VFS .1- .05	SILTS CSI .05- .02	FSI .02- .002	CLAYS CO. 2- .2U	FINE LT .2U	CARBO NATE 3A1A	INT. II .2- .02	COARSE FRAGMENTS PCT. OF WHOLE 20 I 75-	II 20-5	III 5-2
			PERCENT OF LESS THAN 2MM													SOIL	PCT. OF LT 75		
8 727	5- 0	O1+O2														---A	---	---	---
8 728	0- 23	A11	66.4	28.9	4.7	19.2	14.5	7.8	14.1	10.8	11.6	17.3				30.3	63*	20	23Z	N
8 729	23- 36	A12	66.1	29.1	4.8	14.7	14.1	9.1	15.8	12.4	11.6	17.5				33.1	52*	24	25Z	TR
8 730	36- 53	AC	66.6	28.7	4.7	14.1	14.0	9.1	16.2	13.2	12.1	16.6				34.9	53*	24	27Z	N
8 731	53- 79	C 1	67.6	28.4	4.0	12.7	15.1	9.9	17.2	12.7	11.2	17.2				33.8	55*	21	29Z	N
8 732	79- 91	C 2	68.2	27.6	4.2	11.1	17.4	10.7	17.6	11.4	10.7	16.9			---	32.1	73*	37	31Z	N
8 733	91- 0	R															94*	---	---	---
8 734	0- 53	A															29A	---	29Z	N

SAMPLE NO.	DEPTH CM.	ORG.MATTER CARBON 6A1A	NITROGEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B	2-20 6E1B	SESQUIOXIDES DI-CIT FE 6C2B	EXT AL 6G7A	PYROP FE 6C5A	EXT AL 6G5A	ATTERBERG LIMIT LL 4F2	PL 4F1	BULK DENSITY EST. 1/3 BAR 4A1F	1/3 BAR 4A1F	DRY 4A1H	CM 3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2	EXTNSBLTY LEF 4D1	LE 4D1
		-PERCENT-		-PERCENT-		-PERCENT-				PCT.	NO.40	GRAMS PER CC				-PERCENT-			-PERCENT-	
8 727	5- 0														1.00					
8 728	0- 23	4.85	0.178			1.0				NP	NP		0.90	0.91	0.64		27.8	13.8	0.4	0.2
8 729	23- 36	1.97	0.109									0.90			0.73			11.8		
8 730	36- 53	1.63	0.089			1.1				NP	NP		0.88	0.88	0.73		21.9	12.7		
8 731	53- 79	1.60				1.1				NP	NP	0.76			0.74			14.4		
8 732	79- 91	1.44				1.0				NP	NP	0.71			0.58			13.9		
8 733	91- 0											1.63			0.10					
8 734	0- 53	4.04	0.175									0.75			0.90			13.1		

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6Q2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACI- DITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 5A3A	NH4- OAC 5A6A	BASE SATURATION SUM+ ACI- DITY	SUM+ AL	NH4- OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA-CL2 8C1E
		MEQ/100G									PERCENT					
8 727	5- 0															
8 728	0- 23	5.0	0.6	0.1	0.9	6.6	23.7		30.3	23.6	22		28		6.2	5.8
8 729	23- 36	3.2	0.4	0.1	0.9	4.6	21.2		25.8	21.0	18		22		6.2	5.5
8 730	36- 53	4.2	0.5	0.1	0.7	5.5	20.4		25.9	21.8	21		25		6.3	5.4
8 731	53- 79	5.5	0.4	0.1	0.7	6.7	21.7		28.4	24.1	24		28		6.2	5.3
8 732	79- 91	5.9	0.5	0.1	0.7	7.2	20.0		27.2	25.5	26		28		5.9	5.1
8 733	91- 0															
8 734	0- 53														6.1	5.5

SAMPLE NO	DEPTH CM.	CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I	7A2E II	7A2E III	7A2E IV	DTA 7A3 -PERCENT-	X RAY 7A3 I	7A2E II	7A2E III	MINERAL CODE	RELATIVE AMOUNT
8 727	5- 0										1 TRACE
8 728	0- 23	AM 6								AM AMORPHOS	2 SMALL
8 729	23- 36										3 MODERATE
8 730	36- 53	AM 6									4 ABUNDANT
8 731	53- 79	AM 6									5 DOMINANT
8 732	79- 91										6 INDETER.
8 733	91- 0										
8 734	0- 53										

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
*=THE 75-250MM FRACTION IS INCLUDED.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

WACA COBBLY COARSE SANDY LOAM
S68Calif-31-1

Location: Tahoe Basin, Placer County, California; 200 yards north of S¼ corner, sec. 34, T. 15 N., R. 16 E. Compass bearing: S. 37° W to Barker Peak, N 85° W to Stanford Rock, 100 feet south of Blackwood Canyon Road. Date of Sampling: August 6, 1968.
Description by: R. C. Huff. Collectors: J. H. Rogers, L. N. Langan, G. M. Kennedy, G. L. Anderson, B. R. Brasher, W. D. Nettleton.
Classification: Typic Cryandept, cindery.
Vegetation: Not cultivated; white fir, ribies sp., snow berry. Climate: Precipitation is 40 to 45 inches. Mean annual temperature is 40°F., January 24°F., July 60°F. Parent Material: Andesitic tuff breccia. Topography: Mountainous uplands, 35 percent northwest-facing slope. Elevation: 6800 feet. Drainage: Well drained; runoff is rapid; permeability is moderately rapid. Soil Moisture: Near wilting point.
Remarks: Field determinations for pH by Hellige-Truog triplex indicator. Composite A taken from 10 satellite samples.

HORIZON	DESCRIPTION
	(5-0 cm.)
O1 & O2 RSL 68727	2 to 0 inches, fir litter and duff.
	(0-23 cm.)
A11 RSL 68728	0 to 9 inches, brown (10YR 5/3) cobbly coarse sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; very few fine roots; 30 percent gravel and 14 percent cobbles and stones; slightly acid (pH 6.2); abrupt smooth boundary.
	(23-36 cm.)
A12 RSL 68729	9 to 14 inches, brown (10YR 5/3) gravelly coarse sandy loam, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine, many medium roots; many very fine and fine interstitial pores; 35 percent gravel and 3 percent cobbles and stones; medium acid (pH 6.0); diffuse wavy boundary.
	(36-53 cm.)
AC RSL 68730	14 to 21 inches, brown (10YR 5/3) gravelly coarse sandy loam, dark brown (10YR 3/3) moist; weak medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, medium and coarse roots; many very fine and fine interstitial pores; 45 percent gravel and 3 percent cobbles and stones; medium acid (pH 5.8); diffuse wavy boundary.
	(53-79 cm.)
C1 RSL 68731	21 to 31 inches, pale brown (10YR 6/3) very gravelly coarse sandy loam, brown (10YR 4/3) moist; weak medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, medium and coarse roots; many very fine and fine interstitial pores; 35 percent gravel and 3 percent cobbles and stones; medium acid (pH 5.6); diffuse wavy boundary.
	(79-91 cm.)
C2 RSL 68732	31 to 36 inches, pale brown (10YR 6/3) very gravelly coarse sandy loam, dark yellowish brown (10YR 4/6) moist; weak medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, medium and coarse roots; many very fine and fine interstitial pores; 60 percent gravel; very strongly acid (pH 5.0); abrupt irregular boundary.
	(91 cm.)
R RSL 68733	36 inches, slightly weathered andesitic tuff, fractured, with some roots and soil in cracks.

CONSECUTIVE PEDON NUMBER C 68 90 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES WACA SOIL NO. S68 CALI. 31- 2 SAMPLE NO. 8 735-8 745 TAHOE BASIN AREA

SOIL FAMILY TYPIC CRYANDEPT CINDERY RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION SAND 2- .05	SILT .05- .002	CLAY LT .002	SANDS VCS 2-1	CS 1- .05	MS .5- .25	FS .25- .10	VFS .1- .05	CSI .05- .02	FSI .02- .002	SILTS CO. 2- .2U	CLAYS FINE LT .2U	CARBONATE 3A1A.02	1A2A INT. II .2-	COARSE FRAGMENTS PCT. OF WHOLE 20 I 75-	II 20-5	III 5-2
			PERCENT OF LESS THAN 2MM													SOIL --A	PCT. OF LT 75 --	--	--
8 735	5- 0	O1															--		
8 736	0- 3	A11	59.3	32.8	7.9	16.5	10.6	6.6	13.7	11.9	11.4	21.4				31.5	49A	--	49Z	N
8 737	3- 8	A12	59.9	35.4	4.7	12.5	14.4	8.3	14.3	10.4	15.0	20.4				33.1	50A	23	27Z	N
8 738	8- 20	A13	61.7	32.4	5.9	16.1	14.0	7.7	13.1	10.8	10.5	21.9				29.2	46A	20	26Z	N
8 739	20- 33	AC	61.8	32.7	5.5	14.8	13.8	7.7	13.4	12.1	11.7	21.0				31.8	49A	25	24Z	N
8 740	33- 53	C 1	60.5	34.8	4.7	12.4	14.1	7.7	14.1	12.2	12.5	22.3				32.4	64A	52	12Z	N
8 741	53- 74	C 2	62.9	33.4	3.7	6.7	14.9	10.1	17.9	13.3	13.3	20.1				36.7	63A	44	19Z	N
8 742	74- 89	C 3	64.2	32.2	3.6	11.4	15.3	9.7	15.8	12.0	12.7	19.5	--	--		32.8	58A	31	27Z	N
8 743	89- 99	C 4															60A	25	35Z	N
8 744	99-100	R															67A	30	37Z	N
8 745	0- 33	A															29A	--	29Z	N

SAMPLE NO.	DEPTH CM.	ORG.MATTER CARBON 6A1A -PERCENT-	NITROGEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	2-20 6E1B	SESQUIOXIDES DI-CIT EXT FE 6C2B -PERCENT-	AL 6G7A	PYROP EXT FE 6C5A	AL 6G5A	ATTERBERG L I M I T LL 4F2	PL 4F1	EST. 1/3 BAR 4A1F GRAMS PER CC	DENSITY 1/3 BAR 4A1F	DRY 4A1H	CM 382	WATER CONTENT 1/10 BAR 4B1C -PERCENT-	1/3 BAR 4B1C	15 BAR 482	EXTNSBLTY LEF 4D1 -PERCENT-	LE 4D1
										PCT.	NO.40									
8 735	5- 0														1.00					
8 736	0- 3	19.18	0.682										0.24	0.32	0.92	102.9	37.0	10.1	9.1	
8 737	3- 8	9.19	0.329			1.3				NP	NP		0.68	0.70	0.79	38.6	28.6	1.0	0.8	
8 738	8- 20	7.66	0.293										0.68	0.70	0.82	37.7	20.0	1.0	0.8	
8 739	20- 33	5.18	0.224			1.4				NP	NP		0.72	0.73	0.80	40.4	18.8	0.5	0.4	
8 740	33- 53	3.76				1.3				NP	NP		0.76	0.76	0.66	40.7	20.1			
8 741	53- 74	3.06											0.71	0.73	0.69	41.0	20.5	0.9	0.6	
8 742	74- 89	2.88											0.74	0.75	0.72	39.6	19.2	0.4	0.3	
8 743	89- 99	3.12											0.94	0.98	0.65	46.3	22.2	1.4	0.9	
8 744	99-100												1.63	1.67	0.44	20.6	14.2	0.8	0.4	
8 745	0- 33	9.07	0.352									0.70			0.90		25.8			

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6Q2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACI- DITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 5A3A	NH4- OAC 5A6A	BASE SATURATION SUM+ ACI- DITY	SUM+ AL	NH4- OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA- CL2 8C1E
		MEQ/100G									PERCENT					
8 735	5- 0															
8 736	0- 3	10.1	5.0	0.1	0.7	15.9	39.1	1.3	55.0	59.0	29	92	27	5.3		4.7
8 737	3- 8	1.9	0.2	0.1	0.5	2.7	23.2	1.5	25.9	40.0	10	64	7		5.4	4.9
8 738	8- 20	2.0	0.4	0.1	0.5	3.0	36.7	0.7	39.7	34.7	8	81	9		5.5	4.9
8 739	20- 33	0.8	0.1	0.1	0.4	1.4	36.9	0.3	38.3	32.5	4	82	4		5.5	5.0
8 740	33- 53	0.8	0.2	0.1	0.2	1.3	35.2	0.1	36.5	32.3	4	93	4		5.5	5.1
8 741	53- 74	0.7	0.1	0.1	0.1	1.0	34.1	0.3	35.1	34.7	3	77	3		5.5	5.0
8 742	74- 89	0.7	0.2	0.1	0.1	1.1	35.7	0.3	36.8	33.7	3	79	3		5.4	5.0
8 743	89- 99	0.6	0.2	0.2	0.1	1.1	33.2	0.6	34.3	37.6	3	65	3		5.4	4.9
8 744	99-100						27.2	0.9	27.2	27.9					5.3	4.8
8 745	0- 33														5.3	4.9

SAMPLE NO	DEPTH CM.	CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I	7A2E II	7A2E III	7A2E IV	DTA 7A3 -PERCENT-	7A3	L.T. 0.0002 MM X RAY 7A2E I	7A2E II	7A2E III	MINERAL CODE	RELATIVE AMOUNT
8 735	5- 0											1 TRACE
8 736	0- 3										AM	AMORPHOS 2 SMALL
8 737	3- 8	AM 6									KH	HALOYSIT 3 MODERATE
8 738	8- 20											4 ABUNDANT
8 739	20- 33	AM 6										5 DOMINANT
8 740	33- 53	KH 1										6 INDETER.
8 741	53- 74											
8 742	74- 89											
8 743	89- 99											
8 744	99-100											
8 745	0- 33											

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

WACA GRAVELLY COARSE SANDY LOAM
S68Calif-31-2

Location: Tahoe Basin, Placer County, California. SE¼ of sec. 8, T. 14 N., R. 16 E., 0.4 mile east of Barker Pass, 70 feet south of Blackwood Canyon Road. Date of Sampling: August 6, 1968.
Description by: G. M. Kennedy. Collectors: R. C. Huff, L. N. Langan, J. H. Rogers, B. R. Brasher, W. D. Nettleton.
Classification: Typic Cryandept, cindery.
Vegetation: Not cultivated; Red fir, mountain hemlock. Climate: Precipitation is 45 to 50 inches. Mean annual temperature is 39°F., January 20°F., July 59°F. Parent Material: Andesitic breccia. Topography: Mountainous uplands, 30 percent, north-facing slope. Elevation: 7800 feet. Drainage: Well drained; runoff is medium; permeability is moderately rapid. Soil Moisture: Slightly moist.
Remarks: Field determinations for pH by Hellige-Truog triplex indicator. Composite A taken from 10 satellite samples. Samples taken of C1 and C2 horizons for Division of Highways. 51°F. at 20 inches.

HORIZON	DESCRIPTION
	(5-0 cm.)
O1	2 to 0 inches, needle duff.
RSL 68735	
	(0-3 cm.)
A11 RSL 68736	0 to 1 inch, brown (10YR 4/3) gravelly coarse sandy loam, very dark brown (10YR 2/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine, few fine roots; many very fine interstitial and few fine tubular pores; strongly acid (pH 5.2); abrupt smooth boundary.
	(3-8 cm.)
A12 RSL 68737	1 to 3 inches, brown (10YR 4/3) cobbly coarse sandy loam, very dark brown (10YR 2/2) moist; moderate fine and medium granular structure; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots; many very fine interstitial and few fine tubular pores; 30 percent gravel and 5 percent cobbles; medium acid (pH 6.0); clear wavy boundary.
	(8-20 cm.)
A13 RSL 68738	3 to 8 inches, brown (10YR 4/3) gravelly coarse sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine, common medium and coarse roots; many very fine interstitial, few fine tubular pores; 30 percent gravel; medium acid (pH 6.0); clear wavy boundary.
	(20-33 cm.)
AC RSL 68739	8 to 13 inches, brown (10YR 5/3) gravelly coarse sandy loam, dark brown (7.5YR 3/2) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine, common medium and few coarse roots; many very fine interstitial and few very fine and fine tubular pores; 35 percent gravel and 5 percent cobbles; medium acid (pH 6.0); clear wavy boundary.
	(33-53 cm.)
C1 RSL 68740	13 to 21 inches, yellowish brown (10YR 5/4) very gravelly coarse sandy loam, dark brown (7.5YR 3/2) moist; massive; soft, very friable, nonsticky and slightly plastic; many very fine, fine, medium and coarse roots; many very fine and few fine tubular pores; 50 percent gravel and 5 percent cobbles and stones; medium acid (pH 6.0); gradual wavy boundary.
	(53-74 cm.)
C2 RSL 68741	21 to 29 inches, light yellowish brown (10YR 6/4) very gravelly coarse sandy loam, brown (7.5YR 4/4) moist; massive; soft, very friable, nonsticky and slightly plastic; many very fine, fine, medium and coarse roots; common very fine tubular and many very fine, few fine interstitial pores; 50 percent gravel and 5 percent cobbles; medium acid (pH 6.0); gradual smooth boundary.
	(74-89 cm.)
C3 RSL 68742	29 to 35 inches, light yellowish brown (10YR 6/4) very gravelly coarse sandy loam, brown (7.5YR 4/4) moist; massive; soft, very friable, nonsticky and slightly plastic; many very fine and fine, common medium and few coarse roots; many very fine interstitial and few very fine and fine tubular pores; 45 percent gravel; medium acid (pH 6.0); abrupt wavy boundary.
	(89-99 cm.)
C4 RSL 68743	35 to 39 inches, very pale brown (10YR 7/4) very gravelly coarse sandy loam, brown (7.5YR 4/4) with reddish brown (5YR 4/3) stains, moist; massive; soft, very friable, nonsticky and nonplastic; common medium and coarse, few fine roots; 45 percent gravel; medium acid (pH 6.0); gradual wavy boundary.
R RSL 68744	39 to 40 inches, andesitic tuff breccia. (99-100 cm.)

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Windy sandy loam **LOCATION** Amador County, California

SOIL FAMILY: Typic Dystrandept, cindery, frigid

SOIL NOS. S61Calif-3-30 **LAB. NOS.** 61121 - 61127

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)						2/	3A1		2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0- 8	A_{11}	13.0	18.6	6.1	12.3	7.7	33.7	8.6	25.7	23.0	18	
8-16	A_{12}	12.9	18.7	6.7	13.3	7.8	31.2	9.4	25.0	21.9	25	
16-21	AB	15.8	19.4	6.4	12.2	7.4	29.3	9.5	24.0	19.6	9	
21-35	B	11.1	20.7	8.3	14.6	7.5	28.7	9.1	25.5	19.3	7	
35-47	C_1	11.9	22.1	7.6	13.9	7.5	29.4	7.6	24.9	20.1	6	
47-57	C_2	17.5	26.7	8.5	13.6	6.7	22.6	4.4	20.0	16.7	46	
57+	R	14.9	25.0	7.3	11.2	5.8	31.9	3.9	19.5	24.3	13	

pH		Organic Matter							6C1b		4B2
8C1b Saturated Paste 1:1	8C1c KCl 1:10	6A1a Organic Carbon Pct.	6B1a Nitrogen Pct.	C/N					Free iron as % Fe_2O_3		S 11 water 15 atmos. Pct.
5.9	4.5	6.12	0.214	28.7					1.4		18.6
5.9	4.6	3.87	0.174	22.2					1.1		18.3
6.0	4.6	2.18	0.091	24.0					0.8		15.8
6.0	4.5	0.97	0.055	17.6					0.4		16.0
5.9	4.4	0.90	0.051	17.6					0.4		16.2
6.0	4.2	0.21							0.8		14.5
6.0	4.0	0.11							0.5		15.1

5A2a	EXTRACTABLE CATIONS				5B1a	BASE SAT. %	5A3a				
CATION EXCHANGE CAPACITY	6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K	5C3	Sum of Cations				
← (Na)	milliequivalents per 100g. soil →						← soil milliequivalents per 100 g →				
44.1	5.7	1.2	25.0	0.2	1.0	25	33.1				
40.1	4.1	0.8	25.0	0.2	0.8	19	30.9				
29.6	4.3	1.1	18.7	0.2	0.8	26	25.1				
26.9	4.6	2.3	14.8	0.2	1.0	35	22.9				
24.5	2.8	2.2	15.3	0.2	1.0	29	21.5				
24.3	2.7	1.7	12.8	0.2	1.0	30	18.4				
28.6	6.2	3.0	12.9	0.2	0.8	44	23.1				

1/ Percent of the whole soil

2/ Incompletely dispersed

WINDY SANDY LOAM
S61Calif-3-30

Collectors: Grant Kennedy, Jack McClelland, John Rogers, Paul Nazar, David Estrada. Description by: Grant Kennedy.
Date of Sampling: May 8, 1961
Location: Amador County, California, 0.5 mile southwest of Hams Station; 1/4 mile east of southwest corner of sec. 13, T. 8 N., R. 14 E., on old Highway 88
Elevation: 5,445 feet
Relief: Hilly uplands with a 25 percent slope to the south.
Drainage: Well drained; slow runoff; rapid permeability
Parent Material: Andesitic tuff breccia
Climate: Mean annual precipitation 47 inches, some as snow; mean annual temperature 50°
Vegetation: Ponderosa pine, incense cedar, red fir, white fir
Classification: Typic Dystrandept, cindery, frigid.
Remarks: The C1 horizon is 90 percent rotten rock, with soil in crevices in tongues. The C2 horizon is fractured rotten rock with a little soil in cracks. The A11 horizon contains about 10 percent gravels, A12 contains 15 percent gravels, A13 contains 40 percent gravels and cobbles, and the B contains 50 percent gravels, cobbles and fractured stones.

HORIZON		DESCRIPTION
O1	2- ½"	Partially decomposed needles
O2	½- 0"	Well decomposed needles; very strongly acid, pH 5.0.
A11	0- 8"	Dark grayish brown (10YR 4/2) sandy loam, very dark brown (10YR 2/2) when moist; moderate very fine granular; slightly hard when dry; friable when moist; nonsticky and nonplastic when wet; plentiful very fine to medium roots; many very fine interstitial pores; medium acid, pH 6.0; gradual smooth boundary.
RSL No. 61121		
A12	8-16"	Dark grayish brown (10YR 4/2) sandy loam, very dark brown (10YR 2/3) when moist; moderate very fine granular; soft when dry; friable when moist; nonsticky and nonplastic when wet; plentiful very fine to very coarse roots; many very fine interstitial pores; medium acid, pH 6.0; gradual smooth boundary.
RSL No. 61122		
A13	16-21"	Dark grayish brown (10YR 4/2) sandy loam, dark brown (10YR 3/3) when moist; moderate very fine granular; soft when dry, friable when moist, nonsticky and nonplastic when wet; plentiful very fine to very coarse roots; many very fine interstitial pores; medium acid, pH 6.0; clear smooth boundary.
RSL No. 61123		
B	21-35"	Brown (10YR 5/3) sandy loam, dark yellowish brown (10YR 3/4) when moist; moderately very fine granular; soft when dry, friable when moist, and nonsticky and nonplastic when wet; plentiful very fine to medium roots, few coarse and very coarse roots; many very fine interstitial pores; medium acid, pH 5.8; abrupt slightly irregular boundary.
RSL No. 61124		
C1	35-47"	Brown (10YR 5/3) sandy loam, dark yellowish brown (10YR 3/4) when moist; moderate very fine granular; soft when dry, friable when moist, nonsticky and nonplastic when wet; plentiful very fine to fine roots, and few medium and coarse roots; many very fine interstitial pores; medium acid, pH 5.8; gradual slightly irregular boundary.
RSL No. 61125		
C2	47-57"	Fractured rotten andesitic tuff breccia, variegated dark yellowish brown, yellowish brown, olive brown (10YR 4/4, 5/6, 5Y 5/2) when dry; unweathered portions have a purplish cast; few very fine to medium roots, strongly acid, pH 5.5; clear slightly irregular boundary.
RSL No. 61126		
R	57'+	Rotten relatively massive andesitic tuff breccia, but can be scratched with a knife when wet; no roots; very strongly acid, pH 5.0.
RSL No. 61127		

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Windy sandy loam **LOCATION** Amador County, California

SOIL FAMILY: Typic Dystrandept, cindery, frigid

SOIL NOS. S61Calif-3-31 **LAB. NOS.** 61128 - 61133

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	2/ CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0- 7	A_{11}	20.1	15.1	6.8	10.9	6.6	32.4	8.1	22.1	23.3	27	
7-14	A_{12}	16.4	15.9	7.4	12.3	6.7	33.9	7.4	25.2	22.8	24	
14-21	A3	18.8	16.0	7.0	11.8	7.7	30.4	8.3	24.4	20.8	26	
21-34	B	18.8	18.4	7.8	13.4	7.1	28.1	6.4	24.7	18.5	10	
34-66	C1&R	15.9	18.7	9.4	15.2	7.6	25.9	7.3	25.9	16.7	20	
66+	R	12.7	18.3	8.6	14.2	7.8	34.7	3.7	34.5	16.3	4	

pH 8C1b Saturated Paste 1:1	pH 8C1c KCl 1:10	Organic Matter 6A1a Organic Carbon Pct.	6B1a Nitrogen Pct.	C/N	6C1b Free iron as % Fe_2O_3	4B2 Soil water 15 atmos. Pct.
6.2	5.1	7.63	0.273	27.9	1.9	21.3
6.2	4.9	5.02	0.182	27.6	2.6	20.4
6.2	5.0	2.43	0.123	19.8	2.6	17.9
6.3	5.0	1.28	0.084	15.2	2.5	17.4
6.1	4.6	0.47	0.032	14.7	2.0	21.5
6.1	4.6	0.06			1.2	16.6

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	5B1a 6Q2a K	BASE SAT. % 5C3	5A3a Sum of Cations soil
	milliequivalents per 100g. soil →						← milliequivalents per 100 g.
45.8	13.1	1.8	24.0	0.2	0.8	40	39.9
41.7	7.1	1.3	24.6	0.2	0.6	27	33.8
32.9	4.8	1.3	19.8	0.2	0.6	26	26.7
29.5	4.1	1.5	17.2	0.2	0.8	28	23.8
30.0	6.5	3.6	13.0	0.2	1.4	47	24.7
22.0	4.0	2.6	8.9	0.2	1.2	47	16.9

1/ - Percent of the whole soil

2/ Incompletely dispersed

WINDY SANDY LOAM
S61Calif-3-31

Collectors: Grant Kennedy, Jack McClelland, John Rogers, Paul Nazar, David Estrada **Description by: Grant Kennedy.**
Date of Sampling: May 8, 1961
Location: Amador County, California; 3/4 mile south southwest of Cooks Station; NW1/4SW1/4.sec. 28, T. 8 N., R. 14 E.
Elevation: 4800 feet
Relief: Hilly uplands with a 25 percent slope to the south.
Drainage: Well drained; medium runoff; moderately rapid permeability
Parent Material: Andesitic tuff breccia
Climate: Mean annual precipitation 46 inches - some is snow. Mean annual temperature 50°
Vegetation: Ponderosa pine, incense cedar, bear clover, black oak; sparse stand, burned and cutover
Classification: **Typic Dystrandept, cindery, frigid.**
Remarks: The C1&R horizon is fractured rotten rock, breaking to angular cobbles and gravels, with less than 5 percent soil in cracks, except for the upper 10 inches. The B horizon contains 35 percent cobbles and gravels by volume. The A3 horizon contains 30 percent cobbles and gravels by volume; 20 percent of the volume of the A12 and the A3 horizons are roots. There are 2 inches of loose pine needles and 1 to 1½ inches of partially decomposed pine needles and organic matter on the surface.

HORIZON		DESCRIPTION
A11	0- 7"	Dark grayish brown (10YR 4/2) sandy loam, very dark grayish brown (10YR 3/2) when moist; strong very fine granular; soft when dry,
RSL No. 61128		very friable when moist, and nonsticky and nonplastic when wet; plentiful very fine to medium roots; many very fine interstitial pores; medium acid, pH 6.0; gradual smooth boundary.
A12	7-14"	Dark grayish brown (10YR 4/2) sandy loam, very dark grayish brown (10YR 3/2) when moist; moderate very fine granular; soft when dry,
RSL No. 61129		very friable when moist; nonsticky and nonplastic when wet; plentiful very fine to very coarse roots; many very fine interstitial pores; medium acid, pH 6.0; gradual smooth boundary.
A3	14-21"	Brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) when moist; moderate very fine granular; soft when dry; very friable when
RSL No. 61130		moist; nonsticky and nonplastic when wet; plentiful very fine to very coarse roots; many very fine interstitial pores; medium acid, pH 6.0; gradual smooth boundary.
B	21-34"	Brown (10YR 5/3) sandy loam, dark yellowish brown (10YR 3/4) when
RSL No. 61131		moist; moderate very fine granular; soft when dry, very friable when moist, nonsticky and nonplastic when wet; plentiful very fine to medium and few coarse roots; many very fine interstitial pores; medium acid, pH 6.0; abrupt slightly irregular boundary.
C1&R	34-66"	Brown (10YR 5/3) very cobbly, very gravelly loamy sand, dark brown
RSL No. 61132		(10YR 4/3) when moist; very hard when dry; few very fine to coarse roots; strongly acid, pH 5.5; abrupt smooth boundary.
R	66"+	Very pale brown to pink (10YR 7/3, 7/4; 7.5YR 7/4) rotten rock,
RSL No. 61133		dark yellowish brown (10YR 4/4) when moist; massive rotten rock; extremely hard when dry; no roots; strongly acid, pH 5.5.

U. S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Vitrandept, medial-skeletal, mesic

SOIL McCarthy loam SOIL Nos. S62Calif-3-1 LOCATION Amador County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62435 - 62440

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)			Coarse fragments 1A2a: > 2 1/ Pct	Coarse fragments 1A2a: 2 – 19 Pct. of < 76mm	Coarse fragments 1A2a: 19 – 76 Pct. of < 76mm
		Pct. of < 2 mm																
0–4	A11	56.2	35.9	7.9	8.7	13.3	8.5	16.4	9.3	12.4	23.5	29.9	46.9			25		
4–7	A12	58.9	34.7	6.4	10.5	14.4	8.6	15.3	10.1	13.3	21.4	31.6	48.8			22		
7–16	A3	59.2	33.5	7.3	8.3	13.8	9.1	16.8	11.2	12.2	21.3	32.6	48.0			15		
16–24	B2	50.1	40.1	9.8	5.0	11.6	8.8	16.0	8.7	17.8	22.3	34.8	41.4			47		
24–34	B3	53.9	34.0	12.1	4.5	12.0	9.4	17.3	10.7	11.5	22.5	31.2	43.2			46		
34+	R	52.7	35.1	12.2	3.5	10.4	9.0	18.1	11.7	12.3	22.8	33.8	41.0			56		

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. Iron as Fe Pct.	6E1b Carbonate as $CaCO_3$ Pct.		Bulk density: 4A1f 1/3 bar g/cc	Bulk density: 4A1h Oven dry g/cc		4A C'	Water content: Pct	Water content: 4B1c 1/3 bar Pct.	Water content: 4B2 15 bar Pct.	4D1 Extensibility COLEF in./in.	4D1 Extensibility COLE in./in.	pH: 8C1a H_2O 1:1		
0–4	9.30	0.337	28										22.8			6.4		
4–7	3.11	0.124	25										15.8			6.6		
7–16	1.70	0.093	18										15.4			6.4		
16–24	0.75	0.050	15				0.93	0.99		0.74		33.7	15.8	0.021	0.016	6.1		
24–34	0.52	0.040	13				1.09	1.13		0.74		35.5	17.0	0.015	0.009	5.7		
34+	0.53	0.044	12				0.99	1.05		0.68		42.3	17.7	0.020	0.013	5.4		
																6.1		
																5.7		
																5.4		

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	5A3a Sum		6G1d KCl Ext. Al^{+++}						Base saturation: 5C3 Sum Pct.	Pct.
	meq/100 g																
0–4	21.6	2.8	0.3	2.1	26.8	30.5		57.2								47	
4–7	11.2	4.5	0.1	2.0	17.8	21.6		39.4								45	
7–16	9.3	2.1	0.3	1.1	12.7	21.6		34.3								37	
16–24	13.2	2.6	0.2	0.8	16.8	16.8		33.6								50	
24–34	15.4	2.7	0.2	0.8	19.1	15.0		34.1								56	
34+	16.5	2.1	0.2	0.6	19.4	15.4		34.8								56	

Depth (In.)	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Mica	Kaolin	
	X-ray				

1/ From characterization sample (5 kg).

McCARTHY SANDY LOAM
S62Calif-3-1

Location: 0.3 mile N and 0.2 mile W of the southeast corner of section 26, T. 8 N., R. 14 E., Amador County, California; 2.3 miles southwest of Ham's station, 100 feet S of the intersection of Winton Lumber Company field roads Nos. 5 and 6. Date of Sampling: December 11, 1962.
Described by: John E. McClelland. Collectors: Klaus W. Flach, Grant M. Kennedy, John Rogers, and John E. McClelland.
Classification: Typic Vitrandept, medial-skeletal, mesic.
Vegetation: Dominantly white fir, with ponderosa pine, incense cedar, sugar pine and an understory of mountain misery. Climate: Precipitation 47 inches (estimated), some as snow; mean annual temperature 48° F. (estimated). Parent Material: Tuff breccia. Relief: Simple north facing slope of 14 percent towards a saddle in the mountainous uplands of the Sierra Nevada. Elevation: 4740 feet. Drainage: Well drained; moderately rapid permeability; very slow runoff. Biological Activity: None observed. Remarks: The site appeared to be uneroded and no surface stones were observed. The soil was moist when sampled.

Horizon	DESCRIPTION
O1	2 to 0 inches, fresh pine needles, leaves, and twigs that are quite well decomposed in the lower portion.
A11 RSL No. 62435	0 to 4 inches, dark brown (7.5YR 3/2) sandy loam, very dark brown (7.5YR 2/2) when moist, strong very fine granular structure; soft, very friable, nonsticky and nonplastic; abundant very fine, few fine roots; many very fine interstitial pores; slightly acid, pH 6.3; clear, smooth boundary.
A12 RSL No. 62436	4 to 7 inches, dark brown (7.5YR 4/3) sandy loam, dark brown (7.5YR 3/2) when moist; strong very fine granular structure; soft, very friable, nonsticky and nonplastic; plentiful very fine to coarse roots; many very fine interstitial pores; about 10 percent of volume consists of rotten cobbles; soil is difficult to wet and appears slightly grayish because of mycelia; medium acid, pH 6.0; clear, smooth boundary.
A13 62437	7 to 16 inches, similar to above except lacks mycelia; gradual, smooth boundary.
B2 RSL No. 62438	16 to 24 inches, brown (7.5YR 5/3) sandy loam, dark brown (7.5YR 3/3) when moist; massive but crumbles readily to moderate very fine granules; soft, friable, nonsticky and nonplastic; roots and pores as above; about 25 percent rotten cobbles containing common very fine pores with yellowish brown colloidal stains in them and in adjacent areas; medium acid, pH 5.8; gradual smooth boundary.
B3 62439	24 to 34 inches, similar to above but with 40 percent rotten cobbles and strongly acid, pH 5.5; clear, slightly irregular boundary.
R RSL No. 62440	34 inches +, gray, light brownish gray, yellowish brown, with a few flecks of very dark gray (10YR 6/1, 6/2, 5/6, and 3/1) decomposing coarse sandy tuffaceous conglomerate of sandy loam texture when crushed, brown to grayish brown and black (7.5YR 4/2 to 2.5Y 5/2 and 2/2) when moist; massive; hard, very firm; few fine to coarse roots along fracture planes; many very fine irregular pores; some with thin red, others light brownish gray colloidal coatings that extend into the adjoining matrix.

Additional notes: Sands are uniformly but thinly coated dark brown (7.5YR hue) and all but the coarser grains are well rounded. Most of the sand grains appear to have a mineral core with many very fine pores lined with thin, reddish brown clay films in both the A and B horizons. The sand in the A horizon has a lower value than it has in the B horizon. A few sand grains in the B2 horizon appear to be clean but pitted mineral grains.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Piper sandy loam (taxadjunct) **LOCATION** Contra Costa County, California

SOIL FAMILY: Aeric Haplaquept, sandy, mixed, calcareous, thermic.

SOIL NOS. 57Calif-7-3 **LAB. NOS.** 5830 - 5834

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 1B1b VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-2	A1	0.4	4.6	16.2	51.3	7.2	10.9	9.4	37.7	7.4	0	lfs
2-8	AC	0.2	6.5	18.5	45.4	6.4	12.7	10.3	32.6	8.6	0	fsl
8-26	C11	0.1	5.4	18.3	54.4	5.8	5.8	10.2	35.9	4.0	0	lfs
26-44	C12	0.0	7.2	20.5	54.0	6.0	5.3	7.0	34.9	3.7	0	lfs
44+	C13	0.0	7.4	22.7	55.1	6.6	3.7	4.5	35.8	2.3	0	fs

DEPTH INCHES	pH 8C1b SATURATED PASTE 1:1	pH 1:5	pH 8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	ORGANIC MATTER 6B1a NITROGEN %	ORGANIC MATTER C/N	6I1a CO_3 meq/l	8A1a Elec. Conduc. mmhos/cm at 25°C.	6E1b $CaCO_3$ equivalent %	6J1a HCO_3 meq/l	MOISTURE TENSIONS 4B1 1/10 ATMOS. %	MOISTURE TENSIONS 1/3 ATMOS. %	4B2 15 ATMOS. %
0-2	7.7		8.1	5.69	0.433	13.1	2.0	2.0	2	18.3			14.4
2-8	8.2		8.7	1.77	0.185	9.6	0.0	1.2	7	7.3			9.2
8-26	8.4		9.1	0.30	0.023	13.0	0.0	0.7	9	10.9	13.8	11.8	4.6
26-44	8.3		9.0	0.21			0.0	0.9	5	3.7	11.6	7.8	3.5
44+	8.1		8.7	0.15			0.0	1.4	Tr	2.4	8.8	6.4	2.8

DEPTH INCHES	5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	5B Exch. 5B1b Na 6P2a	5B Exch. 5B1b K 6Q2a	5D1 EXCH. Na %	SATURATION EXTRACT SOLUBLE 6P1a Na	6Q1a K	6N1a	6O1a	8A1 6K1a	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil							milliequivalents per liter					
0-2	24.1	19.3	11.7	--	0.2	1.3	0.8	2.2	2.6	8.1	9.3	2.3	65.3
2-8	21.9	12.4	13.9	--	0.3	1.7	1.4	3.1	1.8	2.6	7.1	3.3	44.9
8-26	7.5	13.1	5.5	--	0.1	0.4	1.3	2.2	0.5	2.1	3.9	0.7	27.2
26-44	6.3	16.5	4.4	--	0.2	0.6	3.1	3.2	0.1	2.5	3.9	1.0	32.0
44+	5.2	4.8	2.9	--	0.3	0.9	5.8	2.1	0.1	3.0	5.1	4.0	30.7

PIPER SANDY LOAM (taxadjunct) 1/
S57Calif-7-3

Collector: R. C. Huff. **Date of sampling:** May 14, 1957.
Location: Contra Costa County, California. 100 feet south NE corner of NW1/4NE1/4 sec. 26, T. 2. N., R. 3 E., projected. Eastern Contra Costa SCD. Holland Tract-Dutra Ranch pit silo. 1 mile due north of barn.
Classification: Aeric Haplaquept, sandy, mixed, calcareous, thermic.
Native Vegetation: Annual weeds and grasses, dominately ripgut (Bromus ridigus) red brome (Bromus rubens).
Climate: Rainfall 18". Cool moist winters, dry summers with occasional fog.
Parent Material: Mixed alluvium.
Relief: Undulating with mounds or long low ridges surrounded by peat or muck which has subsided from around these areas.
Elevation: 0 feet.
Drainage: Excessive surface and good internal.
Root Distribution: Numerous 0-2", some 2-10", few to 60".

HORIZON		DESCRIPTION
57Calif-07-3-1 A_1	0- 2"	Gray (10YR 5/1 dry); very dark gray (10YR 3/1 moist) sandy loam. Very friable, loose, nonsticky and nonplastic. Soil reacts violently to dilute HCl. The pH is 8.0. Clear and smooth lower boundary.
57Calif-07-3-2 AC	2- 8"	Light grayish brown (10YR 5.5/2 dry); dark grayish brown (10YR 4/2 moist) sandy loam. Massive, soft, friable, nonsticky and nonplastic. Soil reacts violently to dilute HCl. The pH is 8.0. Lime disseminated and as soft light gray blotches (10YR 7/2 dry). Root holes have rust colored stainings. Abrupt, smooth lower boundary.
57Calif-07-3-3 C_{11}	8-26"	Light gray (10YR 7/2 dry), light grayish brown (10YR 6/2 moist) sandy loam. Massive, slightly hard, friable, nonsticky, and nonplastic. Soil reacts violently to dilute HCl. The pH is 8.0. Diffuse, wavy lower boundary.
57Calif-07-3-4 C_{12}	26-44"	Pale brown (10YR 6/3 dry), brown to yellowish brown (10YR 5/3.5 moist) sandy loam. Massive, soft, firm, nonsticky and nonplastic. Soil reacts violently to dilute HCl. The pH is 8.0. Strong brown mottlings are common, medium, and prominent. Root holes have rust colored stainings. Diffuse, wavy lower boundary.
57Calif-07-3-5 C_{13}	44"+	Light yellowish brown (10YR 6/4 dry), yellowish brown (10YR 5/4 moist) sandy loam. Massive, friable, soft, nonsticky and nonplastic. Soil reacts violently to dilute HCl. The pH is 8.0. Strong brown mottlings - many, coarse, and prominent increasing in amounts with depth. Root holes have rust colored coatings.

1/ The Piper series is in a coarse-loamy, mixed, calcareous, thermic family of Aeric Haplaquepts. This pedon has less clay and more than 50 percent fine sand.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Reyes silty clay loam **LOCATION** Sonoma County, California

SOIL FAMILY: Sulfic Haplaquept, fine, mixed, acid, thermic.

SOIL NOS. S61Calif-49-13 **LAB. NOS.** 61478 - 61483

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0- 7	Ap1	0.1	0.3	0.2	0.5	0.3	39.7	58.9	3.8	36.5	0	c-sic
7-14	Ap2	0.1	0.3	0.1	0.5	0.4	37.9	60.7	2.3	36.3	0	c
14-22	C1g	0.0	0.1	0.1	0.3	0.3	40.2	59.0	1.9	38.8	0	sic-c
22-31	IIC2g	0.0	0.2	0.1	0.3	0.2	38.5	60.7	2.3	36.6	0	c
31-51	IIC3g	0.0	0.1	0.1	0.3	0.2	41.2	58.1	1.7	39.9	0	sic
51-63+	IIC4g	0.1	0.3	0.1	0.4	0.2	36.0	62.9	2.9	33.5	0	c

pH 8C1a H_2O 1:1	pH 8C1c KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	SATURATION EXTRACT SOLUBLE 6P1a Na^+	6Q1a K^+	6N1a Ca^{++}	6O1a Mg^{++}	6K1a Cl^-	6I1a $CO_3^=$	8A1 6J1a HCO_3^-
					← milliequivalents per liter →						
4.2	3.3	5.01	0.427	12	2.7	0.5	1.0	3.1	4.3	-	0.7
4.1	3.2	5.04	0.421	12	3.0	0.4	1.2	3.0	4.1	-	0.2
3.7	3.1	2.63	0.225	12	12.5	0.9	2.7	9.2	18.2	-	-
3.7	3.1	2.29	0.208	11	58.5	1.1	4.7	17.3	29.4	-	-
3.6	3.2	1.96	0.197	10	56.3	1.8	8.1	37.6	55.6	-	-
3.6	3.4	5.48	0.368	15	213	7.3	25.8	184.	182	-	-

5A2a CATION EXCHANGE CAPACITY (+ Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	5B Exch. 5B1b Na 6P2a	5B Exch. 5B1b K 6Q2a	milliequivalents per 100g. soil →	BASE SAT. 1/ % EXCH. 1/ Na %	8A1a Elec. Conduc mmhos/cm. at 25°C.	7C1 Total Sulfur S %	6C1b Ext. Iron % Fe	4B2 Soil water 15 atmos. Pct.	8A MOISTURE AT SATURATION %
49.6	3.9	7.6	38.1	0.4	1.1			0.8	0.21	1.2	26.0	78.2
51.1	3.8	7.8	38.4	0.4	0.7			0.8	0.20	1.0	28.2	79.0
46.4	3.5	8.9	35.4	1.3	1.0			2.8	0.15	1.0	31.4	79.4
43.6	3.3	9.3	35.4	1.8	0.9			4.3	0.12	0.7	32.2	83.3
42.2	3.8	12.0	31.2	3.0	1.1			9.5	0.33	0.8	34.8	92.1
51.9	9.9	27.7	33.1	3.2	2.3			23.7	1.74	0.4	41.5	101.4

1/ Because of oxidizable S in the soil, base saturation and ESP have no meaning

REYES SILTY CLAY LOAM
S61Calif-49-13

Location: Sonoma County, California. Leveroni Ranch - 57° and 3800 feet from railroad bridge at Wingo. SW1/4, SW1/4, section 4, T. 4 N., R. 5 W. Date of Sampling: June 28, 1961. Collectors: Reuben Nelson, Leo C. Klameth, V. C. Miller, G. Lambert, J. H. Kashiwagi, F. Graham. Classification: Sulfic Haplaquept, fine, mixed, acid, thermic
Vegetation: Natural before cultivation - tules, saltgrass, hydrophytic plants. Use: Oat hay production. Climate: Subhumid mesothermal - annual precipitation 24.7 inches, mean January temperature 46.7° F., mean July temperature 66.3° F., mean annual temperature 57.5° F. Parent Material: Mixed alluvium. Elevation: Minus 1 foot. Relief: Gently undulating on 0-1 percent slope. Drainage: Poor. Biological Activity: Anaerobic bacteria in water logged subsoil.
Remarks: Soil conditions in this profile have been influenced by reclamation of tidal flats which have been diked and drained.

HORIZON	DESCRIPTION
Ap1 * RSL No. 61478	0 to 7 inches, grayish brown (10YR 5/2) silty clay loam, dark brown (10YR 3/3) when moist; fine granular structure; slightly hard when dry, friable when moist, sticky and plastic when wet; abundant very fine and fine roots; many very fine and fine interstitial pores; extremely acid, pH 4.0; gradual, smooth boundary.
Ap2 RSL No. 61479	7 to 14 inches, grayish brown (10YR 5/2) silty clay loam, very dark grayish brown (10YR 3/2) when moist; massive breaking out to fine granular structure; hard when dry, friable when moist, sticky and plastic when wet; abundant very fine and fine roots; many very fine and fine tubular and interstitial pores; extremely acid, pH 4.3; abrupt, wavy boundary.
C1g RSL No. 61480	14 to 22 inches, light brownish gray (10YR 6/2) silty clay with common fine distinct brownish yellow (10YR 6/6) mottles when dry, dark gray (10YR 4/1) with common fine distinct mottles of strong brown (7.5YR 5/6) when moist; organic root stains have dual colors when moist, very dark brown (10YR 2/2) and strong brown (7.5YR 5/6); structure is weak coarse subangular blocky; extremely hard when dry, firm when moist, sticky and plastic when wet; abundant very fine and fine roots; many very fine and fine tubular pores; sulfur-like stains along root channels are light gray (2.5Y 7/2) dry; very strongly acid, pH 4.5; gradual, smooth boundary.
IIC2g RSL No. 61481	22 to 31 inches, light gray (5Y 6/1) silty clay with common fine prominent mottles of yellowish red (5YR 5/6) with a few streaks of very dark grayish brown (10YR 3/2) when dry; dark gray (5Y 4/1) with mottles of strong brown (7.5YR 5/6) and black (10YR 2/1) when moist; root stains, strong brown (7.5YR 5/6) and very dark brown (10YR 2/2) when moist; sulfur-like stains along root channels are light gray (2.5Y 7/2) when dry; massive breaking out to very coarse prismatic structure; extremely hard when dry, firm when moist, sticky and very plastic when wet; abundant very fine and fine roots; common very fine and fine tubular pores; very strongly acid, pH 4.5; gradual, smooth boundary.
IIC3g * RSL No. 61482	31 to 51 inches, gray (N 6/) silty clay with common fine, prominent strong brown (7.5YR 5/6) mottles when dry, dark gray (5Y 4/1) with common fine distinct mottles of brown (10YR 5/3) and strong brown (7.5YR 5/6) when moist; stains are cleavage planes, brown (7.5YR 4/4) when moist; these stains are also affected by organic root remains and sulfur-like residues; moderate very coarse prismatic structure; extremely hard when dry, firm when moist, sticky and plastic when wet; abundant very fine and fine roots along ped faces, many very fine and fine tubular pores; very strongly acid, pH 4.5; gradual, smooth boundary.
IIC4g RSL No. 61483	51 to 63 inches +, mixed gray (N 5/) and black (N 2/) silty clay with a few fine distinct yellowish brown (10YR 5/6) mottles, mixed dark gray (5Y 4/1) to black (N 5/) with dark greenish gray (5GY 4/1) blotches when moist; the dark colors appear to be blotches from carbonized fragments of tules and are accompanied by hydrogen sulfide odor from anaerobic bacteria activity; massive in place; extremely hard when dry, firm when moist, sticky and plastic when wet; organic remains replace roots here; common very fine and fine tubular pores; reactions range from extremely acid, pH 4.0, to medium acid, pH 6.0. This horizon is wet and mucky and hard to observe in place.

* Horizons sampled for B.P.R.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Reyes silty clay loam **LOCATION** Sonoma County, California

SOIL FAMILY: Sulfic Haplaquept, fine, mixed, acid, thermic.

SOIL NOS. S61Calif-49-14 **LAB. NOS.** 61484 - 61489

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2	
0- 7	Ap1	0.0	0.3	0.2	0.7	0.5	45.2	53.1	4.9	41.2	0	sic
7-12	Ap2	0.0	0.2	0.1	0.7	0.5	44.7	53.8	3.9	41.7	0	sic
12-23	C3g	0.0	0.2	0.1	0.5	0.4	46.0	52.8	4.5	42.2	0	sic
23-39	C4g	0.1	0.2	0.3	1.0	0.7	41.6	56.1	2.6	40.3	0	sic
39-49	C5g	0.3	0.3	0.1	0.3	0.2	41.5	57.3	1.8	40.1	0	sic
49-59	C6g	0.2	0.3	0.1	0.2	0.3	46.5	52.4	4.6	42.3	0	sic

	pH		ORGANIC MATTER			SATURATION EXTRACT SOLUBLE						8A1
8C1a H_2O 1:1	8C1c KCl		6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6P1a Na^+	6Q1a K^+	6N1a Ca^{++}	6O1a Mg^{++}	6K1a Cl^-	6I1a $CO_3^=$	6J1a HCO_3^-
						← milliequivalents per liter →						
4.1			3.41	0.299	11	11.2	0.6	2.7	8.7	19.1	-	-
4.1			3.15	0.290	11	15.3	0.6	3.8	11.9	28.4	-	-
3.7			2.01	0.198	10	35.9	1.5	3.8	14.4	40.2	-	-
3.5			2.52	0.235	11	64.3	1.5	6.0	25.1	62.6	-	-
3.1			5.44	0.341	16	228.	3.6	22.4	200.	225	-	-
3.7			4.11	0.261	16	77.8	5.4	25.4	242	271	-	-

5A2a CATION EXCHANGE CAPACITY	EXTRACTABLE CATIONS 5B					BASE SAT. 1/ %	8A1a Elec. Condue. mmhos/cm. at 25° C.	Total Sulfur S 7C1 %	6C1b Ext. Iron % Fe	4B2 Soil water 15 atmos. Pct.		8A MOISTURE AT SATURATION %
	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	EXCH. 1/ Na %						
← Na →	milliequivalents per 100g. soil →											
42.7	4.5	11.1	27.3	1.1	1.0		2.6	0.28	1.4	23.8		70.3
43.6	4.9	11.2	27.4	1.4	0.8		3.4	0.20	1.3	24.1		72.5
41.1	3.3	8.5	32.8	2.7	0.9		5.2	0.37	1.6	34.1		88.3
51.4	8.9	27.6	39.8	3.5	1.2		8.2	0.49	2.0	39.2		96.5
45.1	8.5	28.4	41.3	5.6	1.2		28.3	2.06	0.9	40.4		99.8
45.5	10.0	30.3	31.3	26.2	2.0		25.5	3.24	0.6	38.6		94.7

1/ Because of oxidizeable S in the soil base saturation and ESP have no meaning.

KEYES SILTY CLAY LOAM
S61Calif-49-14

Location: Sonoma County, California. Reading Ranch - 278° and 4500 feet from railroad bridge at Wingo. NW1/4, NW1/4, section 8, T. 4 N., R. 5 W. Date of Sampling: June 29, 1961. Collectors: Reuben Nelson, Leo C. Klameth, V. C. Miller, G. Lambert, J. H. Kashiwagi, F. Graham. Classification: Sulfic Haplaquept, fine, mixed, acid, thermic. Vegetation: Natural before cultivation - tules, saltgrass, hydrophytic plants. Use: Oat hay production. Climate: Subhumid mesothermal - annual precipitation 24.7 inches, mean annual January temperature 46.7° F., mean July temperature 66.3° F., mean annual temperature 57.5° F. Parent Material: San Pablo Bay sediments. Elevation: Minus 1 foot. Relief: Gently undulating on 0-1 percent slope. Drainage: Poor. Biological Activity: Anaerobic bacteria in waterlogged subsoil.

Remarks: Soil conditions in this profile have been influenced by reclamation of tidal flats which have been diked and drained. Apparently deep plowing in past years has brought about a mixing of colors in the surface horizons and also reaction may vary from one aggregate to another in most of the horizons. This soil resists rewetting after it has dried beyond the "moist to the feel stage".

HORIZON	DESCRIPTION
Ap1 * RSL No. 61484	0 to 7 inches, mixed light brownish gray (10YR 6/2) and light gray (10YR 7/2) silty clay loam, olive gray (5Y 4/2) when moist; fine granular structure; slightly hard when dry, friable when moist, sticky and plastic when wet; abundant very fine and fine roots; reaction ranges from very strongly acid to slightly acid, pH 5.0 - 6.1; gradual, wavy boundary.
Ap2 RSL No. 61485	7 to 12 inches, grayish brown (10YR 5/2) silty clay loam, olive gray (5Y 4/2) when moist; granular structure; hard when dry, friable when moist, sticky and plastic when wet; abundant very fine and fine roots; very strongly acid, pH 5.0; abrupt, wavy boundary.
C3g RSL No. 61486	12 to 23 inches, gray (10YR 6/1) clay with common fine distinct yellowish brown (10YR 5/6) mottles when dry; dark grayish brown (2.5Y 4/2) with common, fine, distinct yellowish brown (10YR 5/4) mottles when moist; mottling occurs from sulfur residues, root channel deposits and fine organic matter; massive; extremely hard when dry; very firm when moist; sticky and plastic when wet; abundant very fine and fine roots; many very fine and fine tubular pores; very strongly acid, pH 5.0; gradual, smooth boundary.
C4g RSL No. 61487	23 to 39 inches, gray (10YR 6/1) silty clay with common, fine, distinct yellowish brown (10YR 5/6) mottles when dry, grayish brown (2.5Y 5/2) with common, fine, distinct mottles of yellowish brown (10YR 5/4) and very dark brown (10YR 2/2) when moist; mottling occurs from sulfur residues, root channel deposits and fine organic matter; very coarse prismatic structure; extremely hard when dry, very firm when moist, sticky and plastic when wet; plentiful very fine and fine roots; many very fine tubular pores; very strongly acid, pH 4.5; clear, smooth boundary.
C5g RSL No. 61488	39 to 49 inches, variegated gray (N 5/) and black (N 2/) silty clay with common fine distinct mottles of yellowish brown (10YR 5/6) when dry; dark gray (N 4/) and black (N 2/) with mottles of gray (10YR 6/1) and yellow (2.5Y 7/6) when moist; soil is quite wet and difficult to observe in places; some mottling caused by dark organic matter blotches; moderate very coarse prismatic structure; extremely hard when dry; very firm when moist; sticky and plastic when wet; plentiful fine roots; many very fine tubular pores; extremely strong acid, pH 4.0; clear, wavy boundary.
C6g * RSL No. 61489	49 to 59 inches, variegated gray (10YR 6/1) and very dark gray (N 3/) silty clay with common fine distinct mottles of yellowish brown (10YR 5/6) when dry, dark gray (5Y 4/1) and black (N 2/) with mottles of strong brown (7.5YR 5/6) when moist; very coarse prismatic structure; extremely hard when dry, firm when moist, sticky and plastic when wet; few fine roots concentrated on large cracks within horizon; common very fine tubular pores; water enters subsoil at 49 inch level; hydrogen sulfide odor evident; very strongly acid, pH 4.5.

* Horizons sampled for B.P.R.

SOIL SURVEY LABORATORY — Riverside, California

SOIL TYPE Marcuse silty clay (taxadjunct) **LOCATION** Riverside County, California

SOIL FAMILY: Vertic Haplaquept, fine, montmorillonitic, calcareous, thermic.

SOIL NOS. S57Calif-33-7 **LAB. NOS.** 57501 - 57506

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2	
0- 7	Ap	0.1	0.3	0.2	1.5	3.3	48.6	46.0	12.7	40.3	0	sic
7-18	B1	0.1	0.2	0.1	0.8	2.6	43.8	52.4	10.9	36.1	0	sic
18-28	B21	0.0	0.1	0.1	0.8	2.6	42.4	54.0	11.0	34.6	0	sic
28-44	B22	0.1	0.1	0.1	0.6	2.2	42.2	54.7	9.9	35.0	0	sic
44-56	Cca1	0.2	0.1	0.1	0.8	2.2	44.2	52.4	11.1	35.9	0	sic
56-64+	Cca2	0.2	0.2	0.2	1.0	2.8	43.0	52.6	12.0	34.6	0	sic

8C1b SATURATED PASTE 1:1	pH 8C1a 1:10	6J1a HCO_3* meq/l	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6I1a CO_3* meq/l	8A1a Elec. Conduc. EC x 10^3 MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	6F1a GYPSUM me./100g. SOIL		4A3a Bulk Density g/cc	4B2 Soil Water 15 atmos. %
7.8	8.2	5.1	1.03	0.097	10.6	0.0	5.0	2.3				19.2
7.7	8.0	3.0	0.77	0.062	12.4	0.0	9.8	3.5			1.49	20.3
7.9	8.4	3.3	0.70	0.051	13.7	0.0	9.8	4.7			1.54	21.6
8.0	8.7	3.8	0.55	0.037	14.9	0.0	9.8	4.0			1.60	21.5
8.0	8.2	2.9	0.40	0.027	14.8	0.0	14.7	3.9	8.0		1.53	22.3
8.0	8.1	2.9	0.32			0.0	17.7	3.6	11.5		1.49	23.2

5A2a CATION EXCHANGE CAPACITY (+ Na)	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	5D1 EXCH. Na %	SATURATION EXTRACT SOLUBLES 6P1a Na	6Q1a K	6N1a	6O1a	6K1a	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
40.3	38.4	10.4	-	5.2	1.6	13	30.3	0.5	14.5	6.2	27.4	71.6
41.0	39.3	13.1	-	7.7	1.4	19	63.0	0.5	29.0	8.0	82.9	74.3
41.0	34.9	12.7	-	14.6	1.4	36	78.0	0.4	12.2	3.4	83.5	78.4
41.1	27.8	9.9	-	19.8	1.3	48	89.0	0.2	5.0	3.9	81.6	88.3
44.1	59.8	9.9	-	18.4	1.1	42	141.0	0.4	26.5	3.9	91.7	83.8
44.8	59.7	24.9	-	21.2	1.0	47	166.0	0.5	28.4	5.6	107.3	86.5

MARCUSE SILTY CLAY (taxadjunct) 1/
S57Calif-33-7

Location: Riverside County, California. 1100 feet west and 1000 feet south of the N1/4 corner of Sec. 26, T. 4 S., R. 3 W. In barley field east side of San Jacinto River. Floyd Bonge Ranch, about 4 miles east-northeast of Perris.
Date of Sampling: June 7, 1957.
Description by: Fred C. Eggers. Collectors: George Borst, R. E. Nelson, Cliff Henry, and Arnold Knecht.
Classification: Vertic Haplaquept, fine, montmorillonitic, calcareous, thermic.
Vegetation: Irrigated barley--an excellent crop. Precipitation: 12 inches.
Parent Material: Mixed alluvium, chiefly granitic. Physiography: Flood plain.
Elevation: 1,418 feet. Drainage: Slow.
Remarks: Colorado River water used on this field three years.

HORIZON	DESCRIPTION
S57Calif-33-7-1 Ap 0-7"	**Light brownish gray (10YR 6/2 dry, dark gray 4/1 moist) silty clay; strongly defined medium subangular blocky breaking to strongly defined medium granular; hard when dry, firm when moist; sticky and very plastic when wet; moderately slow permeability; many plant roots; many fine pores; pH 8.4; strong effervescence; clear smooth lower boundary.**
S57Calif-33-7-2 B1 7-18"	**Gray (10YR 5/1 dry, very dark gray 3/1 moist) silty clay; strongly defined medium subangular blocky with slight evidence of prismatic structure; very hard when dry, very firm when moist; sticky and very plastic when wet; moderately slow permeability; many plant roots; many pores; pH 8.2; strong effervescence; gradual smooth lower boundary.**
S57Calif-33-7-3 B21 18-28"	**Gray (10YR 5/1 dry, dark gray to very dark gray 4/1-3/1 moist) silty clay; strongly defined medium subangular blocky with slight evidence of prismatic structure; very hard when dry, very firm when moist; sticky and very plastic when wet; slow permeability; occasional plant roots; many fine pores; pH 8.2; strong effervescence; gradual smooth lower boundary.**
S57Calif-33-7-4 B22 28-44"	**Gray (10YR 5/1 dry, dark gray to very dark gray 4/1-3/1 moist) silty clay; strongly defined medium subangular blocky with slight evidence of prismatic structure; very hard when dry, very firm when moist; sticky and very plastic when wet; slow permeability; occasional plant roots; many fine pores; pH 8.2; strong effervescence; clear wavy lower boundary.**
S57Calif-33-7-5 Cca1 44-56"	**Gray (10YR 6/1-5/1 dry, dark gray 4/1 moist) silty clay; massive; very hard when dry, very firm when moist; sticky and very plastic when wet; moderately slow permeability; few plant roots; few pores; pH 8.2; strong effervescence; gypsum in seams and pockets; clear wavy lower boundary.**
S57Calif-33-7-6 Cca2 56-64"+	**Gray (10YR 6/1 dry, dark gray 4/1 moist) silty clay; massive; very hard when dry, very firm when moist; sticky and very plastic when wet; few roots; few pores; pH 8.4; strong effervescence; calcium sulphate in seams and pockets of calcium carbonate concretions.**

1/ This pedon is slightly outside the range of characteristics of the Marcuse series as now defined.

SOIL SURVEY LABORATORY Riverside, California

OIL TYPE Piper sandy loam (taxadjunct) **LOCATION** Contra C sta County, California

SOIL FAMILY: Histic Humaquept, coarse-loamy, mixed, calcareous, thermic

SOIL NOS. S57Calif-7-4 **LAB. NOS.** 5835 - 5839

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-4	A1	Organic matter										
4-10	AC	0.2	6.2	14.8	46.2	5.9	8.9	17.8	31.6	6.7	0	fsl
10-24	C11	0.1	4.4	14.1	53.5	7.7	5.7	14.5	38.4	4.2	0	fsl
24-38	C12	0.3	5.6	13.8	44.5	8.4	16.6	10.8	41.0	3.6	0	fsl
38+	C13	0.2	4.5	14.4	62.5	8.8	3.7	5.9	44.6	2.1	0	fs

	pH		ORGANIC MATTER			6I1a	8A1a	6E1b	6J1a	MOISTURE TENSIONS		
8C1b SATURATED PASTE 1:1	1:5	8C1a 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	CO_3 meq/l	Elec. Conduc. mmhos/cm. at 25°C.	$CaCO_3$ equivalent %	HCO_3 meq/l	4B1a 1/10 ATMOS. %	4B1a 1/3 ATMOS. %	4B2 15 ATMOS. %
7.0		7.3	25.03	1.607	15.6	0.0	1.5	Tr	9.5			41.1
8.0		8.6	2.79	0.247	11.3	0.0	2.9	16	10.7			10.3
8.3		8.9	0.40	0.039	10.3	0.0	1.4	13	5.4			6.3
8.5		9.0	0.22			0.0	0.8	13	9.1	16.1	12.9	4.9
8.5		9.0	0.08			0.0	0.7	2	9.3	9.1	7.5	3.0

5A2a CATION EXCHANGE CAPACITY (+ Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	5D1 EXCH. Na %	SATURATION EXTRACT SOLUBLES 6P1a Na	6Q1a K	6N1a	6O1a	6K1a	8A1 8A MOISTURE AT SATURATION %
	millieq. per 100g. soil →						← millieq. per liter →					
86.5	33.3	51.5	--	1.0	2.4	1.2	3.3	1.6	6.7	6.9	4.4	146.7
20.6	19.2	11.8	--	0.1	0.2	0.5	22.3	0.8	10.1	16.8	6.8	46.1
8.1	18.8	7.1	--	0.3	0.2	3.7	5.1	0.4	6.3	10.6	2.3	33.2
5.8	18.7	5.2	--	0.2	0.4	3.4	3.1	1.0	1.6	3.3	0.5	32.1
4.8	15.6	5.3	--	0.6	0.7	13.0	1.2	2.2	1.0	2.7	0.5	28.6

PIPER SANDY LOAM (taxadjunct) 1/
S57Calif-7-4

Collector: R. C. Huff. **Date of Sampling:** May 14, 1957.
Location: Contra Costa County, California. NE corner of SE1/4SW1/4 sec. 10, T. 2 N., R. 3 E. MDB&M, projected. Eastern Contra Costa SCD. Bethel Island, Honegger Ranch at Pit Silo 1/2 mile due east of house.
Classification: Histic Humaquept, coarse-loamy, mixed, calcareous, thermic.
Native Vegetation: Annual weeds and grasses - mainly ripgut brome (Bromus ridigus) and Red Brome (Bromus rubens).
Climate: Rainfall 18". Cool moist winters. Dry summers with occasional fog.
Parent Material: Mixed alluvium.
Relief: Undulating with mounds or long low ridges surrounded by peat and muck which has subsided from around these areas.
Elevation: 0 feet.
Drainage: Excessive surface and good internal.
Root Distribution: Numerous 0-4", some 4-10", few to 60".

HORIZON		DESCRIPTION
57Calif-07-4-1 A_1	0- 4"	Very dark gray (10YR 3/1 dry); black (10YR 2/1 moist) sandy loam. Crumb structure, loose, nonstick y and nonplastic. The soil mass is noncalcareous but lime occurs as small nodules which appear to have been brought up from the underlying horizon. The pH is 8.0. Clear, wavy lower boundary.
57Calif-07-4-2 AC	4-10"	Light gray (10YR 7/1 dry); grayish brown (10YR 5/2 moist) sandy loam. Massive, soft, very friable, nonsticky and nonplastic. The soil reacts violently to dilute HCl and lime is disseminated. The pH is 8.0. Root holes have iron coatings. Krotovinas are common. Clear, smooth lower boundary.
57Calif-07-4-3 C_{11}	10-24"	Light gray (10YR 7/1 dry); grayish brown (10YR 5/2, moist) sandy loam. Massive, firm, friable, nonsticky and nonplastic. The soil reacts violently to dilute HCl, the pH is 8.0. Rust-colored iron stains follow root holes into horizon below. Diffuse and wavy boundary.
57Calif-07-4-4 C_{12}	24-38"	Light gray (10YR 7/2, dry); light grayish brown (10YR 6/2 moist) sandy loam. Massive, hard, firm, nonsticky and nonplastic. Brownish colored mottlings (10YR 6/4-7/4 dry) are common, medium and distinct. Root holes have rust colored coatings. Soil reacts violently to dilute HCl. The pH is 8.0. Diffuse and wavy boundary.
57Calif-07-4-5 C_{13}	38"+	Pale brown (10YR 6.5/3 dry); yellowish brown (10YR 5/4 moist) sandy loam. Massive, hard, firm, nonsticky and nonplastic. Soil reacts violently to dilute HCl. The pH is 8.0. Rust-colored mottlings (7.5YR 5/6) many, coarse, and prominent.

NOTE: The A_1 horizon of this soil is higher in organic matter (admixture of peat) than the A_1 of 57Calif-07-3-1.

1/ The Piper series is in a coarse-loamy, mixed, calcareous, thermic family of Aeric Haplaquepts. This pedon has a histic epipedon.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Dystric Cryochrept, loamy-skeletal, mixed

SOIL Umpa gravelly sandy loam (taxadjunct) SOIL Nos. S68Calif-31-7 LOCATION Placer County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. R7021 - 7025

Depth cm.	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: (0.05–0.02)	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	1/ Coarse fragments 1A2a: > 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76mm	
0–8	A1	53.6	37.0	9.4	11.4	10.8	8.4	14.0	9.0	11.8	25.2	28.5	44.6					
8–28	A3	52.4	33.2	14.4	10.8	11.2	8.1	14.0	8.3	9.7	23.5	25.5	44.1					
28–51	B1	52.9	32.9	14.2	6.3	11.3	9.7	16.7	8.9	9.7	23.2	27.5	44.0					
51–89	B2	46.1	36.8	17.1	4.2	11.1	8.4	13.9	8.5	8.9	27.9	24.9	37.6					
89–125	R	42.9	38.1	19.0	3.5	10.3	8.2	13.3	7.6	7.3	30.8	22.3	35.3					

Depth cm.	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6C2b Ext. Iron as Fe Pct.	6E1b Carbonate as $CaCO_3$ Pct.	Bulk density 4A1f 1/3 bar g/cc	Bulk density 4A1h Oven dry g/cc	Bulk density g/cc	3B2 Cm	Water content Pct.	Water content 4B1c 1/3 bar Pct.	Water content 4B2 15 bar Pct.	4D1 Extensibility LEf Pct	4D1 Extensibility LE Pct	pH 8C1a H_2O 1:1	pH 8C1e $CaCl_2$
0–8	3.20														6.3	5.8
8–28	0.48														6.1	5.2
28–51	0.45														5.9	5.0
51–89	0.57														5.7	5.0
89–125	0.23														5.5	4.9

Depth cm.	Extractable bases 6N2e Ca	6O2d Mg	6P2a Na	5B4a 6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity 5A6a NH_4OAc	Cation Exch. Capacity 5A3a Sum	6G1e KCl Ext. Al^{+++}	Base saturation 5C1 NH_4OAc Pct.	Base saturation Pct
	meq/100 g										
0–8	3.9	0.5	0.2	0.7	5.3		18.9			28	
8–28	2.9	0.9	0.2	0.8	4.8		13.3			36	
28–51	2.5	1.0	0.2	0.9	4.6		14.4			31	
51–89	3.9	0.8	0.2	1.0	5.9		15.6			37	
89–125	5.3	1.2	0.3	0.8	7.6		15.0			50	

Depth cm.	Clay mineralogy (<0.002 mm.) 3A1 Mont.	Verm.	Mica 7A2 X-ray	Kaolin.
0–8				
8–28				
28–51				
51–89				
89–125				

UMPA GRAVELLY SANDY LOAM (taxadjunct) 1/
S68Calif-31-7

Location: Tahoe Basin, Placer County, California; 0.4 mile north of SE corner, sec. 23, T. 16 N., R. 16 E., 75 feet SW of logging road. Date of Sampling: September 19, 1968. Description by: G. M. Kennedy and G. L. Anderson. Collectors: J. H. Rogers, L. I. Larsen, W. E. Dollarhide.
Classification: Dystric Cryochrept, loamy-skeletal, mixed.
Vegetation: Red fir, white fir, western white pine, pinemat manzanita. Climate: Precipitation is 35 to 40 inches. Mean annual temperature 40°F., January 23°F., July 57°F. Parent Material: Andesite. Topography: Uplands, 8 percent slope, east aspect. Elevation: 7700 feet. Drainage: Well drained; runoff is medium; permeability is moderate. Soil Moisture: Dry throughout profile.
Remarks: This is not the type location for Survey Area. Field determination of pH by Hellige-Truog triplex indicator. Five percent of surface area covered with stones and an occasional boulder. Soil temperature at 20 inches 52°F. Fine to coarse roots found in fracture planes at 35 to 49 inches. B2 horizon appeared marginal to an argillic horizon. Coarse fragments estimated as percent by volume.

HORIZON	DESCRIPTION
	(3-0 cm.)
O1	1 to 0 inch, fresh and decomposed conifer needles. Not sampled.
	(0-8 cm.)
A1 RSL 7021	0 to 3 inches, grayish brown (10YR 5/2) gravelly sandy loam, dark reddish brown (5YR 3/3) moist; weak coarse platy and weak coarse granular structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, common medium and few coarse roots; common very fine tubular and interstitial pores; 15 percent gravel; medium acid (pH 6.0); clear smooth boundary.
	(8-28 cm.)
A3 RSL 7022	3 to 11 inches, pinkish gray (7.5YR 6/2) gravelly sandy loam, reddish brown (5YR 4/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; many very fine, fine, medium and coarse roots; common very fine and very few fine tubular pores; 25 percent gravel and 5 percent cobbles; strongly acid (pH 5.5); clear wavy boundary.
	(28-51 cm.)
B1 RSL 7023	11 to 20 inches, pinkish gray (7.5YR 6/2) gravelly sandy loam, reddish brown (5YR 4/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; many very fine, fine, medium and coarse roots; common very fine and very few fine tubular pores; 15 percent gravel, 5 percent cobbles; strongly acid (pH 5.5); clear irregular boundary.
	(51-89 cm.)
B2 RSL 7024	20 to 35 inches, pinkish gray (5YR 6/2) gravelly loam, reddish gray (5YR 5/2) moist; massive; slightly hard, friable, nonsticky and slightly plastic; many medium and coarse and common very fine and fine roots; common very fine tubular and interstitial pores; common thin clay films line pores; 25 percent gravel and 50 percent cobbles; very strongly acid (pH 4.5); clear irregular boundary.
	(89-125 cm.)
R RSL 7025	35 to 49 inches, partially weathered andesite having a distinct purple color.

1/ The Umpa series is in a loamy-skeletal, mixed, family of Typic Cryochrepts. This pedon has a base saturation of less than 60 percent throughout the upper 75 cm.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Dystric Cryochrept, fine-loamy, mixed

SOIL Umpa gravelly loam, deep variant SOIL Nos. S68Calif-31-10 LOCATION Placer County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. R7026 - 7031

Depth cm.	Horizon	1B1b Total Sand (2-0.05)	Silt (0.05-0.002)	Clay (< 0.002)	Size class and particle diameter (mm) 3A1 Sand: Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Silt: 0.05-0.02	Int. III (0.02-0.002)	Int. II (0.2-0.02)	(2-0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	1/ Coarse fragments 1A2a > 2	2 - 19	19 - 76
		Pct. of < 2 mm														Pct.	Pct. of < 76mm	
0-8	A11	38.6	50.1	11.3	8.8	8.1	4.0	8.0	9.7	16.0	34.1	30.6	28.9					
8-33	A12	25.1	49.7	25.2	3.3	3.5	2.3	8.0	8.0	15.4	34.3	28.6	17.1					
33-51	B1t	23.8	47.7	28.5	0.8	1.9	2.0	8.0	11.1	14.1	33.6	30.7	12.7					
51-79	B21t	24.2	53.7	22.1	0.8	2.2	2.1	7.9	11.2	15.0	38.7	31.4	13.0					
79-130	B22t	27.8	53.2	19.0	1.5	3.4	2.9	9.2	10.8	15.5	37.7	32.1	17.0					
130-165	B23t	22.2	52.9	24.9	0.3	2.1	2.9	8.9	8.0	12.1	40.8	25.5	14.2					

Depth cm.	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2b Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Bulk density 4A1f 1/3 bar	4A1h Oven dry		3B2	Water content 4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility LEf	4D1 Extensibility LE	pH 8C1a H_2O 1:1	8C1e $CaCl_2$
	Pct.	Pct.		Pct.	Pct.	g/cc	g/cc	g/cc	Cm	Pct.	Pct.	Pct.	Pct.		
0-8	13.13													5.5	5.0
8-33	0.98													5.5	5.1
33-51	0.67													5.6	5.2
51-79	0.65													5.7	5.1
79-130	0.20													5.9	5.4
130-165	0.21													5.8	5.4

Depth cm.	Extractable bases 5B4a 6N2a Ca	6O2d Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity 5A6a NH_4OAc	5A3a Sum		6G1e KCl Ext. Al^{+++}					Base saturation 5C1 NH_4OAc	
	meq/100 g														Pct.	Pct.
0-8	9.2	1.4	0.3	1.4	12.3		46.6								26	
8-33	4.2	0.9	0.2	1.3	6.6		20.3								32	
33-51	4.6	1.0	0.3	1.7	7.6		21.0								36	
51-79	3.8	0.9	0.2	1.7	6.6		22.0								29	
79-130	4.0	1.2	0.3	1.7	7.2		20.3								35	
130-165	3.6	1.0	0.2	2.0	6.8		20.1								33	

Depth cm.	Clay mineralogy (<0.002 mm.) 3A1 Mont.	Verm.	Mica 7A2 X-ray	Kaolin.
0-8				
8-33				
33-51				
51-79				
79-130				
130-165				

UMPA GRAVELLY LOAM, DEEP VARIANT 1/

S68Calif-31-10

Location: Tahoe Basin, Placer County, California; 2,300 feet north and 650 feet east of E¼ corner sec. 35, T. 16 N., R. 16 E., 30 feet east of logging road and 2¼ miles NNW of Tahoe City. Date of Sampling: September 19, 1968.
Description by: J. H. Rogers. Collectors: J. H. Rogers and P. G. Nazar.
Classification: Dystric Cryochrept, fine-loamy, mixed.
Vegetation: Red fir, whitebark and western white pine, prostrate manzanita. Climate: Precipitation is 35 to 40 inches. Mean annual temperature is 40°F., January 23°F., July 57°F. Parent Material: Latite. Topography: Slightly convex upland with 18 percent slope and north aspect. Elevation: 7120 feet. Drainage: Well drained; runoff is medium; permeability is moderate. Soil Moisture: Soil dry to 15 inches, slightly moist below.
Remarks: This is not the series type location. Profile taken in Jorge-Tahoma complex. Surface stones cover about 6 percent of area. Field determination of pH by Hellige-Truog triplex indicator. Question as to whether the B23t formed by weathering in place. Coarse fragments estimated as percent by volume. *Depth to a lithic contact is more than 40 inches. Clay content is higher and content of coarse fragments is lower than defined for the Umpa series.

HORIZON	DESCRIPTION
	(1-0 cm.)
01	1/2 to 0 inch, fresh and decomposed conifer needles. Not sampled.
	(0-8 cm.)
A11 RSL 7026	0 to 3 inches, brown and dark brown (10YR 4/3, 3/3) gravelly loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine and common fine roots; many very fine tubular and interstitial pores; 20 percent gravel; slightly acid (pH 6.2); abrupt smooth boundary.
	(8-33 cm.)
A12 RSL 7027	3 to 13 inches, brown (7.5YR 5/4) gravelly loam, reddish brown (5YR 4/4) moist; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine and many medium roots; common very fine, fine and medium pores; 20 percent gravel; medium acid (pH 5.8); clear smooth boundary.
	(33-51 cm.)
B1t RSL 7028	13 to 20 inches, light brown (7.5YR 6/4) gravelly loam, brown (7.5YR 4/4) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine, fine, medium and coarse roots; common very fine, fine and medium pores; few thin clay films in pores; 20 percent gravel and 5 percent cobbles; strongly acid (pH 5.5); clear smooth boundary.
	(51-79 cm.)
B21t RSL 7029	20 to 31 inches, light brown (7.5YR 6/4) gravelly clay loam, brown (7.5YR 4/4) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine, fine and medium roots; common very fine, fine and medium pores; common thin clay films line pores and on faces of peds; 20 percent gravel, 10 percent cobbles; strongly acid (pH 5.5); clear smooth boundary.
	(79-130 cm.)
B22t RSL 7030	31 to 52 inches, light brown (7.5YR 6/4) gravelly clay loam, brown (7.5YR 4/4) moist; moderate fine subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few very fine, fine and medium roots; few very fine and fine tubular pores; many thin clay films line pores and on faces of peds; 25 percent gravel, 10 percent cobbles, 2 percent stones; very strongly acid (pH 4.8); clear wavy boundary.
	(130-165 cm.)
B23t RSL 7031	52 to 65 inches, light brown (7.5YR 6/4) clay loam, reddish brown (5YR 4/4) moist; moderate fine and medium subangular blocky structure; very hard, firm, slightly sticky, and plastic; no roots; few very fine and fine tubular pores; many thin clay films line pores and on faces of peds; no gravel; very strongly acid (pH 4.8); clear wavy boundary.
	(165 cm.)
R	65 inches, slightly weathered latite.

1/ The Umpa series is in a loamy-skeletal, mixed family of Typic Cryochrepts. This pedon has a base saturation of less than 60 percent throughout the upper 75 cm. and more than 18 percent clay and less than 35 percent coarse fragments in the 25 to 100 cm. depth.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Durochrept, coarse-loamy, mixed, thermic
SOIL Arlington loam (taxad junct) SOIL Nos. S66Calif-37-3 LOCATION San Diego County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 66243 - 66248

Depth (in.)	Horizon	1B1h Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: (0.05–0.02)	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)			1/ Coarse fragments 1A2a: ≥ 2 Pct.	2–19 Pct. of < 76mm	19–76 Pct. of < 76mm	
		Size class and particle diameter (mm) 3A1																	
		Pct. of < 2 mm																	
0- 1	A11	50.9	38.2	10.9	3.4	15.8	15.4	11.8	4.5	17.8	20.4	26.7	46.4	0	11	10	8	2	2/
1- 5	A12	54.5	34.7	10.8	2.7	14.9	17.9	13.5	5.5	15.6	19.1	26.2	49.0	0	11	11	8	3	2/
5-10	A2	51.5	37.6	10.9	2.2	13.3	16.9	13.6	5.5	16.9	20.7	27.9	46.0	0	11	15	9	6	2/
11-21	B2tsim	65.5	9.5	25.0	11.3	22.2	15.7	12.5	3.8	5.8	3.7	15.3	61.7	0	25	9	0	1	3/
21-24	IIB31sim	82.7	9.0	8.3	16.6	27.8	19.5	14.0	4.8	5.2	3.8	16.2	77.9	0	8	27	4	11	4/
24-58+	IIB32sim	63.4	10.5	26.1	5.0	19.0	23.5	11.9	4.0	5.5	5.0	14.2	59.4	0	26	80	10	59	4/

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven dry		3B2	Water content	4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH: 8C1a H_2O 1:1		
	Pct.	Pct		Pct.	Pct	g/cc	g/cc	g/cc	Cm	Pct	Pct	Pct.	in./in.	in./in.			
0- 1	5.11														5.2		
1- 5	0.96					1.70	1.73		0.93		12.9	4.1	0.005	0.004	6.0		
5-10	0.31					1.81	1.84		0.89		10.5	3.2	0.004	0.004	5.4		
11-21	0.22					1.52	1.64		0.94		23.3	13.0	0.027	0.026	4.5		
21-24	0.13														4.3		
24-58+	0.13														4.0		

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	5A3a Sum	6G1d KCl Ext. Al^{+++}	Base saturation: 5C3 Sum	5C1 NH_4Ac
	meq/100 g									Pct	Pct.
0- 1	4.7	1.9	0.5	0.7	7.8	11.0	18.4	18.8	0.2	41	42
1-5	4.4	2.1	0.4	0.4	7.3	3.9	8.3	11.2	-	65	88
5-10	2.2	2.0	0.4	0.4	5.0	3.9	6.7	8.9	0.4	56	75
11-21	4.0	6.2	2.3	0.4	12.9	13.7	23.5	26.6	7.4	48	55
21-24	2.9	4.1	2.7	0.2	9.9	10.7	20.7	20.6	5.1	48	48
24-58+	3.8	6.8	4.8	0.3	15.7	8.7	19.0	24.4	3.6	64	83

Depth (In.)	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Mica	Kaolin
	X-ray			
0- 1				
1- 5	t	-	x	xx
5-10				
11-21	xxx	-	-	xxx
21-24				
24-58+				

1/ From characterization sample (5Kg)(except as noted).
2/ 2-19 mm. from characterization sample, 19-76 mm. from field weight (>50 Kg).
3/ 2-19 mm. from characterization sample, 19-76 mm. from field weight; >2 mm. includes volume estimate of >76 mm. fraction.
4/ Calculation of % >2 mm. of these horizons differs from that of those above only in that a Bd 1/3 bar of 1.79 g./cc. was assumed for 66247 and a Bd 1/3 bar of 1.92 g./cc. was assumed for 66248.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

ARLINGTON LOAM (taxadjunct) 1/
S66Calif-37-3

Location: San Diego County, California; Miramar Transect No. 1, station 44.1; 950 feet west and 750 feet north of the southeast corner of section 24, T. 15 S., R. 3 W. Date of sampling: June 10, 1966.
Description by: George Borst, David Estrada, Gerald Kester, Reuben Nelson, and Dennis Nettleton. Samples collected by: Klaus Flach, Benny Brasher, and Dennis Nettleton.
Classification: Typic Durochrept, coarse-loamy, mixed, thermic.
Vegetation: Flattop buckwheat. Climate: Weather record for San Diego, near the sampling site, is mean winter air temperature 55° F., mean summer air temperature 68° F., mean annual precipitation 10 inches. Parent Material: Stream deposit over Pleistocene marine terrace. Topography: Flat marine terrace of less than 1 percent slope. Elevation: 425 to 450 feet. Drainage: Moderately well drained; runoff is medium; permeability is very slow. Soil Moisture: Dry.
Remarks: Very cobbly below 24 inches.

HORIZON	DESCRIPTION
A11 RSL No. 66243	0 to 1 inch, grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) when moist; weak coarse platy structure; soft, friable, nonsticky, slightly plastic; abundant very fine roots; very strongly acid (pH 5.0); abrupt smooth boundary.
A12 RSL No. 66244	1 to 5 inches, strong brown (7.5YR 5/6) loam, dark yellowish red (5YR 4/6) when moist; massive; hard, friable, nonsticky, plastic; few very fine to medium roots; few very fine tubular pores; strongly acid (pH 5.5); abrupt smooth boundary.
A2 RSL No. 66245	5 to 10 inches, light brown (7.5YR 6/4) loam, brown (7.5YR 5/4) when moist; massive; hard, friable, nonsticky, plastic; few very fine to medium roots; many very fine tubular pores; very strongly acid (pH 5.0); abrupt smooth boundary.
B1	10 to 11 inches, pink (7.5YR 7/4) loam, light brown (7.5YR 6/4) when moist; massive; hard, friable, slightly sticky, plastic; few very fine to medium roots; many very fine tubular pores; few thin colloid stains on mineral grains; very strongly acid (pH 4.6); abrupt wavy boundary.*
B2tsim RSL No. 66246	11 to 21 inches, grayish brown (2.5Y 5/2) duripan, dark grayish brown (2.5Y 4/2) when moist with dark red (2.5YR 3/6) coatings of iron oxide and clay on cleavage planes; strong medium angular blocky structure; indurated; very few, very fine to fine roots; very strongly acid (pH 4.5); clear smooth boundary.
IIB31sim RSL No. 66247	21 to 24 inches, pale brown (10YR 6/3) gravelly duripan, brown (10YR 5/3) when moist; massive; indurated; very few fine roots; very strongly acid (pH 4.5); clear smooth boundary.
IIIB32sim RSL No. 66248	24 to 58 inches +, very cobbly duripan; massive; indurated, but somewhat weaker than above.

* Strongly degraded at contact with underlying duripan.

1/ The Arlington series is in a coarse-loamy, mixed, thermic family of Haplic Durixeralfs. This pedon has an indurated duripan. It also has clay skins and a clay increase sufficient for an argillic horizon in the duripan horizon. However, the classification system does not provide for horizons having properties of both argillic horizons and duripans.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Pentz sandy loam (taxadjunct) **LOCATION** Amador County, California

SOIL FAMILY: Typic Durochrept, coarse-loamy, mixed, thermic.

SOIL NOS. S60Calif-3-20 **LAB. NOS.** 6085 - 6089

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 2/	TEXTURAL CLASS
0- 5	A11	1.9	13.7	13.4	27.9	13.2	21.2	8.7	40.8	10.0	0	fsl-sl
5-10	A12	1.5	14.7	13.1	28.4	13.0	20.6	8.7	40.0	10.2	0	fsl-sl
10-16	C1	1.9	13.9	12.4	27.6	13.3	21.2	9.7	40.3	10.5	1	fsl-sl
16-28	IIC2	5.6	17.2	11.9	23.1	13.6	19.2	9.4	38.0	8.4	0	sl (1
28-45+	IIC3	14.5	21.6	11.7	20.8	11.8	15.7	3.9	33.4	6.0	4	lcos

pH 8C1a H_2O 1:1	pH 8C1c KCl (1 N) 1:1	ORGANIC MATTER 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC x 10^3 MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	6C1b Free iron as % Fe_2O_3	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
6.2	4.9		0.88	0.077	11.4				0.7			4.4
6.1	4.5		0.35	0.038					0.5			4.0
6.0	4.4		0.10						0.7			4.5
6.0	4.3		0.07						0.5			6.4
5.2	3.4		0.12						0.4			6.5

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	Mg 6O2c	H 6H2a	Na 6P2a	K 6Q2a	BASE SAT. % 5C3	Clay mineralogy (<0.002 mm.) Mont.	Verm.	Mixed layer Mica-Verm.	Mica	% Kaolin DTA 7A3	% Gibb. DTA 7A3
	milliequivalents per 100g. soil →						←	X-ray 7A2		→		
9.5	4.2	1.2	3.7	0.1	1.0	64						
7.9	3.2	1.0	3.4	0.1	0.9	60	-	-	x	x	35	-
7.1	3.3	1.3	2.1	0.1	0.8	72	-	-	-	xx	40	-
7.3	2.7	1.8	1.2	0.2	1.2	83						
9.0	0.9	2.1	3.0	0.5	2.0	63						

1/ Sample does not include intermittent indurated pan sections in this horizon.

2/ Percent of total soil.

- = looked for but not found
tr = detected, very small amounts
x = detected, small amounts
xx = moderate amounts
xxx = large amounts
xxxx = predominant amounts

PENTZ SANDY LOAM (taxadjunct) 1/
S60Calif-3-20

Location: On Strohm's Ranch, 0.1 mile S of the center of the NW1/4 of sec. 30, T. 5 N., R. 10 E., 1/4 mile SW of Easterling's house, 3/4 mile SW of Buena Vista Peaks, Photo DDE-26-114, Amador County, California.
Date of Sampling: May 2, 1960 Description by: Jack McClelland.
Collectors: Grant Kennedy, Reuben Nelson, Robert Sketchley, Clifford Henry, John Rogers, Paul Nazar, Jack McClelland.
Vegetation: Annual grasses and forbs - soft chess, ripgut, silver hairgrass, Spanish and owl (annual) clovers, filaree
Climate: Mean annual rainfall - 22 inches; average temperatures: January - 46°F. July 88° F.; mean - 61° F. (Ione Station - 38 years)
Parent Material: Rhyolitic tuff of the Valley Springs formation containing many thin hardpan lenses in the upper portion
Relief: Gently sloping foothills on a SE-facing plane slope of 4 percent.
Elevation: 500 feet
Drainage: Well drained; moderate runoff; moderately permeable above the parent rock. Considerable seepage occurs during the winter months in these soils above the parent rock.
Remarks: This soil is a Lithosol. Bureau of Public Roads and California Division of Highway samples were obtained of the A11 (0-5 inch) and IIC2 (16-28 inch) horizons. Soil was moist when described.
Classification: Typic Durochrept, coarse-loamy, mixed, thermic.

HORIZON		DESCRIPTION
A11 RSL No. 6085	0- 5"	Light brownish gray (10YR 6/2) light sandy loam, dark grayish brown (10YR 4/2) when moist; massive when dry breaking to weak very fine granular structure when moist; slightly hard, friable, nonsticky and nonplastic; abundant very fine roots; many very fine interstitial and tubular pores; medium acid (pH 6.0); clear, smooth boundary.
A12 RSL No. 6086	5-10"	Pale brown (10YR 6/3) light sandy loam, dark grayish brown (10YR 4/2) when moist; similar to the above horizon; clear smooth boundary.
C1 RSL No. 6087	10-16"	Light gray (10YR 7/2) loamy sand, brown (10YR 5/3) when moist; massive; slightly hard, friable, nonsticky and nonplastic; plentiful very fine roots; many very fine and fine interstitial and tubular pores; medium acid (pH 6.0); abrupt wavy boundary.
IIC2 RSL No. 6088	16-28"	Light gray (10YR 7/2) loamy sand containing 4 or 5 intermittent, thin (1/4 to 1" thick), indurated silica cemented pans, the lower two being nearly continuous together with a few thin (1/4 to 1/2" thick) pale brown (10YR 6/3) fine sandy loam bands that seem to be weakly cemented, pale brown (10YR 6/3 - soil), light brownish gray (10YR 6/2 - pans), and grayish brown (10YR 5/2 - bands) when moist; massive; slightly hard (soil) and indurated (pans), friable (soil), nonsticky and nonplastic (soil); very few very fine roots, roots forming a mat on uppermost hardpan; many very fine and fine interstitial and tubular pores; lower part of pan has yellowish brown stains; medium acid (pH 6.0); abrupt smooth boundary.
IIC3 RSL No. 6089	28-45"+	Similar to above but no roots observed; hardpan layers are 1/4 to 1/2 inch thick and occur at 1 to 2 inch intervals; few thin bands in upper portion; strongly acid (pH 5.5).

1/ The Pentz series is in a loamy, mixed, nonacid, thermic, shallow family of Typic Xerorthents. This pedon is a taxadjunct because it has a duripan.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Pentz fine sandy loam (taxadjunct) **LOCATION** Amador County, California

SOIL FAMILY: Typic Durochrept, coarse-loamy, mixed, thermic.

SOIL NOS. 60Calif-3-21 **LAB. NOS.** 6090 - 6095

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0- 5	A11	1.4	5.3	9.7	31.3	13.6	28.5	10.2	44.1	16.0	3	fsl
5-10	A12	1.2	4.7	9.6	30.8	14.5	28.4	10.8	45.5	14.7	4	fsl-sl
10-19	C1	1.7	5.2	9.5	29.7	12.9	29.7	11.3	43.7	15.5	1	fsl
19-22	IIC2m	Not determined										
22-28	IIIC3	3.2	8.5	12.2	29.4	12.0	24.5	10.2	41.3	11.6	1	fsl
28-46+	IIIC4	2.9	10.1	13.3	38.5	11.6	18.7	4.9	43.1	8.4	0	ls

pH 8C1a H_2O 1:1	pH 8C1c KCl (1 N) 1:1	ORGANIC MATTER 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC x 10^3 MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	6C1b Free iron as % Fe_2O_3	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
6.2	5.0		0.93	0.096	9.7				0.6			7.3
5.9	4.6		0.49	0.041	12.0				0.6			6.8
5.7	4.3		0.23	0.027					0.6			7.7
		Not determined										
5.5	3.9		0.13						0.5			10.0
5.3	3.5		0.02						0.4			11.3

5A2a CATION EXCHANGE CAPACITY ← Na →	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Na 6P2a	K 6Q2a	5E1a BASE SAT. % 5C3	Clay mineralogy (<0.002 mm.) Mont. ←	Verm. X-ray	Mixed layer Mica-Verm. 7A2	Mica →	% Kaolin DTA 7A3	% Gibb. DTA 7A3
	milliequivalents per 100g. soil →											
11.9	6.2	1.2	3.4	0.1	1.0	71						
10.1	4.7	1.2	2.7	0.1	1.0	72	xx	-	-	x	30	-
9.4	3.8	1.4	2.3	0.2	1.1	74	x	-	-	xx	35	-
		Not determined										
10.9	2.9	2.0	2.2	0.3	2.1	77						
13.2	3.8	3.0	2.2	0.5	2.8	82						

1/ Percent of total soil

- = looked for but not found
tr = detected, very small amount
x = detected, small amounts
xx = moderate amounts
xxx = large amounts
xxxx = predominant amounts

PENTZ FINE SANDY LOAM (taxadjunct) 1/
S60Calif-3-21

Location: Arroyo Seco Land Grant (section lines projected) 0.2 mile N of the center of the SE1/4 of sec. 9, T. 5 N., R. 9 E., 100 feet SE of Highway 88, 0.6 mile SW of Jackson Creek bridge on Highway 88, on Orr Ranch, Amador County.
Date of Sampling: May 2, 1960 Description by: Jack McClelland.
Collectors: Grant Kennedy, Reuben Nelson, Robert Sketchley, Clifford Henry, John Rogers, Paul Nazar, Jack McClelland
Vegetation: Annual grasses and forbs including soft chess, filaree, lupine, and clovers
Climate: Mean annual rainfall - 19.6 inches; average temperatures: January-46°F.; July - 88° F.; mean - 61° F. (Ione Station)
Parent Material: Rhyolitic tuff of the Valley Springs formation containing numerous hardpan lenses in the upper portion at least.
Relief: Gently sloping foothills on a SW facing plane slope of 5 percent.
Elevation: 220 feet
Drainage: Well drained; moderate runoff; moderately permeable above the parent rock or hardpans. Considerable seepage occurs during the winter months in these soils above the parent rock.
Remarks: This soil is a Lithosol. Bureau of Public Roads and California Division of Highway samples were obtained of the A11 (0-5 inches) and IIIC4 (28-46 inches) horizons. The rhyolitic tuff in the roadcut nearby when dry and baked is extremely hard throughout. Soil was moist when described.
Classification: Typic Durochrept, coarse-loamy, mixed, thermic.

HORIZON		DESCRIPTION
A11	0- 5"	Light brownish gray (10YR 6.5/2) sandy loam, dark grayish brown (10YR 4/2) when moist; massive; slightly hard, friable, non-
RSL No. 6090		sticky and nonplastic; abundant very fine roots; many very fine interstitial and tubular pores; slightly acid (pH 6.2); clear smooth boundary.
A12	5-10"	Similar to above but medium acid (pH 6.0); clear smooth boundary.
RSL No. 6091		
C1	10-19"	Light brownish gray (10YR 6/2) sandy loam, brown (10YR 5/3) when moist; massive; slightly hard, friable, nonsticky and non-
RSL No. 6092		plastic; abundant very fine roots; many very fine interstitial and tubular pores, many fine tubular pores; discontinuous hardpan layer near the upper boundary which varies from 1 to 3 inches thick; strongly acid (pH 5.5); abrupt smooth boundary.
IIC2m	19-22"	Very pale brown (10YR 7/3) indurated hardpan with silica coating on upper surface; brown (10YR 5/3) when moist; extremely
RSL No. 6093		hard; few very fine roots along cleavage planes; occasional fine crack; abrupt smooth boundary.
IIIC3	22-28"	Light gray (10YR 7/2) loamy sand, grayish brown (10YR 5/2) when moist; massive; slightly hard, friable, nonsticky and non-
RSL No. 6094		plastic between indurated discontinuous hardpan lenses (0 to 3); few very fine roots; many very fine interstitial, few very fine tubular pores; strongly acid (pH 5.5); abrupt smooth boundary.
IIIC4	28-46"+	Light gray (5Y 7/2) loamy sand between a succession of hardpan layers 2 - 4" thick, the upper surfaces of which are coated
RSL No. 6095		with silica and the lower portions relatively uncemented, olive (5Y 5/3) when moist with yellowish brown (10YR 5/4 - 5/6) staining in lower portions of hardpan layers; indurated in upper hardpan lenses, slightly hard and firm in lower portions of lenses, nonplastic and nonsticky; no roots; many very fine interstitial pores in lower portion of hardpan; very strongly acid (pH 5.0).

1/ The Pentz series is in a loamy, mixed, nonacid, thermic, shallow family of Typic Xerorthents. This pedon is a taxadjunct because it has a duripan.

CONSECUTIVE PEDON NUMBER C 69 13 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES TRIGO HARDPAN VARIANT SOIL NO. S69 CALI. 31- 3 SAMPLE NO. 9 63-9 67 PLACER COUNTY AREA

SOIL FAMILY TYPIC DUROCHREPT COARSE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SAMPLE NO.	DEPTH CM.	HORZ.	SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION 2- .05	SILT .05- .002	CLAY LT .002	SANDS VCS 2-1	CS 1-.5	MS .5-.25	FS .25-.10	VFS .1-.05	CSI .05-.02	FSI .02-.002	SILTS CO. 2-.2U	CLAYS FINE LT .2U	CARBONATE 3A1A.02	1A2A INT. II .2-.02	COARSE FRAGMENTS PCT. OF WHOLE SOIL	I 75-20 PCT.	II 20-5 OF 20	III 5-2 LT 75
			PERCENT OF LESS THAN 2MM																	
9 63	0- 23	AP	38.8	50.3	10.9	0.4	3.1	5.1	17.9	12.3	20.9	29.4				44.0	--A	--	--	--
9 64	23- 36	B	39.2	48.8	12.0	0.3	3.1	5.2	16.7	13.9	17.8	31.0				41.9	--A	--	--	--
9 65	36- 51	2C 1SI	22.7	59.8	17.5	0.8	3.1	4.2	8.8	5.8	10.5	49.3				21.2	--G	--	--	--
9 66	51- 79	2C 2SI	57.4	36.5	6.1	0.2	3.3	5.9	25.1	22.9	14.3	22.2		--		54.7	--A	--	--	--
9 67	79-105	2C 3	84.5	13.8	1.7	0.1	6.1	13.6	47.1	17.6	8.1	5.7				52.0	--A	--	--	--

SAMPLE NO.	DEPTH CM.	ORG.MATTER CAR- BON 6A1A -PERCENT--	NITRO GEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	19-2 6E1B	EXT. IRON FE 6C2B PCT.	ATTERBERG L I M I T LL 4F2 PCT.	EST PL 4F1 NO.40	1/3 4A1F	BULK DENSITY BAR 4A1F GRAMS PER CC	DRY 4AH	CM 3B2	WATER CONTENT 1/10 BAR 4B1C ----PERCENT---	1/3 BAR 4B1C	15 BAR 4B2	EXTENSBLTY LEF 4D1 -PERCENT--	LE 4D1	-----PH------ H2O 1/1 8C1A	H2O 1/10 8C1A	CACL2 8C1E
9 63	0- 23	0.63	0.061						1.62	1.68	1.00		18.5	4.9	1.2	1.2	5.5		4.8	
9 64	23- 36	0.32	0.038						1.60	1.68	1.00		17.5	5.5	1.6	1.6	5.7		5.1	
9 65	36- 51	0.24	0.042						1.30	1.36	1.00		39.9	14.2	1.5	1.5	6.7		6.4	
9 66	51- 79								1.54	1.59	1.00		20.8	7.1	1.1	1.1	6.8		6.5	
9 67	79-105								1.48	1.51	1.00		10.6	5.4	0.7	0.7	6.6		6.2	

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES--- CA 5B4A 6N2E	MG 5B4A 6Q2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	BASE SAT.	C E C-- NA- OAC 5A2A	NH4- OAC 5A6A	EC 8A1A	WATER EXTRACT FROM SATURATED PASTE 8A1 CA 6N1B	MG 6O1B	NA 6P1A	K 6Q1A	CO3 6I1A	HCO3 6J1A	CL 6K1A	SO4 6L1B	B 6T1A	PH SAT. PASTE 8C1B
		MEQ/100G PCT.						-MEQ/100G		MMHO	MEQ/1000 ML								PPM	
9 63	0- 23	5.4	2.2	0.1	0.1	7.8	76		10.3											
9 64	23- 36	6.5	2.8	0.2	0.1	9.6	87		11.0											
9 65	36- 51	16.6	7.7	1.2	0.2	25.7	100+		22.5											
9 66	51- 79	9.2	5.3	0.5	0.2	15.2	100+		15.0											
9 67	79-105	7.2	3.6	0.4	0.1	11.3	100+		11.0											

SAMPLE NO.	DEPTH CM.	WATER AT SAT. 8A PCT.	EXCHANGBLE NA 5B4B MEQ.	NA__ 5D2 PCT.	SAR 5E	-GYPSUM- AMT. 6F1B PERCENT	REQ. 6P3A	CLAY MINERALOGY ---------- LESS THAN 0.002 MM---------- X RAY---------- DTA I 7A2E	II 7A2E	III 7A2E	IV 7A2E	PCT. 7A3	-L.T. .0002 MM- X RAY I 7A2E	II 7A2E	III 7A2E	MINERAL CODE	RELATIVE AMOUNT
9 63	0- 23		0.1	1				MI 4	KK 3	MT 1						MI MICA	1 TRACE
9 64	23- 36		0.2	2				MI 4	KK 3	MT 1						KK KAOLINIT	2 SMALL
9 65	36- 51		1.2	5												MT MONTMORT	3 MODERATE
9 66	51- 79		0.5	3													4 ABUNDANT
9 67	79-105		0.4	4				MT 4	MI 3	KK 3							5 DOMINANT
																	6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
G=GROUND WHOLE. HORIZON INDURATED OR GRAVEL TOO SOFT TO BE SEPARATED. ALL DATA FOR WHOLE SOIL.

TRIGO LOAM, HARDPAN VARIANT* 1/
S69Calif-31-3

Location: Placer County, California; 38 feet north and 700 feet east of SW corner sec. 30, T. 10 N., R. 6 E. John Fiddyment ranch approximately 3.7 miles northwest of Roseville, California. Date of Sampling: May 6, 1969.
Description by: G. M. Kennedy, T. M. Ryan. Collectors: K. W. Flach, W. D. Nettleton, G. M. Kennedy, L. A. Brittan, T. M. Ryan.
Classification: Typic Durochrept, coarse-loamy, mixed, thermic.
Vegetation: Filaree, crimson clover, rose clover, burr clover, soft chess. Climate: Average annual precipitation is 17 to 32 inches; mean annual air temperature is 61°F. Parent Material: Surficial sediments (fine grained sandstone and siltstone) deposited over Laguna Formation. Topography: Undulating terrace on a southeasterly slope of 5 percent. Elevation: 106 feet. Drainage: Well to moderately well drained; rapid and ponded runoff; moderate permeability. Soil Moisture: Slightly moist below surface.
Remarks: Roots matted horizontally at upper boundary of IIC1sim horizon. Top of duripan has 2 to 4 mm thick silica layer with dark reddish brown (5YR 3/3 moist) clay films overlying silica. Approximately 1.5 meters to right of described profile there is a clay layer with strong fine prismatic structure below loam material which abruptly overlies IIC1sim horizon. Silt layer below IIC3 horizon at 42 inches. Occasional smooth well rounded gravel in IIC1sim horizon. Temperature at 20 inches is 64°F.
* The Trigo series is not currently classified as having a duripan.

HORIZON	DESCRIPTION
	(0-23 cm.)
Ap RSL 6963	0 to 9 inches, light yellowish brown (10YR 6/4) loam, brown and dark yellowish brown (7.5YR 4/4, 10YR 4/4) moist; common fine faint very pale brown (10YR 7/3) mottles; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, plastic; common very fine and fine vertical roots; many very fine tubular and interstitial pores; medium acid (pH 6.0); clear smooth boundary.
	(23-36 cm.)
B RSL 6964	9 to 14 inches, pale brown (10YR 6/3) loam, brown (7.5YR 4/4) moist; common fine distinct very pale brown (10YR 7/4) mottles; massive; slightly hard, friable, slightly sticky, plastic; few very fine vertical roots; many very fine and common fine tubular and interstitial pores; slightly acid (pH 6.5); abrupt smooth boundary.
	(36-51 cm.)
IIC1sim RSL 6965	14 to 20 inches, very pale brown (10YR 8/3) silt loam, light olive brown (2.5Y 5/4) moist; very pale brown (10YR 7/4) stains; massive; extremely hard, very firm, brittle, slightly sticky, slightly plastic; very few very fine and fine tubular pores; very few thick clay films in root channels;moderately alkaline (pH 8.0); abrupt smooth boundary.
	(51-79 cm.)
IIC2si RSL 6966	20 to 31 inches, light gray (2.5Y 7/2) sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, firm, nonsticky, nonplastic; few very fine and fine tubular pores; very few moderately thick clay films line pores and bridge mineral grains; mildly alkaline (pH 7.7); clear smooth boundary.
	(79-105 cm.)
IIC3 RSL 6967	31 to 42 inches, light gray (2.5Y 7/2) loamy sand, dark brown (10YR 4/3) moist; massive; hard, very firm, nonsticky, nonplastic; abundant mica; mildly alkaline (pH 7.5); clear wavy boundary.

1/ The Trigo series is in a loamy, mixed, nonacid, thermic, shallow family of Typic Xoerorthents. This pedon has a duripan.

CONSECUTIVE PEDON NUMBER C 69 19 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES TRIGO HARDPAN VARIANT SOIL NO. S69 CALI. 31-11 SAMPLE NO. 9 91-9 95 PLACER COUNTY AREA

SOIL FAMILY TYPIC DUROCHREPT COARSE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION 2- .05 SAND	2- .05 SILT	2- .002 CLAY	SANDS VCS 2-1	SANDS CS 1- .5	SANDS MS .5- .25	SANDS FS .25- .10	SANDS VFS .1- .05	SILTS CSI .05- .02	SILTS FSI .02- .002	CLAYS CO. 2- .2U	CLAYS FINE LT .2U	CLAYS CARBONATE 3A1A.02	1A2A INT. II PCT. OF WHOLE SOIL	COARSE FRAGMENTS I 75- 20 PCT.	II 20-5 OF 20 PCT. OF LT 75	III 5-2
			PERCENT OF LESS THAN 2MM																
9 91	0- 15	AP	49.3	38.4	12.3	2.9	6.5	6.4	22.0	11.5	18.9	19.5			42.9	--A	--	--	--
9 92	15- 36	B	44.2	40.1	15.7	3.1	5.1	4.8	18.5	12.7	18.2	21.9			41.9	--A	--	--	--
9 93	36- 392C	1	22.9	60.8	16.3	1.7	3.6	2.8	9.4	5.4	19.1	41.7			30.4	--A	--	--	--
9 94	39- 512C	2SM	33.1	52.4	14.5	2.9	5.8	5.3	11.0	8.1	15.4	37.0			29.3	--G	--	--	--
9 95	0- 0	AP														--A	--	--	--

SAMPLE NO.	DEPTH CM.	ORG.MATTER CARBON 6A1A -PERCENT--	NITROGEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	19-2 6E1B	EXT. IRON FE 6C2B PCT.	ATTERBERG LIMIT LL 4F2 PCT.	PL 4F1	BULK DENSITY EST 1/3 BAR 4A1F NO.40	1/3 BAR 4A1F GRAMS	DRY 4AH PER CC	CM 3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C -----PERCENT-----	15 BAR 4B2	EXTENSBLTY LEF 4D1 -PERCENT--	LE 4D1	PH H2O 1/1 8C1A	H2O 1/10 8C1A	CACL2 8C1E
9 91	0- 15	0.98	0.079							1.65	1.71	1.00		15.8	6.0	1.2	1.2	6.0		5.3
9 92	15- 36	0.36	0.039						1.60			1.00			6.3			6.1		5.4
9 93	36- 39	0.29							1.70			1.00			10.6			5.8		5.3
9 94	39- 51									1.83	1.92	1.00		18.5	11.1	1.6	1.6	6.6		6.0
9 95	0- 0	0.50	0.052						1.65			1.00			5.8					

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6O2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	BASE SAT. PCT.	C E C NA- OAC 5A2A	C E C NH4- OAC 5A6A	WATER EXTRACT FROM SATURATED PASTE EC 8A1A MMHO	CA 6N1B	MG 6O1B	NA 6P1A	K 6Q1A	CO3 6I1A	HCO3 6J1A	CL 6K1A	SO4 6L1B	8A1 B 6T1A PPM	PH SAT. PASTE 8C1B
		MEQ/100G						MEQ/100G			MEQ/1000 ML									
9 91	0- 15	7.2	4.5	0.1	0.2	12.0	98		12.3											
9 92	15- 36	8.4	5.0	0.2	0.2	13.8	100+		13.6											
9 93	36- 39	14.0	5.9	0.3	0.2	20.4	91		22.4											
9 94	39- 51	13.3	6.8	0.4	0.2	20.7	97		21.3											
9 95	0- 0																			

SAMPLE NO.	DEPTH CM.	WATER AT SAT. 8A PCT.	EXCHANGBLE NA 5B4B MEQ.	EXCHANGBLE NA 5D2 PCT.	SAR 5E	GYPSUM AMT. REQ. 6F1B PERCENT	6P3A	CLAY MINERALOGY --LESS THAN 0.002 MM-- X RAY I 7A2E	X RAY II 7A2E	X RAY III 7A2E	DTA IV 7A2E	DTA PCT. 7A3	-L.T. .0002 MM- X RAY I 7A2E	X RAY II 7A2E	X RAY III 7A2E
9 91	0- 15		0.1	1				MT 3	MI 3	KK 3					
9 92	15- 36		0.2	1											
9 93	36- 39		0.3	1				MT 3	MI 3	KK 3					
9 94	39- 51		0.4	2											
9 95	0- 0														

MINERAL CODE: MT MONTMORT, MI MICA, KK KAOLINIT

RELATIVE AMOUNT: 1 TRACE, 2 SMALL, 3 MODERATE, 4 ABUNDANT, 5 DOMINANT, 6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
G=GROUND WHOLE. HORIZON INDURATED OR GRAVEL TOO SOFT TO BE SEPARATED. ALL DATA FOR WHOLE SOIL.

TRIGO LOAM, HARDPAN VARIANT* 1/
S69Calif-31-11

Location: Placer County, California. Approximately 3.5 miles southwest of Lincoln, 300 yards west of California 65 on Pleasant Grove Road and 70 feet north of fence; 1,500 feet west and 70 feet north of SE corner of sec. 33, T.12N., R.6E. Date of Sampling: May 7, 1969.

Description by: L. A. Brittan, G. M. Kennedy. Collectors: K. W. Flach, W. D. Nettleton, G. M. Kennedy, T. M. Ryan, L. A. Brittan.

Classification: Typic Durochrept, coarse-loamy, mixed, thermic.

Vegetation: Rose clover, soft chess, ripgut brome, filaree. Climate: Average annual precipitation 20 inches. Mean annual temperature 61°F. Parent Material: Surficial sediments deposited over Laguna Formation (fine grained sandstone and siltstone). Topography: Undulating terrace on a southeast slope of 4 percent. Elevation: 120 feet. Drainage: Well to moderately well drained; medium runoff; moderate permeability. Soil Moisture: Essentially dry; below wilting point when sampled.

Remarks: Roots mat horizontally along upper boundary of IIC1 horizon. At approximately 21 inches there is clay banding in the IIC2sim horizon. There is an occasional gravel in the profile. The pores in the IIC1 horizon may be root channels. Top of IIC1 horizon has common thick dark reddish brown (5YR 3/3) moist clay films; also colloid stains inside root channels and pores. *The Trigo series is not currently classified as having a duripan.

HORIZON	DESCRIPTION
	(0-15 cm.)
Ap RSL 6991	0 to 6 inches, light brownish gray (2.5Y 6/2) and pale brown (10YR 6/3) loam, dark brown (10YR 4/3) moist; few fine distinct yellowish brown (10YR 5/6) mottles; massive; hard, friable, slightly sticky, slightly plastic; common very fine vertical roots; common very fine pores; medium acid (pH 6.0); abrupt smooth boundary.
	(15-36 cm.)
B RSL 6992	6 to 14 inches, pale brown (10YR 6/3) heavy loam, dark brown (10YR 3/3) moist; massive; hard, friable, slightly sticky, slightly plastic; common very fine vertical roots; common very fine and fine and few medium pores; slightly acid (pH 6.5); abrupt wavy boundary.
	(36-39 cm.)
IIC1 RSL 6993	14 to 15½ inches, light gray (2.5Y 7/2) light loam, light gray (2.5Y 7.2) moist; common fine distinct dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/8) mottles; massive; very hard, extremely firm, slightly sticky, slightly plastic; common very fine tubular pores; few moderately thick clay films line pores; slightly acid (pH 6.3); abrupt wavy boundary.
	(39-51 cm.)
IIC2sim RSL 6994	15½ to 20 inches, light gray (10YR 7/2) sandy loam, dark brown (10YR 4/3) moist; common fine distinct yellowish brown (10YR 5/6) mottles; massive; extremely hard, extremely firm, brittle, slightly sticky, slightly plastic; top of horizon has 1 to 2 mm thick silica layer; mildly alkaline (pH 7.6).

1/ **The Trigo series is in a loamy, mixed, nonacid, thermic, shallow family of Typic Xerorthents. This pedon has a duripan.**

CONSECUTIVE PEDON NUMBER C 69 20 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES TRIGO HARDPAN VARIANT SOIL NO. S69 CALI. 31-12 SAMPLE NO. 9 96-9 97 PLACER COUNTY AREA

SOIL FAMILY TYPIC DUROCHREPT COARSE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SAMPLE NO.	DEPTH CM.	HORZ.	SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION <2 MM SAND 2-.05	SILT .05-.002	CLAY LT .002	VCS 2-1	CS 1-.5	MS .5-.25	FS .25-.10	VFS .1-.05	CSI .05-.02	FSI .02-.002	CO. CLAYS 2-.2U	FINE CLAYS LT .2U	CARBONATE CLAYS 3A1A	1A2A INT. II .2-.02	-COARSE FRAGMENTS- PCT. OF WHOLE SOIL I 75-20	II 20-5 PCT. OF WHOLE SOIL	III 5-2 PCT. OF WHOLE SOIL LT 75
			PERCENT OF LESS THAN 2MM																
9 96	0- 18	AP	40.5	46.1	13.4	1.9	4.1	6.9	16.2	11.4	17.1	29.0				37.4	--A	--	--
9 97	18- 30	B	41.2	45.2	13.6	0.9	3.5	6.8	16.4	13.6	15.4	29.8				39.0	--A	--	--

SAMPLE NO.	DEPTH CM.	ORG. CAR- BON 6A1A -PERCENT--	NITRO GEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	19-2 6E1B	EXT. IRON FE 6C2B PCT.	ATTERBERG L I M I T LL 4F2 PCT.	PL 4F1 NO.40	BULK DENSITY EST 1/3 BAR 4A1F GRAMS	1/3 BAR 4A1F PER CC	DRY 4AH	CM 3B2	WATER CONTENT 1/10 BAR 4B1C ----PERCENT----	1/3 BAR 4B1C	15 BAR 4B2	EXTENSBLTY LEF 4D1 -PERCENT--	LE 4D1	-----PH------ H2O 1/1 8C1A	H2O 1/10 8C1A	CACL2 8C1E
9 96	0- 18	0.81	0.066						1.62		1.00				6.0			5.7		5.2
9 97	18- 30	0.39							1.60		1.00				5.8			5.7		5.1

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES--- CA 5B4A 6N2E	MG 5B4A 6Q2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	BASE SAT. PCT.	C E C-- NA- OAC 5A2A -MEQ/100G	NH4- OAC 5A6A	WATER EXTRACT FROM SATURATED PASTE 8A1 EC 8A1A MMHO	CA 6N1B	MG 6Q1B	NA 6P1A	K 6Q1A -MEQ/1000 ML	CO3 6I1A	HCO3 6J1A	CL 6K1A	SO4 6L1B	B 6T1A PPM	PH SAT. PASTE 8C1B
		MEQ/100G					PCT.													
9 96	0- 18	7.5	3.4	0.1	0.2	11.2	85		13.2											
9 97	18- 30	7.5	3.0	0.1	0.1	10.7	87		12.3											

SAMPLE NO.	DEPTH CM.	WATER AT SAT. 8A PCT.	EXCHANGBLE NA 5B4B MEQ.	NA 5D2 PCT.	SAR 5E	-GYPSUM- AMT. REQ. 6F1B 6P3A PERCENT	C L A Y M I N E R A L O G Y --LESS THAN 0.002 MM-- -L.T. .0002 MM- X RAY DTA X RAY 7A2E I	7A2E II	7A2E III	7A2E IV	7A3 PCT.	7A2E I	7A2E II	7A2E III	MINERAL CODE	RELATIVE AMOUNT
9 96	0- 18		0.1	1			MI 4	KK 3	MT 2						MI MICA	1 TRACE
9 97	18- 30		0.1	1			MI 4	KK 3	MT 2						KK KAOLINIT	2 SMALL
															MT MONTMORT	3 MODERATE
																4 ABUNDANT
																5 DOMINANT
																6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

TRIGO LOAM, HARDPAN VARIANT* 1/
S69Calif-31-12

Location: Placer County, California. Approximately 4.7 miles south of Lincoln on Highway 65 and 150 feet east along embankment of PG&E substation, 750 feet west and 500 feet south of NE corner of sec. 9, T. 11 N., R.6E. Date of Sampling: May 7, 1969. Description by: T. M. Ryan, L. A. Brittan. Collectors: K. W. Flach, W. D. Nettleton, G. M. Kennedy, L. A. Brittan, T. M. Ryan.

Classification: Typic Durochrept, coarse-loamy, mixed, thermic.

Vegetation: Filaree, rose clover, soft chess, lupine, and purple vetch. Climate: Average annual precipitation 17 to 32 inches. Mean annual air temperature 61°F. Parent Material: Surficial sediments deposited over Laguna Formation. Topography: Undulating terrace on a south aspect of 2 to 9 percent slope. Elevation: 125 feet. Drainage: Well to moderately well drained, rapid and ponded runoff, moderate permeability. Soil Moisture: Almost dry in control section.

Remarks: Roots matted horizontally at top boundary of IIC1sim horizon. IIC1sim breaks out in plates and is interbedded with thick dark red (2.5YR 3/6) clay films. *The Trigo series is not currently classified as having a duripan.

HORIZON	DESCRIPTION
	(0-18 cm.)
Ap RSL 6996	0 to 7 inches, light yellowish brown (10YR 6/4) and pale brown (10YR 6/3) loam, dark yellowish brown (10YR 3/4) moist; weak very fine and fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few very fine vertical roots; many very fine tubular and interstitial pores; neutral (pH 6.7); clear wavy boundary.
	(18-30 cm.)
B RSL 6997	7 to 12 inches, brown (10YR 5/3) loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; common very fine vertical roots; many very fine tubular and interstitial pores; few thin clay films bridge mineral grains; slightly acid (pH 6.3); abrupt smooth boundary.
	(30-66 cm.)
IIC1sim	12 to 26 inches, light gray (2.5Y 7/2) silt loam, light yelloiwsh brown (2.5Y 5/4) moist; massive; extremely hard, very firm, brittle, slightly sticky, slightly plastic; continuous thick clay films in bedding planes; neutral (pH 6.6); abrupt wavy boundary.
	(66-155 cm.
IIC2si	26 to 62 inches, stratified sand and silt layers ranging in thickness from a few mm to several cm thick.

1/ The Trigo series is in a loamy, mixed, nonacid, thermic, shallow family of Typic Xerorthents. This pedon has a duripan.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Crouch stony fine sandy loam (taxadjunct) **LOCATION** San Diego County, California

SOIL FAMILY: Typic Xerochrept, coarse-loamy, mixed, mesic

SOIL NOS. S60Calif-37-6 **LAB. NOS.** 60425 - 60430

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 >2 1/	TEXTURAL CLASS
0- 3	A11	8.2	14.3	10.6	26.8	14.5	19.5	6.1	42.6	8.2	17	sl
3- 9	A12	7.0	13.5	10.7	28.2	15.4	19.0	6.2	43.7	8.0	10	sl-fsl-ls
9-18	B1	7.6	14.7	11.7	29.6	14.4	15.5	6.5	41.3	6.8	3	ls-sl-fsl
18-30	B2	11.6	18.9	11.7	24.9	11.5	14.8	6.6	34.4	6.9	2	lcos
30-43	B3		not		determined							
43-49+	C1		not		determined							

5C1a pH H_2O 1:1	8C1c KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	Atterberg limits Plastic limit Pct.	Liquid limit of 0.4 mm	Plastic index	Free Fe_2O_3 6C1b %	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
7.0	6.0	2.38	0.150	15.9				1.9			5.8
6.9	5.9	0.98	0.064	15.3				1.9			4.4
6.8	5.3	0.29	0.019		N.P.	-	N.P.	1.8			4.1
6.6	4.9	0.26	0.013					2.0			4.5
6.5	4.7	0.28	0.012					-			
not	determined										

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B1a 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K	BASE SAT. % 5C3	Sum of Cations me./100 g. soil 5A3a	g. K	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →							milliequivalents per liter →	
15.5	11.0	1.4	3.7	0.2	0.7	78	17.0		
10.5	7.2	1.2	2.6	0.1	0.3	77	11.4		
8.3	4.8	1.2	1.7	0.1	0.2	79	8.0		
9.5	5.6	1.5	1.9	0.1	0.2	80	9.3		
not determined									

1/ Percent of the whole soil

CROUCH STONY FINE SANDY LOAM (taxadjunct) 1/
S60Calif-37-6

Description: George Borst
Date of Sampling: November 15, 1960
Collectors: Reuben Nelson, Fred C. Eggers, Cliff Henry, James Lockard, and George Borst
Location: Approximately 200 feet west of California State Highway 78, 4.1 miles east of Julian, in SW1/4 sec. 33, T. 12 S., R. 4 E., San Diego County, Calif.
Elevation: 3,500 feet
Relief: Very steep, 60 percent
Use: Range
Vegetation: Native chaparral, burned about 5 years prior to sampling
Drainage: Somewhat excessively drained
Parent Material: Deeply weathered micaceous schist
Climate: This soil occurs under an average annual rainfall of about 20", a mean annual temperature of 53°, a mean January temperature of 39°, and a mean July temperature of 70°.
Remarks: The weathered schist is highly micaceous and considerably tilted and broken by recent diastrophism. Considerable unweathered angular stone occurs at the surface.
Reaction: pH was determined in the field with a Truog (Hellige) soil reaction kit.
Classification: **Typic Xerochrept, coarse-loamy, mixed, mesic.**

HORIZON		DESCRIPTION
A11	0- 3"	Brown (10YR 5/3) fine sandy loam, dark grayish brown (10YR 4/2) when moist; weak fine crumb structure; soft, friable, nonsticky and nonplastic; abundant very fine random roots; neutral (pH 6.8); highly micaceous; clear smooth boundary.
A12	3- 9"	Brown (10YR 5/3) fine sandy loam, dark grayish brown (10YR 4/2) when moist; weak fine crumb structure; soft, friable, nonsticky and nonplastic; abundant fine random roots; slightly acid (pH 6.5); highly micaceous; clear wavy boundary.
B1	9-18"	Brown (7.5YR 5/4) stony fine sandy loam, dark brown (7.5YR 3/3) when moist; massive; soft, friable, nonsticky and nonplastic; abundant fine to medium random roots; common fine random tubular pores; slightly acid (pH 6.3); highly micaceous; gradual irregular boundary.
B2	18-30"	Brown (7.5YR 5/4) stony fine sandy loam, dark brown (7.5YR 3/3) when moist; massive; soft, friable, nonsticky and nonplastic; plentiful medium to coarse random roots; medium acid (pH 6.0); highly micaceous; gradual irregular boundary.
B3	30-43"	Brown (7.5YR 5/4) stony fine sandy loam, dark brown (7.5YR 3/3) when moist; massive; soft, friable, nonsticky and nonplastic; few medium to coarse random roots; medium acid (pH 6.0); highly micaceous; clear smooth boundary.
C1	43-49"+	Brown (10YR 5/3), reddish brown (5YR 5/3) and dark gray (10YR 4/1) weathered micaceous schist, dark brown (10YR 3/3), dark reddish brown (5YR 3/4) and very dark gray (10YR 3/1); when moist; massive; very few coarse random roots; medium acid (pH 5.8).

1/ **The Crouch series is in a coarse-loamy, mixed, mesic family of Ultic Haploxerolls. This pedon has moist color values that are above 3.5 in the epipedon.**

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Hugo sandy loam variant **LOCATION** San Mateo County, California

SOIL FAMILY: Typic Xerochrept, coarse-loamy, mixed, mesic.

SOIL NOS. S57-Calif-41-1 **LAB. NOS.** 57447-450

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 2/	TEXTURAL CLASS
0- 8	A1	2.1	14.0	13.3	26.1	14.1	25.3	5.1	42.7	11.9	2	fs1
8-26	B1	2.0	14.8	14.0	25.8	14.4	24.0	5.0	43.0	10.9	1	fs1
26-40	B2	2.8	17.8	13.5	25.3	13.4	21.8	5.4	40.2	9.9	0	fs1
40+	Dr	not analysed										

pH 8C1b SATURATED PASTE 1:1	8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	8A1a Elec. Conduc. mhos/cm. at 25°C.	6C1b Free Fe_2O_3 %	6F1a GYPSUM me./100g. SOIL	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
5.3	5.7	0.73	0.031	23.5		0.2	0.9		19.6	13.3	3.8
5.5	5.9	0.22	0.015			0.1	1.2		17.0	12.1	3.7
5.5	5.9	0.16	0.010			0.1	1.1		16.7	11.4	4.1
							1.1				

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a Ca+Mg 6O1a	6J1a HCO_3 1/	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
10.6	3.0	1.0	4.7	0.2	0.2	48	0.1	0.2	1.3	0.5	.3	26.8
9.3	3.4	1.0	2.7	0.2	0.2	64	0.7	0.1	1.0	0.3	.2	23.5
9.3	3.3	1.2	3.2	0.2	0.1	60	0.7	0.1	0.6	0.1	.3	23.5

1/ no $CO_3^{=}$ found

2/ percent of whole soil

HUGO SANDY LOAM variant 1/
S57Calif-41-1

Collectors: T. E. Arkley, R. Ulrich, and R. J. Wagner.
Date of sampling: May, 1957. Description by: Rudolph Ulrich.
Location: 4.9 miles north of Sky Londa along California Highway 5 (Skyline Blvd.) thence 2.35 miles SW along Swett Road to Junction with Double K Ranch Road, thence 850 feet (paced) easterly to sample site along old logging trail. Sample site in cut on north side of trail, SW 1/4 NW1/4 sec. 17, T. 6 S., R. 4 W., San Mateo County, California.
Elevation: 1900 feet (estimated).

Parent Material: Weathered Vaqueros sandstone.

Vegetation: Second growth Redwood and Douglas fir overstory with an understory of tanbark oak and madrone trees; scattered ferns and deer vetch in sparse ground cover.

Topography: Mountainous with steep and very steep slopes generally in excess of 45 percent and narrow crests or divides.

Slope: F slopes of 45+ percent, convex toward south (estimated).

Drainage: Runoff rapid to very rapid; permeability, rapid; somewhat excessive general drainage.
Classification: Typic Xerochrept, coarse-loamy, mixed, mesic.
Sample Numbers: S57-Cal-41-1-1 through 4. Bulk samples only. Condition of soil throughout extremely wet following two heavy rains, each in excess of 2 inches.

HORIZON		DESCRIPTION
AOO & Ao (No sample taken)	2-0"	Fresh and rotting leaves, needles, and twigs. Very dark colored wet and soggy and spongy. Abrupt smooth boundary.
A_1 (S57Cal-41-1-1)	0-8"	Pale brown (10YR 6/3) dry, dark brown (10YR 4/3) moist, sandy loam with whitish mycelial growth along root channels; weak fine granular; slightly hard, very friable, nonsticky, nonplastic; pH 6.5 (Truog); many worm casts, mostly upper 3 to 4 inches; common medium and fine roots, few larger ones; many fine interstitial pores, common fine continuous simple tubular pores; gradual wavy boundary.
B_1 (S57Cal-41-1-2)	8-26"	Very pale brown (10YR 7/4) strong brown (7.5YR 5/5) moist, gravelly (sorted out and discarded about 25 percent by volume as gravel and small stones) sandy loam with stronger brown (7.5YR 5/8) moist, stainings; very weak medium subangular blocky; slightly hard, very friable, nonsticky, nonplastic; pH 5.6; clay skins, if any, are very thin and very patchy; common medium and fine roots, few larger ones; many fine interstitial pores, common fine and few coarse simple tubular pores; diffuse boundary.
B_2 (S57Cal-41-1-3)	26-40"	Very pale brown (10YR 7/4) strong brown, (7.5YR 5/5) moist, stony (sorted out and discarded about 50 percent by volume as angular stones up to 4 inches in diameter) sandy loam; very weak coarse subangular blocky; slightly hard, very friable, nonsticky, nonplastic; pH 5.8; clay skins, if any, are very thin and very patchy; common medium and fine roots, few large ones; many fine interstitial pores, common fine and few medium and coarse simple tubular pores; abrupt broken boundary.
D_r (S57Cal-41-1-4)	40"+	Yellow (10YR 7/6) yellowish brown, (10YR 5/5) moist, soft sandstone (Vaqueros Formation) with thin patchy reddish brown clay skins on surfaces of shattered fragments; essentially massive with increasing depth.

1/ The Hugo series is in a fine-loamy, mixed, mesic family of Dystric Xerochrepts. This pedon has less than 18 percent clay and a base saturation above 60 percent (by NH_4OAc) in some parts of the soil between 25 and 75 cm. of the soil surface.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Xerochrept, coarse-loamy, mixed, mesic

SOIL Stoner loam SOIL Nos. S65Calif-27-19 LOCATION Monterey County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65552 - 65558

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	* Coarse fragments 1A2a > 2	2 - 19	19 - 76	
		Pct. of < 2 mm														Pct.	Pct. of < 76mm		
0-5	A11	48.9	35.1	16.0	8.5	10.6	6.7	13.1	10.0	13.8	21.3	31.3	38.9	0	16	5	3	2	**
5-13	A12	52.1	32.0	15.9	7.5	11.6	6.8	14.1	12.1	12.1	19.9	31.9	40.0	0	16	9	7	2	**
13-24	B1t	50.9	33.4	15.7	7.9	11.6	6.5	13.2	11.7	13.4	20.0	32.5	39.2	0	16	11	9	2	**
24-37	B2t	59.9	28.3	11.8	10.7	13.9	7.7	15.9	11.7	12.5	15.8	32.9	48.2	0	12	18	16	2	**
37-47	C1	57.2	33.9	8.9	6.3	12.0	7.9	18.2	12.8	15.0	18.9	38.1	44.4	0	9	9	7	2	**
47-54	C2	66.4	27.3	6.3	12.6	16.4	9.2	17.8	10.4	13.4	13.9	33.5	56.0	0	6	15	13	2	**
54-60+	C3	63.5	31.6	4.9	8.0	16.0	9.3	19.1	11.1	13.3	18.3	34.8	52.4	0	5	10	8	2	**

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$		Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven dry		3B2 Cm	Water content	Water content: 4B1c 1/3 bar	Water content: 4B2 15 bar	4D1 Extensibility COLE	4D1 Extensibility COLE	pH: 8C1a H_2O 1:1	pH	
	Pct.	Pct.		Pct.	Pct.		g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.	in./in.			
0-5	6.73	0.290	23	1.3	-		1.04	1.07		0.98		24.4	16.1	0.007	0.007	6.1		
5-13	1.19	0.070	17	1.4	-		1.26	1.30		0.96		22.7	9.5	0.011	0.011	5.1		
13-24	0.50			1.3	-		1.39	1.43		0.94		20.8	9.7	0.012	0.011	5.5		
24-37	0.21			0.8	-		1.47	1.53		0.89		21.3	8.4	0.013	0.011	5.7		
37-47	0.40			1.4	-		1.37	1.44		0.95		23.3	9.2	0.015	0.014	5.8		
47-54	0.34			1.5	-		1.54	1.60		0.91		17.2	7.5	0.012	0.011	5.9		
54-60+	0.25			1.2	-		1.45	1.50		0.94		19.7	5.5	0.010	0.009	6.0		

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	5A2a NaOAc		6G1d KCl Ext. Al^{+++}		Atterberg limits: Plastic limit	Liquid limit	Plastic index		Base saturation: 5C1 NH_4OAc	
	meq/100 g											Pct.	of <0.4 mm			Pct.	Pct.
0-5	25.3	7.3	0.2	1.2	34.0	14.9		41.2								82	
5-13	5.9	3.3	0.2	0.3	9.7	14.1	18.5					28	34	6		52	
13-24	9.9	4.0	0.2	0.2	14.3	8.4	19.4									74	
24-37	8.5	4.5	0.4	0.2	13.6	5.1	16.2									84	
37-47	10.8	6.6	0.4	0.1	17.9	5.6	21.6									83	
47-54	10.9	5.9	0.4	0.1	17.3	5.1	20.8									83	
54-60+	9.0	4.1	0.6	0.1	13.8	3.5	15.9						-	N.P.		87	

Depth (In.)	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Mica	Kaolin
	X-ray			

* From characterization sample (5Kg)(except as noted).

** 2-19 mm. from characterization sample, 19-76 mm. from field volume estimate.

STONER LOAM
S65Calif-27-19

Location: Monterey County, California, 650 feet NW of Bouchers Gap, 8.5 miles up Palo Colorado Canyon from Hwy #1, about 100 feet up slope from culvert on small drainage way. Date of Sampling: May 24, 1965.
Description by: Lewis C. Leifer. Collectors: W. D. Nettleton, B. R. Brasher, C. J. Weisel, R. D. Waggoner, F. J. Pecarich; site selection by T. D. Cook.
Classification: Typic Xerochrept, coarse-loamy, mixed, mesic. (Yellowish Brown Lateritic).
Vegetation: Dense canopy of hardwood trees, mostly tanbark oak. Climate: Precipitation is 40 inches. Mean annual temperature 56°F., mean January 48°F., mean July 60°F. Parent Material: Deeply weathered granite. Topography: Slightly convex steep SW slope of 45 percent, not subject to accretions from above or serious natural erosion losses. Elevation: 2050 feet. Drainage: Well drained, moderately to moderately slow permeability, medium runoff. Soil Moisture: Moisture near field capacity at time of sampling.
Remarks: Field pH determinations by Truog Kit. Asterisks indicate horizons sampled for California Division of Highways.

HORIZON	DESCRIPTION
O1 Not sampled	2½ to 2 inches, surface cover of leaves and twigs. (pH 7.0).
O2 Not sampled	2 to 0 inches, porous. Loose duff, very dark brown (10YR 2/2m). (pH 6.0).
A11 RSL 65552	0 to 5 inches, dark grayish brown (10YR 4/2) loam, dark brown (7.5YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and slightly plastic; plentiful fine and medium roots; many very fine interstitial and few fine tubular pores; strongly acid (pH 5.5); clear smooth boundary.
*A12 RSL 65553	5 to 13 inches, brown (7.5YR 5/4) loam, darker brown (7.5YR 4/4) moist; moderate coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; plentiful fine medium and coarse roots; many very fine interstitial and few fine tubular pores; strongly acid (pH 5.5); gradual smooth boundary.
B1t RSL 65554	13 to 24 inches, light yellowish brown (10YR 6/4) light clay loam, strong brown (7.5YR 5/6) with faint yellowish red mottles or veins (5YR 4/6) moist; weak medium and coarse subangular blocky structure; hard, friable, sticky and plastic; plentiful fine medium and coarse roots; many very fine interstitial and few fine tubular pores; medium acid (pH 6.0); gradual wavy boundary.
B2t RSL 65555	24 to 37 inches, light yellowish brown (10YR 6/4) sandy clay loam, yellowish brown (10YR 5/4) moist, with some strong brown (7.5YR 5/6) moist mixed colors; weak coarse subangular blocky structure; hard, friable, sticky and plastic; plentiful fine medium and coarse roots; many very fine interstitial pores; appears to have few thin clay films in bridges, clay not generally oriented; medium acid (pH 5.8); clear irregular boundary.
C1 RSL 65556	37 to 47 inches, light yellowish brown (10YR 6/4) fine sandy loam, yellowish brown (10YR 5/6) moist; massive; material shows definite rock structure but rock is quite rotten; hard, friable, slightly sticky and slightly plastic; few fine medium and coarse roots; many very fine interstitial pores; medium acid (pH 5.6); clear smooth boundary.
C2 RSL 65557	47 to 54 inches, light yellowish brown (10YR 6/4) fine sandy loam, yellowish red (5YR 5/6) moist; massive; clearly shows rock structure but rock is strongly weathered; hard, friable, slightly sticky and slightly plastic; few fine roots; common very fine interstitial pores; many thin clay films in bridges; slightly acid (pH 6.3); most of these profile differences due to differences in the parent material, not genetic; clear smooth boundary.
*C3 RSL 65558	54 to 60 inches, mixed light yellowish brown (10YR 6/4) and yellowish red (5YR 5/6) moist; mostly brown (10YR 5/3) dry, weathered granite showing rock structure; hard, friable; no roots; many very fine interstitial pores; slightly acid (pH 6.3).

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Xerochrept, coarse-loamy, mixed, mesic
SOIL Stoner gravelly sandy loam SOIL Nos. S66Calif-47-10 LOCATION Siskiyou County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 66401 - 66408

Depth (In.)	Horizon	1B1b Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05)	Total: Silt (0.05–0.002)	Total: Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Non-carbonate clay	1/ Coarse fragments 1A2a: > 2	2 – 19	19 – 76
		Pct. of < 2 mm													Pct.	Pct. of < 76mm	
0-1	A11	65.8	24.8	9.4	28.9	17.0	6.4	8.5	5.0	8.9	15.9	17.9	60.8	9	39	38	1
1-3	A12	59.9	27.6	12.5	23.5	15.4	6.1	9.1	5.8	8.2	19.4	18.7	54.1	13	35	34	1
3-12	A13	56.7	30.3	13.0	15.8	15.9	7.1	10.5	7.4	13.4	16.9	26.2	49.3	13	26	26	-
12-21	B21t	58.0	28.3	13.7	13.5	15.6	7.8	12.4	8.7	11.1	17.2	26.4	49.3	14	27	27	-
21-27	B22t	59.1	28.2	12.7	15.1	15.8	7.6	12.2	8.4	11.3	16.9	26.1	50.7	13	27	27	-
27-36	B23t	59.9	27.9	12.2	16.6	15.6	7.5	11.9	8.3	10.5	17.4	25.5	51.6	12	29	28	1
36-60+	B24t	50.1	28.4	21.5	11.9	12.4	6.8	11.1	7.9	9.7	18.7	23.8	42.2	22	80	64	16
0-6	A1 2/														24	23	1

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven dry		3B2 C'	Water content: Pct.	Water content: 4B1c 1/3 bar	Water content: 4B2 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH: 8C1a H_2O 1:1	
	Pct	Pct		Pct.	Pct.	g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.	in./in.		
0-1	2.30	0.147	16									6.5			6.4	
1-3	1.52	0.105	14									5.7			6.4	
3-12	0.86	0.088	10			1.54	1.57		0.83		16.8	6.5	0.007	0.005	6.0	
12-21	0.53					1.63	1.65		0.82		13.8	6.4	0.005	0.004	5.9	
21-27	0.28					1.71	1.73		0.81		13.3	6.3	0.005	0.004	5.9	
27-36	0.20					1.80	1.84		0.78		13.1	6.3	0.007	0.006	5.8	
36-60+	0.26											8.4			5.9	
0-6	1.52	0.118	13									6.4			6.5	

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	5A3a Sum	6G1d KCl Ext. Al^{+++}	Base saturation: 5C1 NH_4OAc	5C3 Sum
	meq/100 g									Pct	Pct
0-1	8.3	0.9	0.1	0.5	9.8	2.8	10.5	12.6		93	78
1-3	7.1	0.8	0.1	0.4	8.4	3.0	9.6	11.4		88	74
3-12	7.1	0.9	0.1	0.4	8.5	3.0	9.8	11.5		87	74
12-21	4.6	0.8	0.1	0.4	5.9	3.2	7.7	9.1		77	65
21-27	3.8	0.9	0.1	0.4	5.2	2.8	7.0	8.0		74	65
27-36	3.6	1.3	0.1	0.3	5.3	2.6	6.8	7.9		78	67
36-60+	4.9	1.9	0.1	0.4	7.3	2.6	9.0	9.9		81	74
0-6	8.3	0.8	0.1	0.6	9.8	3.4	11.0	13.2		89	74

Depth (In.)	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Mica	Kaolin
	X-ray			

1/ From characterization sample (5 kg).

2/ Composite of 20 subsamples taken in a 15x12' grid adjacent to the master pedon.

STONER GRAVELLY SANDY LOAM
S66Calif-47-10

Location: Siskiyou County, California. A pit located on the Madeline Brown Ranch in McConnaughy Gulch in Scott Valley, $\frac{1}{4}$ mile north of the McConnaughy Gulch Road up Dockery Gulch. 1600 feet west and 2500 feet north of the SW corner of Sec. 5, T41N, R8W. Date of Sampling: May 26, 1966.
Description by: J. J. Newlun. Collectors: J. Newlun, D. Lucas, and L. Mann.
Classification: Typic Xerochrept, coarse-loamy, mixed, mesic.
Vegetation: In the order of dominance: Buckbrush (Ceanothus cuneatus); Juniper, white oak, annual bromes and other grasses and forbs, an occasional ponderosa pine; some oak had been cleared from the site. The oak canopy is approximately 25 percent at the present time. Climate: The average annual precipitation is approximately 16 inches with much of it in the form of snow. The average January temperature is 32°F., the average July temperature 71°F., and a mean annual temperature of 51°F. Parent Material: The soil has formed in gravelly alluvium from mixed sources, dominantly metamorphosed sedimentary and igneous rocks and some ultra-mafic rocks. The alluvium was deposited in fan, bottom and terrace positions along drainageways from the adjacent mountains. The soil is commonly somewhat stratified at depths greater than 36 inches. It contains 20 to 60 percent cobbles, stones and gravels but most of the material $>$ 2 mm is fine to medium sized gravels. Topography: The site is located about midslope on a single convex slope of a terrace which has a gradient of 5 percent and a south aspect. Elevation: 3160 feet. Drainage: Well drained, moderate permeability, medium runoff. Soil Moisture: Air dry throughout profile.
Remarks: Reactions determined by Truog soil reaction test. Profile S66Calif-47-9 is the paired profile. This profile is a representative of the lower limits of the precipitation zone in which these soils occur in this soil survey area. The soil has an ochric epipedon and a cambic horizon. Most of the Stoner soils are cultivated but this profile and the paired profile have not been disturbed as far as could be ascertained.

HORIZON	DESCRIPTION
A11 RSL 66401	0 to 1 inch, brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist and rubbed with dark yellowish brown (10YR 3/4) moist ped faces; weak fine granular structure; soft, very friable, slightly sticky, slightly plastic; many fine and very fine roots; strongly acid (pH 5.5); 30 percent fine and medium gravels (included in sample); abrupt smooth boundary.
A12 RSL 66402	1 to 3 inches, brown (10YR 5/3) gravelly sandy loam, dark yellowish brown (10YR 3/4) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; many fine and very fine roots; common fine and few medium tubular pores; medium acid (pH 5.8); 25 percent fine and medium gravels (included in sample); abrupt smooth boundary.
A13 RSL 66403	3 to 12 inches, brown (10YR 5/3) gravelly sandy loam, dark yellowish brown (10YR 3/4) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and plastic; many fine and very fine roots; many fine tubular pores; few thin clay films in pores; medium acid (pH 6.0); 25 percent fine and medium gravels (included in sample); abrupt smooth boundary.
B21 RSL 66404	12 to 21 inches, brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 4/3) moist; very weak medium prismatic breaking to moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; common fine, very fine and medium roots; many fine tubular pores; few thin clay films in pores and on ped faces; medium acid (pH 5.9); 20 percent fine and medium gravels (included in sample); clear smooth boundary.
B22 RSL 66405	21 to 27 inches, light yellowish brown (10YR 6/4) gravelly sandy loam, yellowish brown (10YR 5/4) moist and rubbed with yellowish brown (10YR 5/6) moist ped faces; very weak medium prismatic breaking to moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; common fine and very fine roots; common fine tubular pores; many thin and few moderately thick clay films in pores and on ped faces; medium acid (pH 5.9); 30 percent medium and fine gravels (included in sample); clear smooth boundary.
B23 RSL 66406	27 to 36 inches, light yellowish brown (10YR 6/4) gravelly sandy loam, yellowish brown (10YR 5/6) moist and rubbed with dark yellowish brown (10YR 4/4) moist ped faces; moderate medium subangular blocky structure; hard, friable, sticky and plastic; common fine and very fine roots; common fine tubular pores; many thin, common moderately thick clay films in pores and on ped faces; medium acid (pH 5.8); 30 percent fine and medium gravels (included in sample); abrupt smooth boundary.
C RSL 66407	36 to 60 inches, strong brown (7.5YR 5/6) very gravelly heavy loam, yellowish brown (10YR 5/8) moist; relief rock structure; hard, firm, very sticky, plastic; few fine roots; few fine tubular pores; many moderately thick clay films in pores and on ped faces; few thick films in pores; medium acid (pH 5.9); 10 percent cobbles (not included in sample), 65 percent fine and medium gravels (included in sample).

OIL SURVEY LABORATORY Riverside, California

OIL TYPE Vista sandy loam **LOCATION** Riverside County, California

SOIL FAMILY: Typic Xerochrept, coarse-loamy, mixed, thermic

SOIL NOS. S55Calif-33-6 **LAB. NOS.** 55554-559

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0-1	A11	11.4	15.4	10.6	21.4	13.9	22.0	5.3	42.0	6.3	11	cosl
1-9	A12	10.9	17.4	11.1	21.1	12.6	20.9	6.0	40.0	5.9	9	cosl
9-15	A	11.1	16.3	10.8	20.2	12.3	21.7	7.6	38.3	7.5	12	cosl
15-20	A3	11.1	16.9	10.4	19.5	12.1	19.6	10.4	36.9	6.0	13	cosl
20-32	B2	11.3	15.0	10.4	19.7	11.1	21.3	11.2	34.6	8.9	20	cosl
32-43	Cir	not analysed										

	pH		ORGANIC MATTER				8A1a Elec. Condc.	6E1b	6F1a	MOISTURE TENSIONS		
8C1b SATURATED PASTE 1:1	8C1a 1:5	8C1a 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	EC x 10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	4B1a 1/10 ATMOS. %	4B1a 1/3 ATMOS. %	4B2 15 ATMOS. %
6.4		6.1	1.18	0.081	14.6		0.53			23.7	12.4	3.6
6.5		6.3	0.42	0.036	11.7		0.25			18.9	10.7	3.4
6.7		6.6	0.25				0.18			17.4	10.3	4.0
6.6		6.5	0.21				0.19			17.3	10.6	4.2
6.8		6.8	0.11				0.25					5.1

5A2a	EXTRACTABLE CATIONS 5B					BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1					8A
CATION EXCHANGE CAPACITY (-(Na)	5B1a Ca 6N2b	5B1a Mg 6Q2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a		6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg		6K1a Cl	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
9.0	5.0	0.9	2.3	0.1	0.5	74	0.5	0.7	4.3			34.8
7.5	4.1	0.9	1.7	0.1	0.4	76	0.5	0.3	1.6			24.9
8.5	3.9	0.9	2.6	0.1	0.6	68	0.5	0.3	0.6			21.6
7.3	4.2	1.1	1.5	0.1	0.5	79	0.7	0.1	0.9			21.4
8.7	4.5	1.6	1.7	0.1	0.2	80	0.8	Tr.	1.4			25.4

1/- Percent of the whole soil

VISTA SANDY LOAM
S55Calif-33-6

Collectors: Fred Eggers, Arnold Knecht, Floyd G. Stephens, W. G. Harper, R. E. Nelson, F. F. Harradine. Sampling date: December 5, 1955.

Description by: W. G. Harper

Location: 700' S of NE corner of Sec. 34, T5S, R1W. On the McSweeney Ranch, about 4 miles S of Hemet, Riverside County, California.

Elevation: 1650 feet

Precipitation: 14 inches

Classification: Typic Xerochrept, coarse-loamy, mixed, thermic.

California Group: VII

Vegetation: Wild buckwheat, California sage, wild oats, cheat grass and some giant wild rye.

Parent Material: Granodiorite.

Physiography: Rolling upland with many outcrops of granite 3 to 25 feet across and 1 to 6 feet above surface of ground.

Drainage: Well drained.

HORIZON		DESCRIPTION
A_{11}	0- 1"	Grayish brown (10YR 5/2 dry, very dark grayish brown 3/2 moist) sandy loam; very weakly defined medium to fine crumb; loose, very friable; moderately rapid permeability; many plant roots; pH 7.2; noncalcareous; abrupt smooth boundary.
A_{12}	1- 9"	Brown (10YR 5/3 dry, dark brown 3/3 moist) sandy loam; very weakly defined medium to fine crumb; slightly hard, friable; moderately rapid permeability; moderate number of plant roots; pH 6.5; abrupt smooth boundary.
A	9-15"	Similar to horizon above in color, texture and structure; slightly hard, friable; moderately rapid permeability; few plant roots; noncalcareous; pH 6.0; abrupt smooth boundary.
A_3	15-20"	Brown (10YR 5/3 dry, dark brown 3/3 moist) sandy loam; moderately defined medium to fine subangular blocky; slightly hard, friable, nonsticky; moderately permeable; few roots; pH 6.0; abrupt smooth boundary.
B2	20-32"	Yellowish brown (10YR 4.5/4 dry, dark yellowish brown 3.5/4 moist) gritty loam; massive; slightly hard, friable, slightly sticky; moderately permeable; very few roots; pH 6.8; clear, irregular boundary.
CDr	32-43"	Light yellowish brown and yellowish brown (10YR 6/4 to 5/4 dry, dominantly brown 4/3 moist) decomposing granodiorite; massive; very hard, firm; slowly permeable; noncalcareous; pH 6.8

Remarks: The entire profile is highly micaceous.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Vista sandy loam **LOCATION** Riverside County, California

SOIL FAMILY: Typic Xerochrept, coarse-loamy, mixed, thermic

SOIL NOS. S55Calif-33-7 **LAB. NOS.** 55560-564

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)							3A1		2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0-1	A11	14.6	18.4	10.5	20.4	10.7	20.5	4.9	36.0	7.0	12	cosl
1-9	A12	15.7	19.9	11.0	20.1	9.9	17.5	5.9	33.2	5.9	10	lcos
9-15	A	18.5	21.0	10.2	18.8	8.1	16.2	7.2	28.7	6.4	16	cosl
15-24	B2	16.6	21.1	9.5	19.8	9.4	14.5	9.1	30.0	5.3	26	cosl
24-30	CDr	not analysed										

8C1b SATURATED PASTE 1:1	pH 8C1a 1:5	pH 8C1d 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	ORGANIC MATTER 6B1a NITROGEN %	ORGANIC MATTER C/N	EST% SALT (BUREAU CUP)	8C1a Elec. Conduc. EC x 10³ MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	6F1a GYPSUM me./100g. SOIL	MOISTURE TENSIONS 4B1a 1/10 ATMOS. %	MOISTURE TENSIONS 4B1a 1/3 ATMOS. %	4B2 15 ATMOS. %
6.4		6.4	1.09	0.074	14.7		0.37			22.0	13.3	3.5
6.2		6.3	0.65	0.050	13.0		0.34			19.4	11.7	3.4
6.7		6.2	0.20				0.15			16.1	9.9	3.8
6.9		6.8	0.14				0.22			16.2	9.4	4.0

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →				
10.3	6.1	0.9	2.3	0.2	0.4	74	0.7	0.5	2.7		31.5
9.3	5.3	1.0	2.3	0.1	0.3	74	0.5	0.3	2.4		27.8
7.5	4.3	1.2	1.0	0.2	0.3	86	0.3	0.2	0.8		24.7
8.5	4.9	1.5	0.8	0.1	0.2	89	0.5	0.1	1.2		24.9

1/- Percent of the whole soil

VISTA SANDY LOAM
S55Calif-33-7

Collectors: Fred Eggers, Arnold Knecht, F. G. Stephens, W. G. Harper, R. E. Nelson, F. F. Harradine. Sampling date: December 5, 1955

Description by: W. G. Harper

Location: On E side of Hwy. 79 in NW 1/4, Sec. 18, T7S, R1E, about 12 miles south of Hemet, Riverside County, California.

Elevation: 2550 feet

Precipitation: 16 inches

Classification: Typic Xerochrept, coarse-loamy, mixed, thermic.

California Group: VII

Vegetation: Chamise 6-10' high, other shrubs, much cheat grass and alfileria.

Parent Material: Granodiorite

Physiography: Rolling upland with numerous rock outcrops from 3 to 20 feet in diameter and up to 14 feet high. Sample taken near top of ridge which is about 200 feet wide.

Drainage: Well drained

HORIZON		DESCRIPTION
A11	0- 1"	Brown (10YR 5/3 dry, very dark brown 2.5/2 moist) sandy loam; very weakly defined medium to fine crumb; slightly hard, very friable; moderately permeable; many plant roots; high in organic matter; pH 6.0; abrupt smooth boundary.
A12	1- 9"	Brown (10YR 5/3 dry, very dark grayish brown 3/2 moist) fine sandy loam or sandy loam; moderately defined medium to fine crumb; hard, very friable; moderately permeable; many roots; high in organic matter; pH 6.2; clear smooth boundary.
A	9-15"	Grayish brown (10YR 5/2 dry, very dark grayish brown 3/2 moist) gritty sandy loam; massive; slightly hard, very friable; moderately permeable; moderate number of plant roots; pH 6.5; clear smooth boundary.
B2	15-24"	Brown (10YR 5/3 dry, dark grayish brown 3.5/2 moist) gritty sandy loam; weakly defined, medium, subangular blocky; very hard, friable; moderately permeable; moderate number of plant roots; pH 6.5; clear smooth boundary.
CDr	24-30"+	Yellow, white and black feldspars, quartz and biotite of decomposing granodiorite; massive; extremely hard, firm to friable; moderately permeable; very few roots; pH 6.5.

Remarks: The entire profile is highly micaceous.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Xerochrept, coarse-loamy, mixed, thermic

SOIL Vista coarse sandy loam SOIL Nos. S64Calif-37-1 LOCATION San Diego County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 641 - 647

Depth (in.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	* Clay <.002	** Clay <.002	1/ Coarse fragments 1A2a: >2	2 – 19	19 – 76
		Pct of < 2 mm														Pct	Pct. of < 76 mm	
0- 3	A11	72.7	17.1	10.2	19.5	21.2	9.0	14.8	8.2	8.4	8.7	24.2	64.5	11.5	9.3	19	19	0
3- 9	A12	70.9	18.5	10.6	17.8	18.0	9.0	17.2	8.9	9.0	9.5	26.8	62.0	10.9	8.5	22	22	0
9-19	A13	70.3	18.2	11.5	18.2	18.4	8.9	16.0	8.8	8.4	9.8	25.8	61.5	12.2	9.3	23	23	0
19-28	B21	68.7	19.4	11.9	16.2	17.0	8.6	16.3	10.6	9.5	9.9	28.2	58.1	12.5	9.5	24	24	0
28-35	B22	70.6	18.5	10.9	19.5	18.0	8.5	16.1	8.5	8.7	9.8	26.0	62.1	12.4	8.9	28	28	0
35-44	C1	82.3	12.5	5.2	35.3	23.2	6.9	11.8	5.1	6.0	6.5	17.0	77.2	4.1	2.4	41	41	0
44-61+	C2	82.9	12.5	4.6	32.5	23.9	7.8	12.9	5.8	6.0	6.5	18.1	77.1	4.5	2.7	40	40	0

Depth (in.)	* 6A1a Organic carbon	*6B1a Nitrogen	C/N	* 6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven dry	3B2 C'	Water content: 4B1c 1/3 bar	Water content: *4B2 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH: 8C1b Saturated Paste	pH: 8C1a H_2O 1:1	pH: 8C1a H_2O 1:10
	Pct.	Pct		Pct.	Pct.	g/cc	g/cc	g/cc	Pct.	Pct.	Pct.	in./in.	in./in.			
0- 3	0.96	0.080	12	1.0		1.55	1.89		0.88	8.7	5.4	0.066	0.059	6.7	6.9	
3- 9	0.56	0.055	10	0.9		1.51	1.86		0.86	9.8	4.0	0.072	0.061	6.5	6.6	
9-19	0.34			1.0		1.46	1.51		0.86	12.0	3.1	0.010	0.010	6.6	6.8	
19-28	0.28			0.9		1.43	1.52		0.85	10.1	3.7	0.021	0.017	6.6	6.7	
28-35	0.10			1.1		1.46	1.52		0.82	10.9	6.4	0.014	0.011	6.7	6.9	
35-44	0.03			0.7		1.92	1.97		0.67	6.7	4.6	0.008	0.006	7.2	7.1	
44-61+	0.03			0.8							4.2			7.3	7.4	

Depth (in.)	Extractable bases 6N2a * Ca	6O2a* Mg	6P2a* Na	6Q2a* K	5B1a Sum of bases	6H2a* Ext. Acidity	Cation Exch. Capacity 5A2a* NaOAc	5A3a* Sum	Water extract from saturated paste 8A1: 6N1a Ca	6O1a Mg	6P1a ** Na	6Q1a ** K	* 6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter								mmho/cm
0- 3	10.5	3.4	1.4	0.2		1.7	16.9	17.2									
3- 9	10.5	2.8	0.4	0.1		2.3	18.6	16.1									
9-19	13.0	4.0	0.4	0.1		2.2	19.8	19.7									
19-28	11.1	4.0	0.4	0.1		1.8	19.1	17.4									
28-35	13.5	5.1	0.4	0.1		2.1	22.8	21.2									
35-44	9.1	3.7	0.5	tr.		1.2	14.9	14.5			0.7	tr.					0.08
44-61+	9.0	3.7	0.7	0.2		0.8	16.2	14.4									

Depth (in.)	* 8A Water at Saturation Pct.	5D2 Exchangeable Na Pct.	5B1b Exch. Na meq / 100g	Base Sat. Cations Pct.	Base Sat. NaOAc CEC Pct.	Clay mineralogy (<0.002 mm) 7A: Relative abundance based on height of diagnostic X-ray peak 7A2: Mont.	Verm.	Hydro-biotite	Illite	Kaolin	% Kaolin DTA 7A3	% Kaolin in ground whole soil (DTA)
						< X-ray >						
0- 3		8		90	92	-	-	t	xxxx	xx	7	-
3- 9		2		86	74	-	xxx	x	-	xx		
9-19		2		89	89	-	xxx	x	-	xx		
19-28		2		89	81	-	xxx	x	-	xx		
28-35		2		90	84	-	xx	x	t	xxx	12	2
35-44	44.4	3		92	90	-	xxxx	t	-	xx	6	-
44-61+		4		92	84	-	xxxx	t	-	xx	16	tr.

1/ From characterization sample; determined by shaking overnight in a sodium hexametaphosphate solution.

* Analysis of ground whole soil; results expressed on <2-mm basis.

** Analysis of ground whole soil; results expressed on whole-soil basis.

\- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

VISTA SANDY LOAM
S64Calif-37-1

Location: San Diego County, California. A soil profile pit located 2-1/4 miles south and 3/4 mile east of Fallbrook in the NE1/4 of the SW1/4 of section 31, T. 9 S., R. 3 W. Date of Sampling: February 17, 1964.
Description By: David C. Estrada and Gerald Kester. Collectors: Klaus Flach, Gerald Kester, George Borst, Clifford Henry, Roy Bowman and Gerald Anderson.
Classification: Typic Xerochrept, coarse-loamy, mixed, thermic.
Vegetation: Annual weeds and grasses. Climate: The annual precipitation is 15 inches with a mean annual temperature of 60° F., a mean January temperature of 54° F., and a mean July temperature of 70° F. Parent Material: Tonalite grus. Topography: Southwest-facing, smooth 8 percent slopes in hilltop and upper backslope positions on rolling upland. Elevation: 590 feet above sea level. Drainage: Well drained; medium runoff; moderately rapid permeability. Soil Moisture: This profile was moist to about 15 inches.
Remarks: There is much rodent activity by ground squirrels. The irregular boundary between the B22 and C1 horizons may be the result of this activity. In a nearby pit burrow holes occur in the C1 horizon. Isolated bodies of C horizon occur within, or surrounded by, material of the B horizon.

HORIZON	DESCRIPTION
A11 RSL No. 641	0 to 3 inches, dark grayish brown (10YR 4/2) coarse sandy loam, dark brown (10YR 3/3) moist; moderate, fine to medium crumb structure; soft, very friable, nonsticky and nonplastic; plentiful very fine and fine roots; many very fine and fine random pores; neutral (pH 6.7); abrupt smooth boundary.
A12 RSL No. 642	3 to 9 inches, dark brown (10YR 4/3) coarse sandy loam, dark brown (10YR 3/3) moist; weak fine to medium granular structure; slightly hard, very friable, nonsticky and nonplastic; plentiful very fine and fine roots; common very fine and fine tubular and interstitial pores; neutral (pH 6.7); diffuse to clear irregular boundary. Krotovinas filled with this material, 3 to 4 inches wide, extend into the underlying horizons, in places extending into the upper part of the C horizon.
A13 RSL No. 643	9 to 19 inches, dark brown (10YR 4/3) coarse sandy loam, dark brown (10YR 3/3) moist; weak fine to medium granular structure; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine roots; common very fine and fine tubular and interstitial pores; slightly acid (pH 6.5); clear wavy boundary.
B21 * RSL No. 644	19 to 28 inches, dark brown (10YR 4/3) coarse sandy loam, dark brown (10YR 3/3) moist; massive; hard, friable, nonsticky and nonplastic; few very fine and fine roots; common very fine and fine tubular and interstitial pores; slightly acid (pH 6.3); clear smooth boundary.
B22 RSL No. 645	28 to 35 inches, yellowish brown (10YR 5/4) coarse sandy loam, dark yellowish brown (10YR 3/4) moist; massive; hard, friable, nonsticky and nonplastic; very few very fine and fine roots; common very fine and fine interstitial, few fine tubular pores; slightly acid (pH 6.3); abrupt irregular to broken boundary.
C1 RSL No. 646	35 to 44 inches, yellowish brown (10YR 5/4) and very pale brown (10YR 7/4) tonalite grus composed mostly of quartz, feldspar, hornblende, and accessory dark-colored minerals; clear irregular boundary.
C2 * RSL No. 647	44 to 61 inches +, brown (10YR 5/3) and very pale brown (10YR 7/3) tonalite grus composed mostly of quartz, feldspar, hornblende, and other dark-colored minerals, mostly unweathered.

*Soil horizons sampled for BPR

U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Xerochrept, coarse-loamy, mixed, thermic.

SOIL Vista sandy loam SOIL Nos. S64Calif-37-4 LOCATION San Diego County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 648 - 6413

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	* Clay <.002	** Clay <.002	1/ Coarse fragments 1A2a: > 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct	Pct. of < 76 mm	
0- 8	Ap	64.0	22.3	13.7	13.2	15.3	9.1	17.0	9.4	9.6	12.7	28.2	54.6	14.3	12.2	15	15	0
8-15	B12	64.0	22.7	13.3	13.3	15.5	8.7	16.8	9.7	10.6	12.1	29.4	54.3	14.6	12.9	12	12	0
15-24	B21	62.8	23.8	13.4	12.8	13.2	8.3	17.9	10.6	11.1	12.7	31.7	52.2	15.1	12.5	18	18	0
24-36	B22	64.8	22.0	13.2	13.1	15.6	8.8	17.7	9.6	9.8	12.2	28.4	55.2	13.9	11.7	16	16	0
36-47	C1	77.3	16.3	6.4	24.0	20.1	7.5	17.1	8.6	6.9	9.4	24.7	68.7	5.1	3.3	35	35	0
47-56+	C2	70.8	22.3	6.9	21.6	17.6	7.3	15.4	8.9	8.3	14.0	25.6	61.9	6.4	3.5	45	45	0

Depth (In.)	*6A1a Organic carbon	6B1a* Nitrogen	C/N	*6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven dry	3B2	Water content: 4B1c 1/3 bar	Water content: 4B2* 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH: 8C1b Saturated paste	pH: 8C1a H_2O 1:1	pH: 8C1a H_2O 1:10
	Pct.	Pct.		Pct.	Pct.	g/cc	g/cc	g/cc	Pct	Pct.	in./in.	in./in.			
0- 8	0.53	0.064	8	0.9						6.1			6.4	6.7	
8-15	0.41	0.038	11	0.9						6.5			6.8	7.0	
15-24	0.29			0.9						6.8			6.9	7.2	
24-36	0.23			1.0						6.5			6.9	7.2	
36-47	0.05			0.8						4.8			7.1	7.2	
47-56+	0.07			1.1						4.4			7.0	7.2	

Depth (In.)	Extractable bases 5B1a: 6N2a* Ca	6O2a* Mg	6P2a* Na	6Q2a* K	Sum* of bases	6H2a* Ext. Acidity	Cation Exch. Capacity: 5A2a* NaOAc	5A3a* Sum	Water extract from saturated paste 8A1: 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K	6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter								mmho/cm
0- 8	11.9	3.0	0.8	0.2	15.9	2.0	17.9	17.9									
8-15	12.2	3.0	0.8	0.1	16.1	1.7	18.0	17.8									
15-24	13.3	3.5	1.0	0.1	17.9	1.6	20.3	19.5									
24-36	13.0	4.0	1.0	0.1	18.1	1.5	20.8	19.6									
36-47	10.3	4.2	0.9	0.2	15.6	0.9	18.0	16.5									
47-56+	12.2	4.4	1.5	0.2	18.3	1.1	24.6	19.4									

Depth (In.)	8A Water at Saturation	5D2 Exchangeable Na	5B1b Exch. Na meq / 100g	Base Sat. Cations	Base Sat. NaOAc CEC	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Mica	Kaolin.
	Pct.	Pct.		Pct.	Pct.	X-ray			
0- 8		5		89	89				
8-15		4		90	89				
15-24		5		92	89				
24-36		5		92	87				
36-47		5		94	86				
47-56+		6		94	74				

1/ From characterization sample; determined by shaking overnight in a sodium hexametaphosphate solution.

* Analysis of ground whole soil; results expressed on <2-mm basis.

** Analysis of ground whole soil; results expressed on whole-soil basis.

VISTA SANDY LOAM
S64Calif-37-4

Location: San Diego County, California. A soil profile pit located 1.5 miles south and 1.5 miles east of Fallbrook in the SE1/4 of the NE1/4 of section 30, T. 9 S., R. 3 W.
Date of Sampling: February 19, 1964.
Description By: David C. Estrada and Gerald Kester. Collectors: Klaus Flach, Gerald Kester, George Borst, Clifford Henry, Roy Bowman and Gerald Anderson.
Classification: Typic Xerochrept, coarse-loamy, mixed, thermic.
Vegetation: Annual weeds and grasses. Climate: This soil occurs under about 15 inches of annual rainfall. The mean annual temperature is about 60°F., the mean January temperature about 54° F., and the mean July temperature about 70° F. Parent Material: Tonalite grus. Topography: Southeast-facing, smooth to slightly convex 7 percent slopes in hilltop and upper backslope positions on rolling upland. Elevation: 710 feet above sea level. Drainage: Well drained; medium runoff; moderately rapid permeability. Soil Moisture: Profile moist to 15 inches.
Remarks: This soil occurs on a hilltop above sample sites of the Fallbrook and Bonsall soils. There is much rodent activity by ground squirrels. The abrupt and irregular boundary between the B22 and the C1 may be the result of this activity.

HORIZON	DESCRIPTION
A11 RSL No. 648	0 to 8 inches, dark brown (10YR 4/3) coarse sandy loam, dark brown (10YR 3/3) moist; moderate fine to medium crumb structure; slightly hard, very friable, nonsticky and nonplastic; plentiful medium, very fine and fine roots; many very fine and fine interstitial pores; slightly acid (pH 6.5); abrupt wavy boundary.
A12 RSL No. 649	8 to 15 inches, color, texture, consistence and reaction same as above; weak medium to coarse angular blocky structure; very few medium and few very fine and fine roots; common very fine and fine tubular and interstitial pores; abrupt irregular boundary.
B21 RSL No. 6410	15 to 24 inches, brown (10YR 4/3) heavy sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; roots, pores and reaction same as above; clear smooth boundary.
B22 RSL No. 6411	24 to 36 inches, color, texture, structure, consistence and pores same as above; few very fine and fine roots; abrupt irregular boundary.
C1 RSL No. 6412	36 to 47 inches, brownish yellow (10YR 6/6), very pale brown (10YR 8/3), yellowish brown (10YR 5/4) and very dark gray (10YR 3/1) tonalite grus, fine gravelly sand in texture; neutral (pH 6.7); clear irregular boundary.
C2 RSL No. 6413	47 to 56 inches +, white (10YR 8/2), pale brown (10YR 6/3) and very dark gray (10YR 3/1) tonalite grus.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Xerochrept, coarse-loamy, mixed, S65Calif-27-7
SOIL Vista aspect study thermic SOIL Nos. S65Calif-27-29 S65Calif-27-30 LOCATION Monterey County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65599 - 65601

Lab. No.	Horizon	1B1b Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05)	Total: Silt (0.05–0.002)	Total: Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: (0.05–0.02)	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)			* Coarse fragments 1A2a: > 2 Pct.	2 - 19 Pct. of < 76mm	19 - 76 Pct. of < 76mm	
		Pct. of < 2 mm																	
65599	A1***															28	26	2	**
65600	A1***															23	23	0	**
65601	A1***															22	22	0	**

Lab. No.	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. Iron as Fe Pct.	6E1b Carbonate as $CaCO_3$ Pct.		Bulk density: 4A1f 1/3 bar g/cc	4A1h Oven dry g/cc	g/cc		Water content: Pct.	4B1c 1/3 bar Pct.	4B2 15 bar Pct.	4D1 Extensibility COLEF in./in.	4D1 Extensibility COLE in./in.	pH: 8C1a H_2O 1:1		
65599	1.35	0.075	18															
65600	1.00	0.076	13															
65601	2.48	0.120	21															

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	5A3a Sum		6G1d KCl Ext. Al^{+++}						Base saturation: Pct.	Pct.
	meq/100 g																

Depth (In.)	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Mica	Kao	Mn.
	X-ray				

* From characterization sample (5Kg)(except as noted).
** 2-19 mm. from characterization sample, 19-76 mm. from field volume estimate.
*** Composite A horizon sample.

VISTA SANDY LOAM

S65Calif-27-7

Location: Monterey County, California, about 10 miles NE of King City on Montgomery Ranch, 300 feet due west from Pinalito VABM, about 75 feet down from ridge top. (Site #2 South Slope). Date of Sampling: May 18, 1965.

Description by: Lewis C. Leifer. Collectors: W. D. Nettleton, B. R. Brasher, and T. D. Cook.

Classification: Typic Xerochrept, coarse-loamy, mixed, thermic. (minimal) Noncalcic Brown.

Vegetation: Chamise, wild oats, red brome, many small weeds. Climate: Precipitation is 14 inches; mean annual temperature 60°F., January mean 58°F., July mean is 67°F. Parent Material: Diorite. Topography: Steep slopes, locally 47 percent, slightly convex, southern exposure, about 125 feet below ridge crest. Elevation: 1500 feet. Drainage: Somewhat excessively drained, moderately rapid permeability, medium runoff. Soil Moisture: Dry.

Remarks: Composite sample of A1 by orchard type auger to depth of 8 inches. Composite sample included individual samples (borings) from a plot with 4 rows, 12 feet apart. Each row was sampled 6 times at 6-foot intervals. Surface has weak fine pavement of fine gravels. The N pair at this location is S65Calif-27-6-1. Other units of this study are samples #65Calif-27-29-1 on South slope and S65-Calif-27-30-1 on North exposure. Twenty-four samples were taken for the composite.

HORIZON	DESCRIPTION
A1 RSL 65599	0 to 12 inches, pale brown (10YR 6/3) fine gravelly coarse sandy loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; plentiful very fine roots; many very fine interstitial and common very fine tubular pores; medium acid (pH 6.0) 0 to 3 inches and neutral (pH 7.0) 3 to 12 inches; soil contains about 25 percent fine gravel by volume.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Xerochrept, coarse-loamy, mixed, S65Calif-27-7

SOIL Vista aspect study thermic SOIL Nos. S65Calif-27-29 S65Calif-27-30 LOCATION Monterey County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65599 - 65601

Lab. No.	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)			* Coarse fragments 1A2a ≥ 2 Pct.	2 - 19 Pct. of < 76mm	19–76 Pct. of < 76mm	
		Size class and particle diameter (mm) 3A1 — Pct. of < 2 mm																	
65599	A1***															28	26	2	**
65600	A1***															23	23	0	**
65601	A1***															22	22	0	**

Lab. No.	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. Iron as Fe Pct.	6E1b Carbonate as $CaCO_3$ Pct.		Bulk density: 4A1f 1/3 bar g/cc	4A1h Oven dry g/cc	g/cc		Water content: Pct	4B1c 1/3 bar Pct.	4B2 15 bar Pct.	4D1 Extensibility COLEF in./in.	4D1 Extensibility COLE in./in.	pH: 8C1a H_2O 1:1		
65599	1.35	0.075	18															
65600	1.00	0.076	13															
65601	2.48	0.120	21															

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	5A3a Sum		6G1d KCl Ext. Al^{+++}							Base saturation: Pct.	Pct.
	meq/100 g																	

Depth (In.)	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Mica	Kaolin	
	X-ray				

* From characterization sample (5Kg)(except as noted).

** 2-19 mm. from characterization sample, 19-76 mm. from field volume estimate.

*** Composite A horizon sample.

VISTA SANDY LOAM
S65Calif-27-29

Location: Monterey County, California. 350 feet west of center SW¼ SW¼, Sec. 2, T17S, R6E, 4.5 miles up Bryant Canyon Road from Metz Road out of Soledad. (Site #1, south slope). Date of Sampling: May 27, 1965.

Description by: T. D. Cook and W. D. Nettleton. Collectors: W. D. Nettleton and T. D. Cook.

Classification: Typic Xerochrept, coarse-loamy, mixed, thermic. (minimal) Moncalcic Brown.

Vegetation: Red brome, wild oats, few chamise plants, some forbs. Climate: Precipitation is 10 inches. Mean annual temperature is 65°F., mean January 55°F., mean July 70°F. Parent Material: Slightly weathered granodiorite. Topography: Hilly, locally slightly concave south-facing slope of 25 percent, about 100 feet below ridge top. Elevation: 1550 feet. Drainage: Well drained, moderately rapid permeability, medium runoff. Soil Moisture: Essentially dry.

Remarks: Composite sample of A1 horizon by auger to a depth of about 8 inches for a few determinations. Composite sample included individual samples (borings) from a plot with 4 rows, 12 feet apart. Each row was sampled 6 times at 6-foot intervals. This site is paired to a south slope several miles away, No. S65Calif-27-7, a nearby north slope, No. S65Calif-27-30 and a distant north slope S65Calif-27-6. Texture of Vista units in this study labeled as sandy loam, but range from sandy loam to fine gravelly sandy loam and fine gravelly coarse sandy loam. Twenty-five samples were taken for the composite. One extra sample was taken from a 5th row.

HORIZON	DESCRIPTION
O	1/2 to 0 inches, mat of dead grass and roots. Clear smooth boundary.
A11 RSL 65600	0 to 6 inches, brown (10YR 5/3) fine gravelly sandy loam, dark yellowish brown (10YR 3/4) moist; moderate fine granular structure; slightly hard, very friable, nonsticky and nonplastic; abundant very fine roots; many very fine interstitial pores; medium acid (pH 6.0); 18 to 20 percent fine gravel; clear wavy boundary.
A12	6 to 15 inches, brown (7.5YR 5/4) fine gravelly sandy loam, darker brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; plentiful very fine roots; many very fine interstitial pores; slightly acid (pH 6.5); 20 to 25 percent fine gravel.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Xerochrept, coarse-loamy, mixed, S65Calif-27-7
SOIL Vista aspect study thermic SOIL Nos. S65Calif-27-29 / S65Calif-27-30 LOCATION Monterey County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65599 - 65601

Lab. No.	Horizon	1B1b Size class and particle diameter (mm) Total: Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1 * Coarse fragments 1A2a: ≥ 2 Pct.	2 - 19 Pct. of < 76mm	19 - 76 Pct. of < 76mm	
		Pct. of < 2 mm															
65599	A1***													28	26	2	**
65600	A1***													23	23	0	**
65601	A1***													22	22	0	**

Lab. No.	6A1a Organic carbon Pct.	6B1a Nitrogen Pct	C/N	6C2a Ext. Iron as Fe Pct.	6E1b Carbonate as $CaCO_3$ Pct.	Bulk density: 4A1f 1/3 bar g/cc	4A1h Oven dry g/cc	* g/cc	Water content: Pct.	4B1c 1/3 bar Pct.	4B2 15 bar Pct.	4D1 Extensibility COLEF in./in.	4D1 Extensibility COLE in./in.	pH: 8C1a H_2O 1:1		
65599	1.35	0.075	18													
65600	1.00	0.076	13													
65601	2.48	0.120	21													

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	5A3a Sum	6G1d KCl Ext. Al^{+++}	Base saturation: Pct.	Pct.
	meq/100 g										

Depth (In.)	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Mica	Kao-Hn.
	X-ray			

* From characterization sample (5Kg)(except as noted).
** 2-19 mm. from characterization sample, 19-76 mm. from field volume estimate.
*** Composite A horizon sample.

VISTA SANDY LOAM
S65Calif-27-30

Location: Monterey County, California. 600 feet SW from center of SW¼ Sec. 2, T17S, R6E, 4.5 miles up Bryant Canyon Road from Metz Road out of Soledad. (Site #2 North Slope). Date of Sampling: May 27, 1965.

Description by: T. D. Cook and W. D. Nettleton. Collectors: W. D. Nettleton and T. D. Cook.

Classification: Typic Xerochrept, coarse-loamy, mixed, thermic. (minimal) Non-calcic Brown.

Vegetation: Thick stand of chamise, a little coffee berry and understory of soft chess, ripgut and red brome. Climate: Precipitation is 10 inches. Mean annual temperature is 65°F., mean January 55°F., and mean July 70°F. Parent Material: Slightly weathered granodiorite. Topography: Smooth even hill slope of 25 percent on north-facing slope, about 300 feet below ridge crest. Elevation: 1550 feet. Drainage: Well drained, moderately rapid permeability, medium runoff. Soil Moisture: 0 to 15 inches dry.

Remarks: For this study the Vista north slopes are assumed to be mollic, though the epipedon at this site may be too thin. The related north Vista sample is S65Calif-27-6, the south slope about 400 feet away is S65Calif-27-29 and the more distant south slope is S65Calif-27-7. Composite sample for a few determinations obtained by auger from A1 to a depth of about 8 inches. Composite sample included individual samples (borings) from a plot with 4 rows, 12 feet apart. Each row was sampled 6 times at 6-foot intervals.

HORIZON	DESCRIPTION
A1 RSL 65601	0 to 5 inches, dark grayish brown (10YR 4/2) fine gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, very friable, nonsticky and nonplastic; abundant very fine roots nearly form a mat; many very fine interstitial pores; medium acid (pH 5.8); 25 percent fine gravel; clear wavy boundary.
B1	5 to 15 inches, brown (7.5YR 5/3) gravelly light loam, reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine interstitial and common very fine tubular pores; common thin clay films in bridges and pores; slightly acid (pH 6.3).

CONSECUTIVE PEDON NUMBER C 69 28 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CIENEBA TAXADJUNCT SOIL NO. S69 CALI. 31-23 SAMPLE NO. 9 137-9 141 PLACER COUNTY AREA

SOIL FAMILY TYPIC XEROCHREPT COARSE-LOAMY,MIXED,THERMIC,SHW RIVERSIDE SOIL SURVEY LABORATORY

SAMPLE NO.	DEPTH CM.	HORZ.	SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION 2- .05	SILT .05- .002	CLAY LT .002	SANDS VCS 2-1	CS 1- .05	MS .5- .25	FS .25- .10	SILTS VFS .1- .05	CSI .05- .02	FSI .02- .002	CLAYS CO. 2- .2U	FINE LT .2U	CARBO NATE 3A1A	1A2A INT. II .2- .02	COARSE FRAGMENTS- OF WHOLE SOIL PCT.	I 75- 20	II 20-5	III 5-2
			PERCENT OF LESS THAN 2MM															PCT. OF LT 75			
9 137	0- 13	A11	74.9	15.9	9.2	24.2	19.3	10.1	14.7	6.6	1.4	14.5				15.1	19W	--	--	19
9 138	13- 33	A12	68.7	22.1	9.2	18.4	18.4	10.2	14.4	7.3	8.5	13.6				22.9	12W	--	--	12
9 139	33- 51	2B2	65.5	22.8	11.7	21.3	16.1	8.6	13.2	6.3	8.1	14.7				21.0	18W	--	--	18
9 140	51- 94	3C 1	66.4	16.7	16.9	20.9	17.9	8.7	13.3	5.6	6.2	10.5				18.5	24W	--	--	24
9 141	94-130	3C 2	81.3	9.4	9.3	32.6	23.9	9.6	11.7	3.5	3.5	5.9			--	12.2	32W	--	--	32

SAMPLE NO.	DEPTH CM.	ORG. CAR- BON 6A1A -PERCENT--	MATTER NITRO GEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	19-2 6E1B	EXT. IRON FE 6C2B PCT.	ATTERBERG L I M I T EST LL 4F2	PL 4F1	BULK DENSITY 1/3 BAR 4A1F GRAMS PER CC	4A1F	DRY 4AH	CM 3B2	WATER CONTENT 1/10 BAR 4B1C -PERCENT---	1/3 BAR 4B1C	15 BAR 4B2	EXTENSBLTY LEF 4D1 -PERCENT--	LE 4D1	PH H2O 1/1 8C1A	H2O 1/10 8C1A	CACL2 8C1E
							NO.40													
9 137	0- 13	1.35	0.098						1.60	1.62	0.88		10.3	3.9	0.4	0.4	5.6		4.9	
9 138	13- 33	0.40	0.041					1.65			0.92			4.1			5.5		4.9	
9 139	33- 51	0.14							1.74	1.76	0.87		9.2	4.4	0.4	0.3	5.5		4.9	
9 140	51- 94							1.82			0.82			7.9			5.7		5.2	
9 141	94-130								1.82	1.88	0.76		11.2	4.7	1.1	0.8	5.9		5.4	

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6O2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	BASE SAT. PCT.	C E C NA- OAC 5A2A -MEQ/100G	NH4- OAC 5A6A	WATER EXTRACT FROM SATURATED PASTE EC 8A1A MMHO	CA 6N1B	MG 6O1B	NA 6P1A -MEQ/1000	K 6Q1A	CO3 6I1A ML	HCO3 6J1A	CL 6K1A	SO4 6L1B	B 6T1A PPM	8A1 PH SAT. PASTE 8C1B
9 137	0- 13	4.2	0.7	0.1	0.2	5.2	68		7.6											
9 138	13- 33	3.8	0.4	0.1	0.2	4.5	83		5.4											
9 139	33- 51	4.7	0.8	0.1	0.1	5.7	100+		4.1											
9 140	51- 94	4.5	1.0	0.1	0.1	5.7	83		6.9											
9 141	94-130	6.1	1.1	0.1	0.1	7.4	100+		6.7											

SAMPLE NO.	DEPTH CM.	WATER AT. SAT. 8A PCT.	EXCHANGBLE NA 5B4B MEQ.	NA 5D2 PCT.	SAR 5E	GYPSUM- AMT. 6F1B PERCENT	REQ. 6P3A	CLAY MINERALOGY --LESS THAN 0.002 MM--- -L.T. .0002 MM- X RAY DTA X RAY MINERAL CODE	RELATIVE AMOUNT
								7A2E I 7A2E II 7A2E III 7A2E IV 7A3 PCT. 7A2E I 7A2E II 7A2E III	
9 137	0- 13		0.1	1				MI 3 KK 3 VR 1	MI MICA 1 TRACE
9 138	13- 33		0.1	2					KK KAOLINIT 2 SMALL
9 139	33- 51		0.1	2				MI 3 KK 3	VR VERMICLT 3 MODERATE
9 140	51- 94		0.1	1					4 ABUNDANT
9 141	94-130		0.1	1					5 DOMINANT
									6 INDETER.

SAMPLE PREPARATION CODES
W=DATA DETERMINED ON WHOLE SOIL AND RECALCULATED TO 2 MM BASIS. GRAVEL FROM SLAKED SUBSAMPLE.

CIENEBA COARSE SANDY LOAM (TAXADJUNCT) 1/

S69Calif-31-23

Location: Placer County, California. From Rocklin Road, approximately 2,200 feet south on Sierra College Blvd. and 30 feet west to pit; 1,200 feet east and 400 feet north from SW corner of sec. 21, T. 11 N., R. 7 E. Date of Sampling: May 9, 1969.
Description by: T. M. Ryan, L. A. Brittan. Collectors: K. W. Flach, W. D. Nettleton, G. M. Kennedy, L. A. Brittan, T. M. Ryan.
Classification: Typic Xerochrept, coarse-loamy, mixed, thermic, shallow.
Vegetation: Foxtail, soft chess, ripgut, fescue and forbs. Climate: Average annual precipitation 17 to 32 inches. Mean annual air temperature 63°F. Parent Material: Granodiorite. Topography: Rolling upland, 13 percent slope on west aspect. Elevation: 500 feet. Drainage: Somewhat excessively drained, slow to medium runoff, moderately rapid permeability. Soil Moisture: Slightly moist.
Remarks: C1 horizon digs with difficulty with spade. Stone line or thin discontinuous horizontally tilted quartzite dike in upper part of third horizon. Less than 10 percent rounded gravel.

HORIZON	DESCRIPTION
	(0-13 cm.)
A11 RSL 69137	0 to 5 inches, grayish brown (10YR 5/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium and coarse granular structure; slightly hard, friable, nonsticky, nonplastic; many very fine vertical roots; many very fine tubular and interstitial pores; medium acid (pH 6.0); clear wavy boundary.
	(13-33 cm.)
A12 RSL 69138	5 to 13 inches, pale brown (10YR 6/3) coarse sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, nonsticky, nonplastic; many very fine vertical roots; common very fine tubular and interstitial pores; medium acid (pH 5.8); clear wavy boundary.
	(33-51 cm.)
IIB2 RSL 69139	13 to 20 inches, pale brown (10YR 6/3) coarse sandy loam, brown (7.5YR 5/4) moist; massive; hard, friable, slightly sticky, slightly plastic; common very fine vertical roots; many very fine tubular and interstitial pores; medium acid (pH 6.0); clear smooth boundary.
	(51-94 cm.)
IIIC1 RSL 69140	20 to 37 inches, pink (7.5YR 7/4, 5YR 7/4) gravelly coarse sandy loam, yellowish red (5YR 4/8) moist; massive; shows original rock structure; hard, friable, slightly sticky, slightly plastic; very few very fine vertical roots; few very fine tubular and interstitial pores; many thick clay films line pores and bridge mineral grains; slightly acid (pH 6.3); gradual wavy boundary.
	(94-130 cm.)
IIIC2 RSL 69141	37 to 51 inches, variegated granodiorite; massive; hard, firm, nonsticky, nonplastic; very few very fine vertical roots; few very fine interstitial pores; many thick yellowish red (5YR 4/6) clay films line pores and bridge mineral grains; slightly acid (pH 6.3).

1/ The Cieneba series is in a loamy, mixed, nonacid, thermic, shallow family of Typic Xerorthents. This pedon has a cambic horizon.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Millsholm silt loam variant **LOCATION** Alameda County, California

SOIL FAMILY: Typic Xerochrept, fine-silty, mixed, thermic.

SOIL NOS. S59Calif-01-5 **LAB. NOS.** 59230 thru 59233

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2	
0-7	A_{11}	0.1	0.5	0.6	2.9	7.2	65.9	22.8	33.4	41.7	0	sil
7-14	A_{12}	0.0	0.3	0.4	1.8	7.5	63.1	26.9	31.3	40.7	1	sil-sicl
14-22	B_2	0.0	0.3	0.4	1.9	7.2	63.3	26.9	31.3	40.6	6	sil-sicl
22-60+	D_r	not analysed										

pH		Organic Matter			6E1b $CaCO_3$ equivalent Pct.	8A1a Elec. conduc. mmhos/cm. at 25°C.	4B2 Soil water 15 atmos. Pct.
8C1b Saturated Paste 1:1	8C1a 1:10	6A1a Organic Carbon Pct.	6B1a Nitrogen Pct.	C/N			
6.0	6.6	1.43	0.131	10.9		0.5	10.1
5.7	6.6	0.64	0.077	8.3		0.2	11.4
5.7	6.6	0.53	0.066	8.0		0.1	11.7

5A2a	EXTRACTABLE CATIONS 5B					BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1					8A
CATION EXCHANGE CAPACITY (-(Na))	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a		6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
28.3	13.4	8.3	6.7	0.2	0.4	77	1.0	0.1				44.0
29.1	14.4	10.1	6.8	0.3	0.3	79	0.8	<0.1				38.0
31.2	13.5	10.5	6.5	0.2	0.3	79	0.7	<0.1				38.2

MILLSHOLM SILT LOAM variant 1/
S59Calif-01-5

Collectors: Dick Huff, Larry Welch, Lothair Grant.
Description by: Larry E. Welch.
Date of Sampling: May 5, 1959.

Location: Alameda County, California, in the SE 1/4 of the SE 1/4 of the NE 1/4 of Sec. 28, T3S, R1W, near the junction of Palomaris and Stonybrook Roads, about 5 miles ESE of Pleasanton.

Elevation: 1,200 feet.

Relief: Strongly sloping uplands on a convex SW-facing slope of 35 percent.

Drainage: Well drained, moderate runoff, moderate permeability.

Parent Material: Shale.

Climate: Rainfall about 20 inches.

Vegetation: Annual grasses.

Classification: Typic Xerochrept, fine-silty, mixed, thermic.

DESCRIPTION

HORIZON		
A_{11}	0- 7"	Olive (5Y 5/3) silt loam, olive brown (2.5Y 4/3) when moist; massive; very hard when dry, friable when moist, slightly sticky and slightly plastic when wet; abundant very fine roots; many very fine pores; few worm casts; medium acid, pH 6.0; clear, smooth lower boundary.
A_{12}	7-14"	Light olive brown (2.5Y 5/3) silt loam, olive brown (2.5Y 3/3) when moist; massive; very hard when dry, friable when moist, slightly plastic and slightly sticky when wet; plentiful very fine roots; many very fine pores; few thin discontinuous clay films in pores; medium acid, pH 6.0; clear, smooth lower boundary.
B_2	14-22"	Light olive brown (2.5Y 5/3) silty clay loam to silt loam, olive brown (2.5Y 4/3) when moist; massive; very hard when dry, firm when moist, plastic and sticky when wet; plentiful fine roots; many very fine pores; many thin continuous clay films in pores; medium acid, pH 6.0; clear, smooth lower boundary.
D_r	22-60"+	Grayish brown (2.5Y 5/2) shale, dark grayish brown (2.5Y 4/2) when moist; some tonguing of B_2 into cracks.

1/ The Millsholm series is in a loamy, mixed, thermic family of Lithic Xerochrepts. This pedon has a solum thicker than 20 inches and is in a fine-silty family.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE San Emigdio loam (taxadjunct) **LOCATION** Riverside County, California

SOIL FAMILY: Calcixerollic Xerochrept, coarse-loamy, mixed, th rmic.

SOIL NOS. S55Calif-33-10 **LAB. NOS.** 55573-577

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0-8	A11	1.7	4.8	5.9	17.9	15.7	38.2	15.8	44.6	21.1	3	1
8-23	A12	2.6	5.9	6.1	17.8	14.3	38.0	15.3	42.0	22.0	4	1
23-41	C1	2.6	5.7	5.8	17.1	14.1	40.2	14.5	45.6	23.9	3	1
41-54	C2	7.2	13.0	10.4	22.0	13.0	25.5	8.9	40.5	13.6	19	sl
54-60	C3	2.4	4.5	5.4	19.3	17.6	40.1	10.7	51.1	19.7	4	l

pH 8C1b SATURATED PASTE 1:1	pH 8C1a 1:5	pH 8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	ORGANIC MATTER 6B1a NITROGEN %	ORGANIC MATTER C/N	EST% SALT (BUREAU CUP)	8A1a Elec. Conduc. EC×10³ MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	6F1a GYPSUM me./100g. SOIL	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	MOISTURE TENSIONS 4B2 1/3 ATMOS. %	MOISTURE TENSIONS 4B2 15 ATMOS. %
6.6		6.7	0.44	0.049	9.0		0.39					7.5
7.2		7.6	0.27	0.030	9.0		0.43					7.4
7.6		8.4	0.18				0.57	1				8.0
7.9		8.6	0.10				0.42	1				5.1
7.9		8.5	0.08				0.30	2				6.4

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	BASE SAT. % 5B3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a Ca+Mg 6O1a	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil						milliequivalents per liter				
18.4	13.4	2.9	0.7	0.1	0.6	96	0.5	0.2	3.2		29.6
20.5	16.7	3.0	0.8	0.1	0.3	96	0.5	0.1	3.6		30.5
21.6	30.4	2.9	-	0.3	0.2	100+	0.8	0.1	5.1		32.5
13.8	19.8	3.7	-	0.2	0.1	100+	0.9	0.1	3.5		24.3
18.2	25.5	2.5	-	0.3	0.2	100+	1.4	Tr.	1.8		31.1

1/ Percent of the whole soil

SAN EMIGDIO LOAM (taxadjunct) 1/
S55Calif-33-10

Location: 300' W and 1000' S of NE corner of Sec. 12, T3S, R3W, near Moreno, Riverside County, California.
Sampled by: Fred Eggers, Arnold Knecht, F. G. Stephens, W. G. Harper, R. E. Nelson and F. F. Harradine. Description by: W. G. Harper
Elevation: 1625 feet. Sampling date: December 6, 1955.
Precipitation: 14 inches

Classification: Calcixerollic Xerochrept, coarse-loamy, mixed, thermic.

California Group: I

Vegetation: This dry-farmed area had a crop of wheat in 1955.

Parent Material: Alluvium from San Timoteo Badlands

Physiography: Gently sloping.

Drainage: Well drained.

HORIZON		DESCRIPTION
A_{11}	0- 8"	Brown (10YR 5/3 dry; very dark grayish brown 3.5/2.5 moist) loam; weakly defined medium to fine granular; hard, friable; moderately permeable; many roots; noncalcareous; pH 7.5; clear smooth boundary.
A_{12}	8-23"	Brown (10YR 5/3 dry; dark brown 4/2 moist) loam; weakly defined medium to fine angular blocky or subangular blocky; extremely hard, friable; moderately permeable; many roots; noncalcareous; pH 8.0; clear smooth boundary.
C 1	23-41"	Light yellowish brown (10YR 6/4 dry; dark brown 4/3 moist) loam; weakly defined medium to fine angular blocky; hard, friable; moderately permeable; many roots; effervesces slightly; contains slight amount of mycelium-like lime; pH 8.0; clear smooth boundary.
C 2	41-54"	Pale brown (10YR 6/3 dry; dark brown 4/3 moist) fine sandy loam; massive; slightly hard to hard, very friable; moderately permeable; effervesces slightly; pH 8.0; about 50 percent rounded pebbles 2 to 6" in diameter, some coated with white lime; clear smooth boundary.
C 3	54-60"	Light yellowish brown (10YR 6/4 dry; yellowish brown 5/4 moist) fine sandy loam; massive; slightly hard to hard, very friable; moderately permeable; effervesces slightly; pH 8.0; contains some white lime and possibly some gypsum.

Remarks: This soil has weak zonal characteristics as indicated by the leaching of lime from the upper 23".

1/ The San Emigdio taxadjunct is in a coarse-loamy, mixed (calcareous), thermic family of Typic Xerorthents. This pedon has a cambic horizon and soft powdery lime in the lower part of the control section.

CONSECUTIVE PEDON NUMBER C 68 92 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES INVILLE TAXADJUNCT SOIL NO. S68 CALI. 9-17 SAMPLE NO. 8 748-8 753 TAHOE BASIN AREA

SOIL FAMILY DYSTRIC XEROCHREPT COARSE-LOAMY,MIXED,FRIGID RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION 2- .05 SAND	.05- .002 SILT	.002 LT CLAY	SANDS VCS 2-1	CS 1-.5	MS .5-.25	FS .25-.10	VFS .1-.05	SILTS CSI .05-.02	FSI .02-.002	CLAYS CO. 2-.2U	FINE LT .2U	CARBONATE 3A1A	INT. .2-.02	COARSE FRAGMENTS I PCT. OF WHOLE SOIL	I 75-20 PCT.	II 20-5 OF LT 75	III 5-2
			PERCENT OF LESS THAN 2MM																	
8 748	0- 13	A11	74.2	17.2	8.6	12.9	21.1	12.8	18.2	9.2	7.9	9.3				25.5	26A	9	17Z	N
8 749	13- 46	A12	73.2	16.4	10.4	14.4	20.6	12.5	17.8	7.9	7.4	9.0				23.7	26A	10	16Z	N
8 750	46- 69	B21T	70.5	16.7	12.8	11.3	18.7	12.9	19.4	8.2	7.1	9.6				24.6	23A	11	12Z	N
8 751	69-120	B22T	70.9	15.0	14.1	10.7	20.5	13.4	18.7	7.6	5.4	9.6				22.1	19A	5	14Z	N
8 752	120-175	C1 SIM	81.9	8.7	9.4	14.3	22.7	18.1	20.6	6.2	3.8	4.9				18.6	34A	8	26Z	N
8 753	175-200	C 2	84.0	11.7	4.3	8.9	35.0	15.2	18.3	6.6	4.3	7.4				20.0	7A	--	7Z	N

SAMPLE NO.	DEPTH CM.	ORG.MATTER CARBON 6A1A	NITROGEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B	2-20 6E1B	SESQUIOXIDES DI-CIT FE 6C2B	EXT AL 6G7A	PYROP EXT FE 6C5A	AL 6G5A	ATTERBERG LL 4F2	PL 4F1	PI 1/3 BAR 4A1F	BULK DENSITY 1/3 BAR 4A1F	DRY 4A1H	CM 3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2	EXTNSBLTY LEF 4D1	LE 4D1
		PERCENT		PERCENT		PERCENT				PCT.	NO.40	GRAMS PER CC				PERCENT			PERCENT	
8 748	0- 13	1.50	0.053			2.6				NP	NP	1.25		0.86				6.0		
8 749	13- 46	0.49	0.026			2.6						1.30		0.85				5.8		
8 750	46- 69	0.25				2.5				NP	NP	1.35		0.87				6.1		
8 751	69-120	0.20				2.4						1.35		0.89				7.0		
8 752	120-175					1.2						1.40		0.79				6.0		
8 753	175-200					0.6				NP	NP	1.40		0.96				4.4		

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6O2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACI- DITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 5A3A	NH4+ OAC 5A6A	BASE SATURATION SUM+ ACI- DITY	SUM+ AL	NH4+ OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA-CL2 8C1E
		MEQ/100G									PERCENT					
8 748	0- 13	2.8	0.3	TR	0.4	3.5	8.0		11.5	9.5	31		37		5.7	5.2
8 749	13- 46	1.8	0.3	0.1	0.4	2.6	5.7		8.3	9.2	31		28		5.6	5.0
8 750	46- 69	1.7	0.4	0.1	0.4	2.6	5.7	0.4	8.3	5.8	31	87	45		5.5	5.0
8 751	69-120	1.7	0.4	0.1	0.3	2.5	4.5	0.2	7.0	5.5	36	93	45		5.6	5.1
8 752	120-175	1.3	0.2	0.1	0.2	1.8	3.3	0.1	5.1	4.6	35	95	39		5.5	5.0
8 753	175-200	2.1	0.8	0.1	0.1	3.1	3.0	0.2	6.1	5.7	51	94	54		5.4	4.9

CLAY MINERALOGY

SAMPLE NO	DEPTH CM.	LESS THAN 0.002 MM X RAY 7A2E I	7A2E II	7A2E III	7A2E IV	DTA 7A3 -PERCENT-	7A3	L.T. 0.0002 MM X RAY 7A2E I	7A2E II	7A2E III	MINERAL CODE	RELATIVE AMOUNT
8 748	0- 13	KK 3	VR 2	MI 2							KK KAOLINIT	1 TRACE
8 749	13- 46										VR VERMICLT	2 SMALL
8 750	46- 69										MI MICA	3 MODERATE
8 751	69-120											4 ABUNDANT
8 752	120-175											5 DOMINANT
8 753	175-200	KK 2										6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

INVILLE GRAVELLY COARSE SANDY LOAM (TAXADJUNCT) 1/

S68Calif-9-17

Location: Tahoe Basin, El Dorado County, California. 0.2 mile northeast of south ¼ corner, sec. 11, T. 12 N., R. 18 E.; three miles south of Bijou, ¼ mile inside Forest Service boundary, 50 feet south of High Meadow Road, South Lake Tahoe. Date of Sampling: October 26, 1967.

Description by: R. C. Huff. Collectors: G. M. Kennedy, G. L. Anderson, J. H. Rogers, D. Palmquist.

Classification: Dystric Xerochrept, coarse-loamy, mixed, frigid.

Vegetation: Not cultivated; Jeffrey pine, white fir, greenleaf manzanita, squaw carpet. Climate: Precipitation is 30 inches. Mean annual temperature is 43°F., January 27°F., July 61°F. Parent Material: Mixed alluvium. Topography: Gently sloping terrace, 2 to 5 percent north slope. Elevation: 6500 feet. Drainage: Well drained; runoff is medium; permeability is slow to 48 inches and very slow below. Soil Moisture: Below wilting point.

Remarks: Field determinations for pH by Hellige-Truog triplex indicator. Portion of the C1m horizon with 7.5YR colors not cemented. Horizons A11, A12 (0-18") and B21t, B22t (18 -48") were sampled for State Division of Highways.

HORIZON	DESCRIPTION
	(5-0 cm.)
O1 & O2	2 to 0 inches, not sampled. Pine needles and partly decomposed needles.
	(0-13 cm.)
A11 RSL 68748	0 to 5 inches, brown (7.5YR 5/4) gravelly coarse sandy loam, dark brown (7.5YR 3/2) moist; weak fine crumb structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, medium and coarse roots; many very fine interstitial pores; 20 percent gravel; slightly acid (pH 6.5); clear smooth boundary.
	(13-46 cm.)
A12 RSL 68749	5 to 18 inches, strong brown (7.5YR 5/6) gravelly coarse sandy loam, yellowish red (5YR 4/6) moist; weak fine crumb structure; soft, very friable, slightly sticky and slightly plastic; many very fine, fine, medium and coarse roots; many very fine interstitial pores; 20 percent gravel, less than 2 percent cobbles; medium acid (pH 6.0); diffuse wavy boundary.
	(46-69 cm.)
B21t RSL 68750	18 to 27 inches, reddish yellow (7.5YR 6/6) cobbly coarse sandy loam, yellowish red (5YR 4/6) moist; massive; very hard, firm, slightly sticky and slightly plastic; many very fine, few fine and medium roots; common very fine interstitial, few very fine and fine tubular pores; many thin clay films in pores and bridges; 20 percent cobbles, 10 percent gravel; medium acid (pH 6.0); clear wavy boundary.
	(69-120 cm.)
B22t RSL 68751	27 to 48 inches, reddish yellow (7.5YR 6/6) very gravelly coarse sandy loam, strong brown (7.5YR 5/6) moist; massive; very hard, firm, slightly sticky and slightly plastic; common very fine, few fine and medium roots; common very fine interstitial, few very fine and fine tubular pores; common thin clay films in pores and bridges; 50 percent gravel and less than 1 percent cobbles; medium acid (pH 5.7); abrupt wavy boundary.
	(120-175 cm.)
C1sim RSL 68752	48 to 68 inches, light yellowish brown and very pale brown (10YR 6/4, 7/4) very gravelly loamy sand, yellowish brown and brownish yellow (10YR 5/4, 6/6) moist; reddish yellow (7.5YR 6/8) blotches, strong brown (7.5YR 5/8) moist; massive; very hard, very firm, nonsticky and nonplastic; roots are matted on 2 lenses about a foot apart; very few very fine interstitial pores; 50 percent gravel and 3 percent cobbles; reddish yellow (7.5YR) blotches are not cemented; medium acid (pH 5.7); abrupt wavy boundary.
	(175-200 cm.)
C2 RSL 68753	68 to 78 inches, very pale brown (10YR 7/3) loamy sand, light yellowish brown (10YR 6/4) moist; yellow (10YR 7/6) blotches; massive; soft, very friable; common fine and medium roots; common very fine interstitial pores; strongly acid (pH 5.5).

1/ The Inville series is in a loamy-skeletal, mixed, frigid family of Ultic Haploxeralfs. This pedon lacks an argillic horizon and has less than 35 percent coarse fragments by volume.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Hugo sandy loam variant **LOCATION** San Mateo County, California

SOIL FAMILY: Dystric Xerochrept, coarse-loamy, mixed, mesic.

SOIL NOS. S57-Calif-41-2 **LAB. NOS.** 57451-57454

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1										TEXTURAL CLASS
		3B1b VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY ≤ 0.002	0.2-0.02	0.02-0.002	2A2 > 2 2/	
0- 8	A1	4.2	18.1	13.4	23.4	11.4	23.6	5.9	38.9	9.6	15	fsl
8-26	B1	3.4	16.2	13.0	23.4	11.6	26.1	6.3	39.0	12.4	7	fsl
26-38	B2	1.9	9.2	7.2	15.7	16.8	36.2	13.2	45.3	17.6	52	l
38+	Dr	not analysed										

pH		ORGANIC MATTER			EST% SALT (BUREAU CUP)	8A1a Elec. Conduc. mmhos/cm. at 25° C	Free Fe_2O_3 % 6C1b	6F1a GYPSUM me./100g. SOIL	MOISTURE TENSIONS		
SATURATED PASTE 8C1b	1:10 8C1a	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N					4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
5.7	6.1	0.80	0.040	20.0		0.2	1.0		20.6	13.5	3.6
5.3	5.7	0.25	0.016	15.6		0.1	1.0		16.6	13.3	3.9
4.8	5.2	0.32	0.021	15.2			2.0		28.0	20.6	8.7
							2.5				

5A2a	EXTRACTABLE CATIONS 5B					BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1					8A
CATION EXCHANGE CAPACITY (+ Na)	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a		6P1a Na	6Q1a K	6N1a Ca+Mg 6O1a	6J1a HCO_3 1/	6K1a Cl	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
10.7	2.2	1.1	4.9	0.3	0.3	44	0.6	0.2	0.6	0.6	.20	24.6
9.5	1.4	1.1	4.4	0.3	0.2	41	0.6	0.1	0.4	0.3	0	18.9
19.5	1.5	3.0	11.4	0.4	0.2	31	-	-	Insufficient Sample			

1/ no $CO_3^=$ found

2/ percent of whole soil smaller than 2 inches

HUGO SANDY LOAM variant 1/
S57Calif-41-2

Location: San Mateo County, California. 4.9 miles north of Sky Londa along California Highway No. 5 (Skyline Blvd.), thence 2.35 miles southwest along Swett Road to junction with Double K Ranch Road, then 1/4 mile southerly along Double K Ranch Road to sample site in road cut (uphill) on west side of road, SW1/4 NW1/4 sec. 17, T. 6 S., R. 4 W. Date of Sampling: May, 1957.
Description by: Rudolph Ulrich. Collectors: T. H. Arkley, R. Ulrich, and R. J. Wagner.
Classification: Dystric Xerochrept, coarse-loamy, mixed, mesic.
Vegetation: Second growth Redwood and Douglas fir overstory, with an understory of tanbark oak and madrone trees, scattered poison oak, and little grass in ground cover due to opening produced by the roadway. Parent Material: Weathered Vaqueros sandstone. Topography: Mountainous with mostly steep and very steep slopes generally in excess of 45 percent and narrow crests and divides. F slope of 45 percent, convex toward east (estimated). Elevation: About 1,800 feet. Drainage: Runoff rapid to very rapid; permeability rapid; somewhat excessive general drainage.
Remarks: Bulk samples only. Condition of soil throughout extremely wet following two heavy rains each in excess of 2 inches.

HORIZON		DESCRIPTION
A_{00} & A_O (No sample taken)	2-0"	Fresh and rotting leaves, needles, and twigs. Very dark colored wet and soggy and spongy. Abrupt smooth boundary.
A_1 (S57-Cal-41-2-1)	0-8"	Pale brown (10YR 6/3) dry, dark brown, (10YR 4/3) moist sandy loam with few whitish mycelial strands; weak fine granular; slightly hard, very friable, nonsticky, nonplastic; common reddish brown subrounded to subangular shot (2-10 mm.) between A_O and A_1, few (2-5 mm.) in horizon; pH 6.0; common worm casts upper few inches; common fine and medium roots, few large ones; many fine interstitial pores, common fine continuous simple tubular pores; gradual smooth boundary.
B_1 (S57-Cal-41-2-2)	8-26"	Very pale brown (10YR 7/4) strong brown (7.5YR 5/5) moist, gravelly (sorted out and discarded about 25 percent by volume as gravel and small stones) sandy loam; very weak coarse subangular blocky; slightly hard, very friable, nonsticky, nonplastic; clay skins, if any, are very thin and very patchy; pH 5.6; common fine and medium roots, few larger ones; many fine interstitial pores, common fine and few coarse simple tubular pores; diffuse boundary.
B_2 (S57-Cal-41-2-3)	26-38"	Very pale brown (10YR 7/4) strong brown (7.5YR 5/5) moist, very stony (sorted out and discarded about 65 percent by volume as angular stones and coarse gravel) heavy sandy loam with few thin patchy stronger brown (7.5YR 5/8) moist, clay skins and thin pore linings; very weak medium subangular blocky; slightly hard to hard, friable, nonsticky, very slightly plastic; pH 5.0; common medium and fine roots, few large ones; many fine interstitial pores, few fine and coarse simple tubular pores; abrupt broken boundary.
D_r (S57-Cal-41-2-4)	38"+	Yellow (10YR 7/5) brownish yellow (10YR 6/6) moist, soft sandstone (Vaqueros Formation) with thin patchy reddish brown clay coatings in seams of somewhat shattered upper portion of rock; rock is shattered for considerable depth here but more massive at comparatively shallow depths nearby.

1/ The Hugo series is in a fine-loamy, mixed, mesic family of Dystric Xerochrepts. This pedon has less than 18 percent clay in the control section.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Temescal very fine sandy loam **LOCATION** Riverside County, California

SOIL FAMILY: Lithic Xerochrept, loamy, mixed, thermic

SOIL NOS. S55Calif-33-9 **LAB. NOS.** 55569-572

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0-2	A11	5.5	8.8	8.3	30.8	19.5	20.9	6.2	55.0	6.5	5	fsl
2-9	A12	3.9	8.6	8.5	31.0	19.9	20.5	7.6	54.8	6.8	10	fsl
9-19	C1	3.8	9.8	9.2	27.5	17.1	17.2	15.4	42.4	9.9	16	fsl
19+	Dr	not analysed										

8C1b SATURATED PASTE 1:1	pH 8C1a 1:5	8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	8A1a Elec. Condc. EC×10³ MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	6F1a GYPSUM me./100g. SOIL	MOISTURE TENSIONS 4B1a 1/10 ATMOS. %	4B1a 1/3 ATMOS. %	4B2 15 ATMOS. %
6.2		6.2	2.14	0.134	16.0		0.37					5.5
6.7		6.7	0.71	0.057	12.5		0.35					4.5
6.6		6.6	0.29	-	-		0.25					7.8

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A 6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg		6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
15.8	9.0	1.4	4.6	0.2	0.4	71	0.7	0.4	2.8			39.1
11.5	6.6	1.2	2.0	0.1	0.3	80	0.5	0.3	2.5			29.9
12.4	4.4	1.5	2.1	0.1	0.5	75	0.6	0.2	1.5			32.1

1/ - Percent of the whole soil

TEMESCAL VERY FINE SANDY LOAM
S55Calif-33-9

Collectors: Fred Eggers, Arnold Knecht, F. G. Stephens, W. G. Harper, R. E. Nelson and F. F. Harradine.

Sampling date: December 7, 1955. Description by: W. G. Harper

Location: Above road cut on west side of Highway 79, 1 mile S of Sage near N line of Sec. 18, T7S, R1E, about 12 miles south of Hemet, Riverside County, California.

Elevation: 2400 feet

Precipitation: 16 inches

Classification: Lithic Xerochrept, loamy, mixed, thermic.

Vegetation: Chemise, cheatgrass, alfileria, wild buckwheat, manzanita; chamise is taller and more dense than at Site 5.

Parent Material: Mica schist. Undivided pre-Cretaceous metamorphics.

Physiography: Rolling upland

Drainage: Well drained

HORIZON		DESCRIPTION
A_{11}	0- 2"	Brown (10YR 5/3 dry, dark brown 3/3 moist) very fine sandy loam; very weakly defined very fine crumb structure; soft, very friable; moderately permeable; many roots and much organic matter; some moss on surface; micaceous; pH 6.0; abrupt smooth boundary.
A_{12}	2- 9"	Dark brown (10YR 4/3 dry, dark brown 3/3 moist) very fine sandy loam; very weakly defined fine crumb structure; slightly hard, very friable; moderately permeable; moderate amounts of roots and organic matter; very strongly micaceous with a few angular pebbles; pH 6.5; abrupt smooth boundary.
C_1	9-19"	Dark brown (10YR 4/3 dry, dark brown 3/3 moist) very fine sandy loam or loam (may have a few clay films); moderately defined medium to fine subangular blocky; very hard, friable; roots common to few, many root channels and some worm holes; high in mica; pH 6.5; abrupt irregular boundary. This horizon contains many angular mica schist fragments. This differs but little from a C horizon even though it has some structure and may have a few clay films.
Dr	19"+	Decomposing to hard mica schist bedrock. The mica schist may be somewhat harder than at Site 5.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Toomes loam **LOCATION** Placer County, California

SOIL FAMILY: Lithic Xerochrept, loamy, mixed, thermic

SOIL NOS. S61Calif-31-1 **LAB. NOS.** 6173 - 6175

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0- 1	A_{11}	2.5	8.6	6.9	17.4	9.3	40.7	14.6	31.4	29.1	9	1
1-11	A_{12}	6.2	9.3	5.4	13.9	9.2	40.5	15.5	29.8	28.6	21	1
11-17+	R											

pH 8C1b Saturated Paste 1:1	pH 8C1c KCl 1:1	Organic Matter 6A1a Organic Carbon Pct.	6B1a Nitrogen Pct.	C/N	$CaCO_3$ equivalent %	Elec. Conduc. Mmhos/cm. at 25°C	6C1b Free Fe_2O_3 %	4A3a Bulk Den. gm/cc	4B2 Soil water 15 atmos. Pct.
5.5	4.7	7.48	0.574	13.0			2.3		21.4
6.1	4.8	1.12	0.082	13.7			2.7	1.52*	8.5

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	5B1a 6Q2a K	BASE SAT. % 5C3	5A3a Sum of Cations / soil	Calc. Sum of Cations / clay	Calc. Sum of Cations / clay + fine silt
	milliequivalents per 100g. soil →						← milliequivalents per 100g. →		
29.8	12.3	3.4	15.2	0.3	1.9	54	33.1	227	60
17.5	9.2	4.2	5.5	0.2	0.3	72	19.4	125	35

1/ Percent of the whole soil

* Single determination

TOOMES LOAM
S61Calif-31-1

Collectors: Reuben Nelson, Grant Kennedy, John Rogers, Lynn Brittan, David Estrada, Paul Nazar, Lothair Grant Description by: Grant Kennedy.
Date of Sampling: April 26, 1961
Location: Placer County, California, 5.5 miles north of Roseville, Whitney Ranch, SW1/4SE1/4SE1/4, sec. 34, T. 12 N., R. 6 E.
Elevation: 170 feet
Relief: Hummocky uplands with a 3 percent slope to the northeast.
Drainage: Well drained; rapid runoff; moderate permeability
Parent Material: Andesitic breccia
Climate: Mean annual rainfall 24 inches, T 61.3°, J 45.6°, J 74.7°
Vegetation: Soft chess, wild oats, filaree, bur clover
Classification: **Lithic Xerochrept, loamy, mixed, thermic.**
Remarks: The hummocks are about 30 feet apart and 8 feet in diameter and 18 to 24 inches high. The parent material has deep cracks 6 to 12 inches wide running approximately northeast by southwest. The vegetation is better over the cracks. Stones cover 5 to 10 percent of the surface. The profile contains 10 to 15 percent stones and cobbles by volume.

HORIZON		DESCRIPTION
A11	0- 1"	Brown (7.5YR 4/4) loam, dark brown (7.5YR 3/2) with black (10YR 2/1) when moist, coating on surface; massive; slightly hard when dry, friable when moist, and nonsticky and nonplastic when wet; abundant very fine roots; many very fine pores; strongly acid, pH 5.5; abrupt smooth boundary.
A12	1-11"	Brown (7.5YR 5/4) loam, dark brown (7.5YR 3/4) when moist; weak medium subangular blocky; slightly hard when dry; friable when moist, and slightly sticky and slightly plastic when wet; abundant very fine roots; many very fine and fine tubular and interstitial pores; medium acid, pH 6.0; abrupt slightly irregular boundary.
R	11-17"+	Andesitic breccia.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Toomes loam **LOCATION** Placer County, California

SOIL FAMILY: Lithic Xerochrept, loamy, mixed, thermic

SOIL NOS. S61Calif-31-2 **LAB. NOS.** 6176 - 6178

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0- 1	A_{11}	3.2	9.6	6.6	17.3	10.1	41.4	11.8	36.0	25.9	13	1
1-11	A_{12}	4.7	8.6	5.6	16.4	11.0	42.6	11.1	37.3	27.1	13	1
11-17+	R											

pH 8C1b Saturated Paste 1:1	pH 8C1c KCl 1:1	Organic Matter 6A1a Organic Carbon Pct.	6B1a Nitrogen Pct.	C/N	$CaCO_3$ equivalent %	Elec. Conduc. Mmhos/cm. %	6C1b Free Fe_2O_3 %	4A3a Bulk Den. gm/cc			Soil Water 15 ATMOS. %
5.8	5.1	4.61	0.338	13.6			1.8				12.4
6.3	5.0	0.61	0.060	10.2			1.8	1.75			6.7
											-

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 6N2b Ca	6G2c Mg	6H2a H	6P2a Na	5B1a 6Q2a K	BASE SAT. % 5C3	5A3a Sum of Cations soil	Calc. Sum of Cations clay	Calc. Sum of Cations clay + fine silt
	milliequivalents per 100g. soil →						← milliequivalents per 100 g. →		
20.1	10.2	2.5	7.6	0.2	1.0	65	21.5	182	40
13.5	5639	2.7	3.1	0.2	0.3	77	13.2	118	25

1/ Percent of the whole soil

TOOMES LOAM
S61Calif-31-2

Collectors: Reuben Nelson, Grant Kennedy, John Rogers, Lynn Brittan, David Estrada, Paul Nazar, Lothair Grant **Description by: Grant Kennedy.**
Date of Sampling: April 26, 1961
Location: Placer County, California, 5.5 miles north of Roseville, Whitney Ranch, 60 feet south of entrance road, 1/8 mile east of 99E, NW1/4NE1/4SE1/4 sec. 33, T. 12 N., R. 6 E.
Elevation: 120 feet
Relief: Hummocky uplands with a 2 percent slope to the northwest.
Drainage: Well drained; rapid runoff; moderate permeability
Parent Material: Andesitic breccia
Climate: Mean annual rainfall 23 inches, T. 61.3°, J. 45.6°, J 74.4°
Vegetation: Foxtail fescue, soft chess, wild oats, filaree, bur clover, and forbs. Soft chess favors mounds; shallower intermound areas mainly forbs and filaree.
Classification: **Lithic Xerochrept, loamy, mixed, thermic.**
Remarks: The profile varies from 6 to 17 inches deep. Hummocks are 30 to 50 feet apart and 2 to 3 feet high. Long, thin diagonal, vertical cracks occur in the parent material. The vegetation is better on the cracks due to deeper soils in the cracks. Stones cover 10 to 15 percent of the ground surface and the profile contains 10 to 15 percent cobbles by volume.

HORIZON		DESCRIPTION
A11	0- 1"	Brown (10YR 5/3) loam, dark brown (10YR 3/3) when moist with very dark brown (10YR 2/2) surface coating; massive; slightly hard when dry, friable when moist, and nonsticky and nonplastic when wet; abundant very fine roots; many very fine pores; strongly acid, pH 5.5; abrupt smooth boundary.
A12	1-11"	Brown (7.5YR 5/4) loam, dark brown (7.5YR 3/4) when moist; massive; slightly hard when dry, friable when moist, and slightly sticky and slightly plastic when wet; abundant very fine vertical roots; many very fine and common fine pores; slightly acid, pH 6.2; abrupt slightly irregular boundary.
R	11-17"+	Andesitic breccia.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Auburn silt loam **LOCATION** Amador County, California

SOIL FAMILY: Ruptic-Lithic Xerochrept, loamy, mixed, thermic

SURVEY NOS. S59Calif-3-7 **LAB. NOS.** 59306 - 59309

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0-1½	A_{11}	2.5	4.4	3.4	6.7	5.9	63.4	13.7	31.5	41.9	14	sil
1½-9	A_{12}	2.3	3.7	2.9	6.7	6.2	64.7	13.5	31.5	43.5	13	sil
9-14	B_2	2.6	4.3	2.7	6.1	6.2	64.1	14.0	32.1	42.2	13	sil
14-24+	D_r	Partially weathered amphibolite										

	pH		ORGANIC MATTER			"Free" Fe_2O_3	ELECTRICAL CONDUCTIVITY			MOISTURE TENSIONS		
8C1a H_2O 1:1	8C1c KCl 1:1	1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6C1b %	EC×10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
6.4	5.3		3.79	0.247	15.3	2.5						9.8
6.4	4.8		1.18	0.098	12.0	2.7						7.0
6.5	4.5		0.42	0.043	9.8	3.1						7.7

5A2a CATION EXCHANGE CAPACITY	EXTRACTABLE CATIONS 5B1a					BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE		MOISTURE AT SATURATION
←(Na)	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Na 6P2a	K 6Q2a →		Na	K	%
	milliequivalents per 100g. soil						← milliequivalents per liter →		
23.2	11.7	5.3	6.4	0.1	0.5	73			
19.6	9.3	5.0	5.1	<0.1	0.1	74			
20.7	8.8	7.5	4.6	<0.1	<0.1	78			

1/ Percent of total soil

AUBURN SILT LOAM
S59Calif-3-7

Collectors: Grant Kennedy, Reuben Nelson, Robert Sketchley, John Rogers
Date of sampling: June 16, 1959 Description by: Grant Kennedy.
Location: Amador County, California - 1/4 mile west and 100 feet north of the SE corner of Section 6, T6N, R9E.
Elevation: 620 feet
Relief: Moderately steep foothills on a 10% slope to the east.
Drainage: Well drained; moderate runoff; moderately permeable above the parent rock.
Parent Material: Amphibolite schist.
Climate: Mean annual rainfall about 24 inches.
Vegetation: Annual grasses, oaks, scattered Digger pine.
Remarks: This soil is a very weakly developed Brunizem near the Brunizem-Noncalcic Brown zonal boundary. Scattered rock outcrops occur in this area.
Classification: Ruptic-Lithic Xerochrept, loamy, mixed, thermic.

HORIZON		DESCRIPTION
A_{11}	0-1½"	Strong brown (7.5YR 5/6) silt loam, reddish brown (5YR 4/4) when moist; massive; slightly hard when dry, friable when moist, slightly sticky and nonplastic when wet; abundant very fine roots; many very fine and fine pores; slightly acid, pH 6.4; clear, smooth lower boundary.
A_{12}	1½-9"	Color texture, structure and consistence as above, except yellowish red (5YR 5/6) when dry and slightly plastic when wet; abundant very fine and fine, plentiful medium roots; many very fine and fine, plentiful medium pores; few thin, discontinuous clay films in pores; slightly acid, pH 6.4; gradual, smooth lower boundary.
B_2	9-14"	Yellowish red (5YR 5/8) silt loam, yellowish red (5YR 4/6) when moist, massive; hard when dry, friable when moist, slightly sticky and slightly plastic when wet; roots and pores as above; few thin, discontinuous clay films in pores; slightly acid, pH 6.5; abrupt, slightly wavy lower boundary.
D_r	14-24"+	Very pale brown (10YR 7/4) partially weathered amphibolite schist with reddish brown colloidal staining on fracture planes and a few roots in cracks; when moist can be scratched with fingernail; slightly acid, pH 6.5.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Auburn silt loam **LOCATION** Amador County, Calif.

SOIL FAMILY: Ruptic-Lithic Xerochrept, loamy, mixed, thermic

SOIL NOS. S59Calif-3-8 **LAB. NOS.** 59310 - 59313

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0-1	A_{11}	2.9	4.5	3.3	5.5	4.5	65.9	13.4	35.1	38.5	4	sil
1-7	A_{12}	1.4	3.6	2.9	5.7	5.8	66.7	13.9	37.9	38.0	19	sil
7-14	B_2	2.0	4.6	3.2	5.7	5.5	65.5	13.5	33.3	41.1	8	sil
14-26+	D_r	Decomposing amphibolite schist										

	pH		ORGANIC MATTER			"Free" Fe_2O_3	ELECTRICAL CONDUCTIVITY			MOISTURE TENSIONS		
	8C1a H_2O 1:1	8C1c KCl 1:1	1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6C1b %	EC x 10^3 MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
	6.0	5.1		5.73	0.416	13.8	4.4						14.0
	6.3	4.9		1.23	0.101	12.2	5.2						7.4
	6.3	4.5		0.43	0.043	10.0	5.2						7.8

5A2a CATION EXCHANGE CAPACITY (+ Na)	EXTRACTABLE CATIONS 5B1a 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Na 6P2a	K 6Q2a	BASE SAT. % 5C3	Clay mineralogy (<0.002 mm.) Mont.	Verm.	Mixed layer Mica-Verm.	Mica	% Kaolin DTA 7A3	% Gibb. DTA 7A3
	milliequivalents per 100g. soil →						←	X-ray 7A2		→		
24.2	13.0	3.1	10.4	<0.1	0.7	62						
18.2	9.0	3.3	6.1	0.2	0.4	68						
18.5	9.4	4.8	4.9	0.1	0.1	75	xxx	-	-	-	12	-
							xxxx	xx	-	-	10	-

1/ Percent of total soil

\- = looked for, but not found
tr = detected, very small amounts
x = detected, small amounts
xx = moderate amounts
xxx = large amounts
xxxx = predominant amounts

AUBURN SILT LOAM
S59Calif-3-8

Collectors: Grant Kennedy, Reuben Nelson, Robert Sketchley and John Rogers.
Date of Sampling: June 16, 1959. Description by: Grant Kennedy.
Location: Amador County, California on the Kuhl property - 300 feet NE of the SW corner of Section 7, T7N, R9E.
Elevation: 760 feet.
Relief: Very gently sloping foothills, on a 3 percent slope to the northwest.
Drainage: Well drained; moderate runoff; moderately permeable above the D_r.
Parent Material: Amphibolite schist.
Climate: Mean annual rainfall about 25 inches.
Vegetation: Annual grasses, forbs, and oaks including filaree, soft chess, ripgut and fiddle-neck used for range.
Remarks: The soil is a (minimal) Brunizem. The profile is nearly free of stones and the bedrock is weathered irregularly.
Classification: Ruptic-Lithic Xerochrept, loamy, mixed, thermic.

HORIZON		DESCRIPTION
A_{11}	0-1"	Yellowish red (5YR 5/6) silt loam, dark reddish brown (5YR 3/4) when moist; massive; slightly hard when dry, friable when moist, slightly sticky and nonplastic when wet; abundant very fine roots; many very fine pores; medium acid, pH 6.0; abrupt, smooth lower boundary.
A_{12}	1-7"	Yellowish red (5YR 4/8) gravelly silt loam, dark reddish brown (5YR 3/4) when moist; massive; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; abundant very fine, few fine and medium roots; many very fine, common fine pores; slightly acid, pH 6.3; clear, smooth lower boundary.
B_2	7-14"	Yellowish red (5YR 4/8) silt loam, dark reddish brown (2.5YR 3/4) when moist, with many soft, angular fragments of light yellowish brown (2.5Y 6/4) partially decomposed schist, olive brown (2.5Y 4/4) when moist; hard when dry, friable when moist, sticky and plastic when wet; plentiful very fine, few fine and medium roots; many very fine, few fine pores; thin continuous clay films in pores and a few fracture planes; slightly acid, pH 6.3; abrupt, irregular lower boundary.
D_r	14-26"+	Light yellowish brown (2.5Y 6/4) decomposing amphibolite schist with reddish brown colloidal staining on fracture planes and roots in cracks; strongly weathered in top 4 inches; slightly acid, pH 6.5.

CONSECUTIVE PEDON NUMBER C 68 82 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CELIO. SOIL NO. S68 CALI. 9-14 SAMPLE NO. 8 678-8 684 TAHOE BASIN AREA

SOIL FAMILY AQUENTIC CRYUMBREPT, SANDY-SKELETAL, MIXED RIVERSIDE SOIL SURVEY LABORATORY

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION 2- .05	SILT .05- .002	CLAY LT .002	VCS 2-1	CS 1- .05	MS .5- .25	FS .25- .10	VFS .1- .05	CSI .05- .02	FSI .02- .002	CO. 2- .2U	FINE LT .2U	CARBONATE 3A1A	INT. .2- .02	COARSE FRAGMENTS- I PCT. OF WHOLE 20	II 75- 20	III 20-5	5-2
			PERCENT OF LESS THAN 2MM														SOIL	PCT. OF LT 75		
8 678	0- 20	A11	85.7	10.5	3.8	30.8	27.9	10.5	11.7	4.8	4.7	5.8			14.9	46A	14	32Z		N
8 679	20- 41	A12	81.6	14.5	3.9	23.3	26.6	12.1	13.1	6.5	6.0	8.5			18.7	46A	17	29Z		N
8 680	41- 58	C 1	83.4	13.1	3.5	21.2	28.8	13.3	13.9	6.2	5.4	7.7			17.9	56A	21	35Z		N
8 681	58-1152C	2	94.3	3.4	2.3	19.0	40.8	20.4	11.8	2.3	1.4	2.0			8.2	51A	9	42Z		N
8 682	115-1402C	3SIM	97.2	1.3	1.5	36.0	40.9	13.7	6.3	0.3	0.3	1.0			2.4	63A	20	43Z		N
8 683	140-1702C	4	98.5	0.7	0.8	67.0	27.0	3.2	1.1	0.2	0.1	0.6			0.7	46A	7	39Z		N
8 684	170-2052C	5	98.5	0.8	0.7	16.1	39.8	21.6	18.9	2.1	0.6	0.2			10.7	27A	6	21Z		N

SAMPLE NO.	DEPTH CM.	ORG. CARBON 6A1A -PERCENT-	NITROGEN 6B1A -PERCENT-	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	2-20 6E1B -PERCENT-	SESQUIOXIDES DI-CIT FE 6C2B -PERCENT-	EXT AL 6G7A -PERCENT-	PYROP FE 6C5A -PERCENT-	EXT AL 6G5A -PERCENT-	ATTERBERG LIMIT LL 4F2 PCT.	PL 4F1 NO.40	BULK DENSITY 1/3 BAR 4A1F GRAMS	DRY 4A1H PER CC	CM 3B2	WATER CONTENT 1/10 BAR 4B1C -PERCENT-	1/3 BAR 4B1C -PERCENT-	15 BAR 4B2 -PERCENT-	EXTNSBLTY LEF 4D1 -PERCENT-	LE 4D1 -PERCENT-
8 678	0- 20	3.53	0.145			2.7				NP	NP	1.30		0.70			6.0		
8 679	20- 41	2.12	0.107			2.8						1.35		0.69			6.4		
8 680	41- 58	1.19	0.081			2.7				NP	NP	1.40		0.60			5.5		
8 681	58-115	0.47				1.6						1.50		0.63			2.3		
8 682	115-140	0.08				1.2						1.80		0.46			1.8		
8 683	140-170					0.4						1.70		0.65			0.7		
8 684	170-205					0.3						1.70		0.81			0.7		

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6Q2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACI- DITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 5A3A	NH4- OAC 5A6A	BASE SATURATION SUM+ ACI- DITY	SUM+ AL	NH4- OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA-CL2 8C1E
		MEQ/100G									PERCENT					
8 678	0- 20	1.7	0.1	0.1	0.2	2.1	14.8	0.7	16.9	16.4	12	75	13		5.4	4.9
8 679	20- 41	0.5	0.1	TR	0.2	0.8	12.7	0.1	13.5	9.7	6	89	9		5.5	5.2
8 680	41- 58	0.5	0.1	TR	0.1	0.7	10.7	0.1	11.4	7.5	7	88	10		5.6	5.2
8 681	58-115	0.1	TR	TR	0.1	0.3	3.8	0.1	4.1	2.7	7	74	11		5.5	5.4
8 682	115-140	0.1	TR	TR	TR	0.2		0.1	0.2	2.1	100+	70	11		5.6	5.4
8 683	140-170	0.1	TR	TR	TR	0.2		0.1	0.2	1.8	100+	70	13		5.5	5.3
8 684	170-205	0.1	TR	0.1	0.1	0.3		0.1	0.3	1.3	100+	77	26		5.5	5.2

SAMPLE NO	DEPTH CM.	CLAY MINERALOGY LESS THAN 0.002 MM X RAY DTA X RAY 7A2E I	7A2E II	7A2E III	7A2E IV	7A3 -PERCENT-	7A3	7A2E I	7A2E II	7A2E III	MINERAL CODE	RELATIVE AMOUNT
8 678	0- 20	VR 1	MI 1								VR VERMICLT	1 TRACE
8 679	20- 41										MI MICA	2 SMALL
8 680	41- 58	MI 1	KK 1	VM 1								3 MODERATE
8 681	58-115										KK KAOLINIT	4 ABUNDANT
8 682	115-140										VM VM/MICA	5 DOMINANT
8 683	140-170											6 INDETER.
8 684	170-205											

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

CELIO GRAVELLY LOAMY COARSE SAND
S68Calif-9-14

Location: Tahoe Basin, El Dorado County, California. 0.1 mile north of southeast corner sec. 30, T. 12 N., R. 18 E. 0.25 mile west of Meyers checking station, west side of Highway 89 extension. Date of Sampling: October 25, 1967.
Description by: R. C. Huff. Collectors: G. M. Kennedy, J. H. Rogers, G. L. Anderson, D. Palmquist.
Classification: Aquentic Cryumbrept, sandy-skeletal, mixed.
Vegetation: Not cultivated; lodgepole pine, juniper, squirrel tail, tall sagebrush.
Climate: Precipitation 35 inches. Mean annual temperature 42°F., January 27°F., July 61°F.
Parent Material: Mixed alluvium, dominantly granitic. Topography: Fans of glacial outwash, smooth, less than 1 percent slope. Elevation: 6340 feet. Drainage: Somewhat poorly to poorly drained; runoff is slow; permeability is rapid to 45 inches, slow from 45 to 56 inches and rapid below. Water table less than 20 feet. Soil Moisture: Moist throughout profile, near field capacity below 56 inches.
Remarks: Field determinations of pH by Hellige-Truog triplex indicator. Horizons A11, A12 (0-16"); IIC2 (23-45"); and IIC5 (67-80") were sampled for State Division of Highways.

HORIZON	DESCRIPTION
	(0-20 cm.)
A11 RSL 68678	0 to 8 inches, brown (10YR 4/3) gravelly loamy coarse sand, very dark grayish brown (10YR 3/2) moist; weak medium granular structure; soft, very friable, nonsticky, nonplastic; many very fine, fine, medium and coarse roots; many very fine interstitial pores; thin gravel pavement on surface; hydrophobic; medium acid (pH 6.0); diffuse wavy boundary.
	(20-41 cm.)
A12 RSL 68679	8 to 16 inches, brown (7.5YR 5/4, 4/4) gravelly loamy coarse sand, dark reddish brown (5YR 3/3) moist;massive; soft, very friable, nonsticky, nonplastic; many very fine, fine, medium and coarse roots; many very fine interstitial pores; 20 percent gravel and 10 percent cobbles; medium acid (pH 6.0); diffuse wavy boundary.
	(41-58 cm.)
C1 RSL 68680	16 to 23 inches, strong brown (7.5YR 5/8) gravelly loamy coarse sand, dark reddish brown (5YR 3/4) moist; massive; soft, very friable, nonsticky, nonplastic; many very fine and fine and common medium roots; many very fine and fine interstitial pores; 20 percent gravel and 10 percent cobbles; slightly acid (pH 6.2); clear wavy boundary.
	(41-115 cm.)
IIC2 RSL 68681	23 to 45 inches, dusky red (10R 3/3) very gravelly coarse sand, dusky red (10R 3/4) moist; many large prominent reddish yellow and strong brown (7.5YR 6/8, 5/8) mottles, brownish yellow and yellowish brown (10YR 6/6, 5/6) moist; single grained; loose, nonsticky, nonplastic; many very fine roots; many very fine interstitial pores; dusky red color occurs in the upper half of horizon, grades to yellowish red in the lower part with bands of dusky red; 60 percent gravel and 10 percent cobbles; slightly acid (pH 6.4); clear wavy boundary.
	(115-140 cm.)
IIC3sim RSL 68682	45 to 56 inches, yellowish red (5YR 5/6) very gravelly coarse sand, dark reddish brown (2.5YR 3/4) moist; many medium prominent reddish yellow and strong brown (7.5YR 6/8, 5/8) mottles, reddish yellow (7.5YR 6/6) moist; massive; extremely hard, very firm, nonsticky, nonplastic; roots matted on surface; common very fine pores; strongly cemented; 60 percent gravel and 10 percent cobbles; slightly acid (pH 6.4); abrupt wavy boundary.
	(140-170 cm.)
IIC4 RSL 68683	56 to 67 inches, white (N 8/, 10YR 8/1) very gravelly coarse sand, light gray (10YR 7/2) moist; few fine prominent yellowish brown (10YR 5/6) moist mottles; single grained; loose, nonsticky, nonplastic; no roots; many very fine interstitial pores; 60 percent gravel and 2 percent cobbles; slightly acid (pH 6.5); abrupt wavy boundary.
	(170-205 cm.)
IIC5 RSL 68684	67 to 80 inches, white (N 8/, 10YR 8/1) coarse sand, light gray (N 7/) moist; thin horizontal black (N 2/ dry and moist) bands; single grained; loose, nonsticky, nonplastic; no roots; many very fine interstitial pores; horizon becomes very gravelly with depth; neutral (pH 6.6).

CONSECUTIVE PEDON NUMBER C 68 83 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES TALLAC SOIL NO. S68 CALI. 9-16 SAMPLE NO. 8 685-8 690 TAHOE BASIN AREA

SOIL FAMILY ENTIC CRYUMBREPT LOAMY-SKELETAL,MIXED RIVERSIDE SOIL SURVEY LABORATORY

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION 2- .05	SILT .05- .002	CLAY LT .002	SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 SANDS VCS 2-1	CS 1- .5	MS .5- .25	FS .25- .10	VFS .1- .05	SILTS CSI .05- .02	FSI .02- .002	CLAYS CO. 2- .2U	FINE LT .2U	CARBO NATE 3A1A	1A2A INT. 11 .2-.02	COARSE FRAGMENTS PCT. OF WHOLE 20 I 75-20	II 20-5	III 5-2
			PERCENT OF LESS THAN 2MM														SOIL --A	PCT. OF LT 75 --	--
8 685	3- 0	01+02																	
8 686	0- 38	A11	68.5	26.4	5.1	11.2	16.9	10.5	16.7	13.2	13.1	13.3				35.9	14A	11	3Z N
8 687	38- 53	A12	67.3	28.5	4.2	9.1	17.0	10.8	16.9	13.5	14.7	13.8				37.8	43A	21	22Z N
8 688	53- 79	C 1	63.6	32.2	4.2	10.8	16.9	9.8	14.4	11.7	15.1	17.1				34.8	46A	20	26Z N
8 689	79-105	C 2	76.5	19.7	3.8	17.4	23.2	12.7	14.8	8.4	10.5	9.2				26.5	48A	11	37Z N
8 690	105-165	C 3SIM	73.6	23.3	3.1	7.5	18.7	13.5	20.4	13.5	13.1	10.2				37.0	35A	12	23Z N

SAMPLE NO.	DEPTH CM.	ORG. MATTER CARBON 6A1A	NITROGEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B	2-20 6E1B	SESQUIOXIDES DI-CIT FE 6C2B	EXT AL 6G7A	PYROP FE 6C5A	EXT AL 6G5A	ATTERBERG LL 4F2	PL 4F1	BULK DENSITY I 3 EST. 4A1F	1/3 BAR 4A1F	DRY BAR 4A1H	CM 3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2	EXTNSBLTY LEF 4D1	LE 4D1
		-PERCENT-		-PERCENT-		-PERCENT-				PCT.	NO.40	GRAMS PER CC				-PERCENT-			-PERCENT-	
8 685	3- 0											0.40								
8 686	0- 38	3.92	0.195			1.2				NP	NP	1.35		0.93				8.2		
8 687	38- 53	2.97	0.162			1.1						1.40		0.71				7.4		
8 688	53- 79	1.61	0.110			1.1				NP	NP	1.50		0.67				6.5		
8 689	79-105	0.79				1.0						1.50		0.66				4.3		
8 690	105-165	0.29				1.1						1.70		0.75				4.2		

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6Q2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACI- DITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 5A3A	C E C NH4- OAC 5A6A	BASE SATURATION SUM+ ACI- DITY	SUM+ AL	NH4- OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA- CL2 8C1E
		MEQ/100G									PERCENT					
8 685	3- 0															
8 686	0- 38	7.1	0.4	0.1	0.5	8.1	15.9		24.0	19.0	34		43		5.9	5.4
8 687	38- 53	4.5	0.4	0.1	0.5	5.5	13.2		18.7	15.5	29		35		6.0	5.4
8 688	53- 79	2.4	0.2	TR	0.5	3.1	12.6		15.7	12.4	20		25		6.0	5.4
8 689	79-105	1.3	0.1	TR	0.4	1.8	7.2		9.0	7.6	20		24		5.9	5.4
8 690	105-165	1.4	0.1	0.1	0.6	2.2	5.3		7.5	7.8	29		28		5.7	5.3

SAMPLE NO	DEPTH CM.	CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I	7A2E II	7A2E III	7A2E IV	DTA 7A3 -PERCENT-	7A3	L.T. 0.0002 MM X RAY 7A2E I	7A2E II	7A2E III	MINERAL CODE	RELATIVE AMOUNT
8 685	3- 0											1 TRACE
8 686	0- 38	VR 2	KK 2								VR VERMICLT	2 SMALL
8 687	38- 53										KK KAOLINIT	3 MODERATE
8 688	53- 79	VR 2	KK 2	MI 1							MI MICA	4 ABUNDANT
8 689	79-105											5 DOMINANT
8 690	105-165											6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

TALLAC GRAVELLY COARSE SANDY LOAM
S60Calif-9-16

Location: Tahoe Basin, El Dorado County, California; 0.2 mile north and 0.1 mile west of southeast corner of sec. 34, T. 13 N., R. 17 E., 2 miles west of Camp Richardson, Lot 18 of the Forest Service Spring Creek Tract. Date of Sampling: October 26, 1967. Description by: R. C. Huff. Collectors: G. L. Anderson, G. M. Kennedy, J. H. Rogers, D. Palmquist.
Classification: Entic Cryumbrept, loamy-skeletal, mixed.
Vegetation: Not cultivated. Jeffrey pine, white fir, some stipa and annual weeds. Climate: Precipitation is 35 to 40 inches. Mean annual temperature about 41°F., January about 30°F., July about 63°F. Parent Material: Glacial deposit, predominantly metabasic. Topography: Undulating moraine; 2 to 5 percent east slope. Elevation: 6480 feet. Drainage: Well drained; runoff is medium; permeability is moderate to 42 inches, slow below. Soil Moisture: Below wilting point.
Remarks: Field determinations of pH by Hellige-Truog triplex indicator. Horizons A11, A12 (0-21"); C1, C2 (21-42"); and C3si (42-65") were sampled for State Division of Highways.

HORIZON	DESCRIPTION
	(3-0 cm.)
01&02 RSL 68685	1 to 0 inches, fresh and decomposed conifer needles. Not sampled.
	(0-38 cm.)
A11 RSL 68686	0 to 15 inches, dark grayish brown (10YR 4/2) gravelly coarse sandy loam, very dark brown (10YR 2/2) moist; weak fine crumb structure; soft, very friable, nonsticky, nonplastic; many very fine, fine, medium and coarse roots; many very fine interstitial pores; 14 percent gravel; medium acid (pH 6.0); diffuse wavy boundary.
	(38-53 cm.)
A12 RSL 68687	15 to 21 inches, dark brown (10YR 4/3) gravelly coarse sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky, nonplastic; many very fine, fine, medium and coarse roots; many very fine interstitial pores; 35 percent gravel, a few cobblestones; medium acid (pH 6.0); diffuse wavy boundary.
	(53-79 cm.)
C1 RSL 68688	21 to 31 inches, yellowish brown (10YR 5/4) very cobbly coarse sandy loam, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky, nonplastic; many very fine, fine, medium and coarse roots; many very fine interstitial pores; 40 percent cobblestones, 10 percent gravel; medium acid (pH 6.0); diffuse wavy boundary.
	(79-105 cm.)
C2 RSL 68689	31 to 42 inches, yellowish brown (10YR 5/6) very gravelly coarse sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky, nonplastic; many very fine, fine and medium and few coarse roots; many very fine interstitial pores; 40 percent gravel and 1 percent cobblestones; medium acid (pH 5.8); abrupt smooth boundary.
	(105-165 cm.)
C3sim RSL 68690	42 to 65 inches, yellowish brown and brown (10YR 5/4 and 7.5YR 5/4) very gravelly coarse sandy loam, dark brown (10YR 4/3 and 7.5YR 4/4) moist; massive; hard, firm, nonsticky and nonplastic; weakly cemented; few fine, medium and coarse roots; most of the roots are matted in the surface of the duripan; strongly acid (pH 5.5).

CONSECUTIVE PEDON NUMBER C 68 84 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES TALLAC SHALLOW VARIANT SOIL NO. 568 CALI. 9-15 SAMPLE NO. S 691-S 696 TAHOE BASIN AREA

SOIL FAMILY DURIC HAPLUMBREPT COARSE-LOAMY,MIXED,FRIGID RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION 2- .05 SAND	.05- .002 SILT	LT .002 CLAY	SAND VCS 2-1	SAND CS 1- .5	SAND MS .5- .25	SAND FS .25- .10	SAND VFS .10 .05	SILTS CSI .05- .02	SILTS FSI .02- .002	CLAYS CO. 2- .2U	CLAYS FINE LT .2U	CLAYS CARBO NATE 3A1A.02	1A2A INT. II .2-	COARSE FRAGMENTS- PCT. OF WHOLE SOIL	I 75- 20 PCT.	II 20-5 OF	III 5-2 LT 75
			PERCENT OF LESS THAN 2MM																	
S 691	8- 4	O1															--A	--	--	--
S 692	4- 0	O2															--A	--	--	--
S 693	0- 13	A1	64.2	31.7	4.1	16.0	12.2	8.3	15.9	11.8	15.7	16.0				36.2	43A	16	27Z	N
S 694	13- 63	AC	64.3	31.1	4.6	11.6	13.9	9.1	16.6	13.1	15.9	15.2				38.4	35A	12	23Z	N
S 695	63- 97	C1	68.5	29.6	1.9	11.4	15.7	10.4	18.9	12.1	15.9	13.7				38.2	37A	12	25Z	N
S 696	97-150	C2	SIM62.9	34.9	2.2	10.8	13.0	8.6	17.1	13.4	19.3	15.6				42.5	42A	12	30Z	N

SAMPLE NO.	DEPTH CM.	ORG.MATTER CAR- BON 6A1A -PERCENT-	NITRO GEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	2-20 6E1B	SESQUIOXIDES DI-CIT FE 6C2B	EXT AL 6G7A -PERCENT-	PYROP FE 6C5A	EXT AL 6G5A	ATTERBERG LIMIT LL 4F2	PL 4F1	BULK DENSITY EST. 1/3 BAR 4A1F PCT.	1/3 BAR 4A1F NO.40	DRY 4A1H GRAMS PER CC	CM 3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C -PERCENT-	15 BAR 4B2	EXTNSBLTY LEF 4D1 -PERCENT-	LE 4D1
S 691	8- 4														1.00					
S 692	4- 0														1.00					
S 693	0- 13	4.85	0.204			0.7						1.35			0.73			9.2		
S 694	13- 63	2.17	0.113			0.7						1.40			0.78			5.8		
S 695	63- 97	0.52	0.035			1.0						1.50			0.75			2.7		
S 696	97-150	0.28				0.5						1.70	2.30	2.31	0.69		5.9	2.3	0.1	

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6O2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACI- DITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 5A3A	NH4- OAC 5A6A	BASE SUM+ ACI- DITY	SATURATION SUM+ AL	NH4- OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA- CL2 8C1E
		MEQ/100G									PERCENT					
S 691	8- 4															
S 692	4- 0															
S 693	0- 13	11.3	1.4	0.1	0.6	13.4	11.5		24.9	21.0	54		64		6.0	5.5
S 694	13- 63	4.4	0.5	0.1	0.4	5.4	10.4	0.4	15.8	12.8	34	93	42		5.4	4.9
S 695	63- 97	1.3	0.3	0.1	0.2	1.9	4.5		6.4	5.3	30		36		5.8	5.1
S 696	97-150	4.1	0.8	0.1	0.1	5.1			5.1	6.0	100+		85		5.9	5.2

SAMPLE NO	DEPTH CM.	CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I	7A2E II	7A2E III	7A2E IV	DTA 7A3 -PERCENT-	7A3	L.T. 0.0002 MM MINERAL X RAY 7A2E I	7A2E II	7A2E III	MINERAL CODE	RELATIVE AMOUNT
S 691	8- 4											1 TRACE
S 692	4- 0											2 SMALL
S 693	0- 13											3 MODERATE
S 694	13- 63											4 ABUNDANT
S 695	63- 97											5 DOMINANT
S 696	97-150											6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

TALLAC GRAVELLY COARSE SANDY LOAM, SHALLOW VARIANT 1/
S68Calif-9-15

Location: Tahoe Basin, El Dorado County, California. Near center of sec. 10, T. 12 N., R. 18 E., 100 feet west of Fallen Leaf Lake road. Date of Sampling: October 26, 1967. Description by: G. M. Kennedy. Collectors: J. H. Rogers, R. C. Huff, G. L. Anderson, D. Palmquist.

Classification: Duric Haplumbrept, coarse-loamy, mixed, frigid. This soil has the duripan at slightly shallower depths than Tallac official.

Vegetation: Not cultivated. White fir, Jeffrey pine, incense cedar. Climate: Precipitation is 35 to 40 inches. Mean annual temperature is 41°F., January 26°F., July 60°F. Parent Material: Mixed, predominantly metamorphic alluvium. Topography: Moderately sloping lateral moraine, 8 percent north slope. Elevation: 6500 feet. Drainage: Well drained; runoff is medium; permeability is moderately rapid to duripan which has slow permeability. Soil Moisture: Dry.

Remarks: Field determinations of pH by Hellige-Truog triplex indicator. C2m horizon is compacted till? and is very hard in place, but will disintegrate under pressure. The AC horizon may have had some mixing due to tree falls. Horizons AC (5-25") and C2m (38-60") were sampled for State Division of Highways.

HORIZON	DESCRIPTION
	(8-4 cm.)
01 RSL 68691	3¼ to 1½ inches, not sampled.
	(4-0 cm.)
02 RSL 68692	1½ to 0 inches, not sampled.
	(0-13 cm.)
A1 RSL 68693	0 to 5 inches, dark grayish brown (10YR 4/2) gravelly coarse sandy loam, very dark grayish brown and very dark brown (10YR 3/2, 2/2) moist; strong very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, medium and coarse roots; many very fine tubular and interstitial pores; about 30 percent gravel; medium acid (pH 6.0); clear smooth boundary.
	(13-63 cm.)
AC RSL 68694	5 to 25 inches, brown (10YR 4/3) gravelly coarse sandy loam, dark brown (10YR 3/3) moist; moderate fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, medium and coarse roots; many very fine interstitial, common very fine, fine and medium tubular pores; about 25 percent gravel; medium acid (pH 5.8); clear wavy boundary.
	(63-97 cm.)
C1 RSL 68695	25 to 38 inches, light yellowish brown (2.5Y 6/4) cobbly coarse sandy loam, olive brown (2.5Y 4/4) moist; common large prominent strong brown (7.5YR 5/6) mottles, yellowish red and strong brown (5YR 5/6, 7.5YR 5/6) moist; massive; slightly hard, friable, nonsticky and nonplastic; many very fine, fine, medium and coarse roots; common very fine tubular pores; about 26 percent pebbles and cobblestones; medium acid (pH 6.0); clear wavy boundary.
	(97-150 cm.)
C2sim RSL 68696	38 to 60 inches, light gray (2.5Y 7/2) gravelly coarse sandy loam, grayish brown (2.5Y 5/2) moist; common large prominent brown (7.5YR 4/4) moist mottles; massive; extremely hard, nonsticky and nonplastic; few very fine, fine and medium roots; about 29 percent pebbles and cobblestones; slightly acid (pH 6.2).

1/ Tallac is in a loamy-skeletal, mixed, family of Entic Cryumbrepts. This pedon has a duripan, less than 35 percent coarse fragments by volume, and summer temperatures that are greater than 8° C. (47° F.) at 50 cm. (20 inches).

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Fiddletown gravelly loam (taxadjuncts) **LOCATION** Amador County, California

SOIL FAMILY: Pachic Xerumbrept, loamy-skeletal, mixed, mesic.

SOIL NOS. s60Calif-3-27 **LAB. NOS.** 60120 - 60123

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 — VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0- 8	A1	9.0*	8.8*	3.7	7.8	11.3	49.9	9.5	39.0	27.4	44	1-sil
8-22	AC	14.4*	11.8*	4.0	7.3	11.3	43.2	8.0	36.3	23.1	43	l
22-46	C1	11.4*	12.6*	4.6	6.5	14.5	41.5	8.9	38.0	21.6	41	l
46+	R	Rock										

pH H_2O 8C1b 1:1	pH KCl (1 N) 8C1c 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	6C1b Free Iron as % Fe_2O_3	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
5.7	4.8	4.91	0.212	23.2				3.4			9.5
6.2	5.0	0.80	0.052	15.4				3.4			6.9
6.2	5.0	0.41	0.030	13.7				4.0			6.9

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B1a — 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	5B1a Na 6P2a	5B1a K 6Q2a	BASE SAT. % 5C3	Clay mineralogy (<0.002 mm.) — Mont.	Verm.	Mixed layer Mica-Verm.	Mica	% Kaolin DTA 7A3	% Gibb. DTA 7A3
	milliequivalents per 100g. soil →						←	X-ray 7A2		→		
26.8	9.3	1.5	18.2	0.2	0.8	39						
11.2	3.6	0.9	5.6	0.1	0.5	48	-	xx	-	-	10	5
8.5	3.3	0.8	4.2	0.1	0.2	49	-	xx	-	-	35	5

* Many concretions in these fractions

1/ Percent of 1 inch fraction

- = looked for but not found
- tr = detected, very small amounts
- x = detected, small amounts
- xx = moderate amounts
- xxx = large amounts
- xxxx = predominant amounts

FIDDLETOWN GRAVELLY LOAM
S60Calif-3-27

Location: 0.12 mile SE of the center of the NE1/4 of sec. 1, T. 7 N., R. 11 E., 200 feet south of the east dam on Bateman Ranch, 3/8 mile east of the ranch house; 200 feet up the slope from the north fork of Deadman Creek.
Date of Sampling: May 6, 1960 Amador County, California
Collectors: Grant Kennedy, Reuben Nelson, Robert Sketchley, Clifford Henry, Paul Nazar, Jack McClelland. Description by: Grant Kennedy.
Vegetation: Bracken fern and annual grasses - dominantly soft chess (area was cleared but has not been cultivated - original vegetation included ponderosa pine, black oak, incense cedar)
Climate: Mean annual precipitation - 33"; average temperatures (Tiger Creek Station): January - 40° F.; July - 70° F.; mean annual - 55° F.
Parent Material: Dark-colored schists of the Calaveras formation, nearly vertical folding
Relief: Steep uplands, about 100 feet above the base of a north-facing slope of 20 percent.
Elevation: 2,160 feet
Drainage: Well drained; moderately slow runoff; moderate permeability
Remarks: This soil is a dark-colored, Ando-like Regosol. The soil was moist when described.
Classification: Pachic Xerumbrept, loamy-skeletal, mixed, mesic.

DESCRIPTION

A1	0- 8"	Dark grayish-brown (10YR 4/2) gravelly loam containing about 25% gravel and 5% cobbles and stones, very dark brown
RSL No. 60120		(7.5YR 2/2) when moist; moderate very fine granular structure; soft, friable, slightly sticky and slightly plastic; abundant very fine roots; many very fine interstitial and tubular, few fine tubular pores; medium acid (pH 6.0); clear smooth boundary.
AC	8-22"	Brown (10YR 5/3) gravelly loam containing about 25% gravel and 40% cobbles and stones, dark brown (7.5YR 3/3) when
RSL No. 60121		moist; otherwise similar to the above except few fine and medium roots; slightly acid (pH 6.2); diffuse smooth boundary.
C1	22-46"	Grayish-brown (10YR 5/2) gravelly loam about 80% of which consists of gravel, cobbles, stones, and rock outcrop, dark
RSL No. 60122		brown (10YR 3/3) when moist; moderate fine subangular blocky structure; soft, very friable; slightly sticky and slightly plastic; plentiful very fine, few fine to coarse roots; many very fine interstitial and tubular, few fine tubular pores; no clay films observed even on surfaces of rock fragments; slightly acid (pH 6.5); abrupt very irregular boundary.
R	46"+	Gray (N 5/) dark-colored, fine-grained, hard schist, very dark gray (N 3/) when moist; neutral (pH 7.0) on ground,
RSL No. 60123		but somewhat weathered rock.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Fiddletown gravelly loam **LOCATION** Amador County, California

SOIL FAMILY: Pachic Xerumbrept, loamy-skeletal, mixed, mesic

SOIL NOS. S60Calif-3-28 **LAB. NOS.** 60124 - 60127

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0- 8	A1	9.1*	9.3*	3.8	7.4	11.7	47.9	10.8	40.1	24.3	39	1
8-18	AC	9.8*	8.9*	3.8	8.3	12.4	45.9	10.9	40.5	23.4	30	1
18-45	C1	8.8*	9.5*	4.2	8.6	12.9	44.8	11.2	41.0	22.4	27	1
45+	R	not analysed										

	pH		ORGANIC MATTER			EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC x 10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent	6C1b Free Iron as	MOISTURE TENSIONS		
			6A1a	6B1a								4B2
H_2O 8C1a 1:1	KCl (1 N) 8C1c 1:1	1:10	ORGANIC CARBON	NITROGEN	C/N				% Fe_2O_3	1/10 ATMOS.	1/3 ATMOS.	15 ATMOS.
			%	%				%		%	%	%
6.3	5.3		3.40	0.215	15.8				3.8			10.6
6.2	5.2		1.89	0.133	14.2				4.1			9.6
6.3	5.2		1.13	0.084	13.5				4.0			8.9

5A2a	EXTRACTABLE CATIONS 5B1a						BASE SAT. % 5C3	Clay mineralogy (<0.002 mm.)					
CATION EXCHANGE CAPACITY (- Na)	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Na 6P2a	K 6Q2a			Mont.	Verm.	Mixed layer Mica-Verm.	Mica	% Kaolin DTA 7A3	% Gibb. DTA 7A3
	milliequivalents per 100g. soil →							←	X-ray 7A2		→		
23.1	11.7	1.6	13.0	0.2	0.6		52						
18.5	8.1	0.8	10.4	0.1	0.5		48						
13.8	5.7	0.8	8.5	0.1	0.4		45	-	xx	x	-	15	2
								-	x	x	x	35	5

* Many concretions in these fractions.

1/ Percent of 1 inch fraction

- = looked for but not found
tr = detected, very small amounts
x = detected, small amounts
xx = moderate amounts
xxx = large amounts
xxxx = predominant amounts

FIDDLETOWN GRAVELLY LOAM
S60Calif-3-28

Location: 0.15 mile N of the S1/4 corner of sec. 35, T. 8 N., R. 11 E., 120 feet south of the Fiddletown-Silver Lake Road, 0.2 mile east of the Fiddle Hill Ranch; 1.5 miles east of Fiddletown, Amador County, California.
Date of Sampling: May 6, 1960
Collectors: Grant Kennedy, Reuben Nelson, Robert Sketchley, Clifford Henry, Paul Nazar, Jack McClelland Description by: Grant Kennedy.
Vegetation: Black oak, incense cedar, poison oak
Climate: Mean annual precipitation - 32"; average temperatures (Tiger Creek Station): January - 40° F.; July - 70° F.; mean annual - 55° F.
Parent Material: Dark-colored schists of the Calaveras formation with nearly vertical folding
Relief: Steep uplands, in the mid-portion of a north-facing slope of
Elevation: 1,980 feet
Drainage: Well drained; moderately slow runoff; moderate permeability
Remarks: This soil is a dark-colored, Ando-like Regosol. It was moist when described. Classification: Pachic Xerumbrept, loamy-skeletal, mixed, mesic.

HORIZON		DESCRIPTION
O1 & O2	0- 1"	Loose litter of leaves, twigs, etc. partly decomposed in the lower portion.
A1	0- 8"	Dark grayish-brown (10YR 4/2) gravelly (25%) loam, very dark brown (7.5YR 2/2) when moist; moderate very fine granular
RSL No. 60124		structure; soft, friable, slightly sticky and slightly plastic; abundant very fine, few fine to medium roots; many very fine interstitial and tubular, few fine and medium tubular pores; slightly acid (pH 6.2); gradual smooth boundary.
AC	8-18"	Dark-brown (7.5YR 4/3) gravelly loam (25%) with about 15% cobbles and stones, very dark brown (7.5YR 2/2) when moist;
RSL No. 60125		moderate fine granular structure; otherwise similar to the A1; gradual irregular boundary.
C1	18-45"	Similar to above except about 80% of the volume is gravel,
RSL No. 60126		cobbles, stones, and rock outcrop; abrupt irregular boundary.
R	45"+	Gray (N 5/) somewhat fractured schist, very dark gray (N 3/)
RSL No. 60127		when moist; neutral (pH 7.0 - ground rock).

NOTE: The depth to rock varies from 25 to 50 inches, but dominantly ranges around 36 inches.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Pachic Xerumbrept, clayey-skeletal, montmorillonitic, thermic
SOIL Santa Lucia shaly clay loam (taxadjunct) SOIL Nos. S62Calif-42-9 LOCATION Santa Barbara County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62122 - 62125

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002) **	Sand Very coarse (2–1)	Sand Coarse (1–0.5)	Sand Medium (0.5–0.25)	Sand Fine (0.25–0.1)	Sand Very fine (0.1–0.05)	Silt (0.05–0.02	Silt Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)			Coarse fragments 2A2 > 2 Pct.	2 - 19 Pct. of <19 mm	19 - 76 Pct. of <19 mm
		Pct. of < 2 mm																
0–8	A11	32.3	30.1	37.6	7.8	9.3	4.0	6.7	4.5	7.7	22.4	15.5	27.8				23	
8–22	A12	27.2	29.1	43.7	3.6	6.4	3.8	7.7	5.7	8.4	20.7	18.2	21.5				18	
22–36	A13	25.8	25.2	49.0	4.6	7.0	3.2	6.2	4.8	7.0	18.2	15.2	21.0				50	
36–46+	R		Rock															

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct.	6C2a Ext. Iron as Fe Pct.	Bulk density 4A1f 1/3 bar clods* g/cc	Bulk density 4A1h Oven-dry clods* g/cc	g/cc		Water content 4B1c 1/3 bar clods* Pct.	4B2 15 bar Pct.	4D1 Extensibility COLE In./In.		pH 8C1a H_2O 1:1	pH 8C1c 1 N KCl 1:1	(1:1)
0–8	10.30	0.693	15			1.3	0.89	0.95			47.9	40.7	0.020		5.5	4.7	
8–22	4.35	0.347	13			1.6	1.02	1.06			54.4	38.0	0.014		4.4	3.4	
22–36	3.32	0.262	13			1.8	1.16	1.18			43.0	40.7	0.007		4.3	3.2	
36–46+	Rock						1.20	1.22			39.2		0.007				

Depth (In.)	Extractable bases 5B1a 6N2b Ca meq/100 g	6O2c Mg meq/100 g	6P2a Na meq/100 g	6Q2a K meq/100 g		6H2a Ext. Acidity meq/100 g	Cation Exch. Capacity 5A3a Sum meq/100 g							Base saturation 5C3 Sum Pct.	Pct.
0–8	19.7	11.1	0.5	3.7		26.2	61.2							57	
8–22	5.1	0.2	0.7	2.6		38.7	47.3							18	
22–36	3.1	7.8	0.8	1.8		41.5	51.9							20	
36–46+	Rock														

Depth (In.)

* Clods of A12, A13, and R horizons were fragments of shale.

** Shale fragments of sand and silt size break down in particle size distribution analysis. The soil has the chemical properties of a material of higher clay content and the mechanical properties of one of lower clay content.

SANTA LUCIA SHALY CLAY LOAM (taxadjunct) 1/
S62Calif-42-9

Location: Santa Barbara County, California. SE¼ Sec. 4, T9N, R35W. Very near watershed divide in Casmalia Hills, reached by trail road east southeast out of Corralitos Ranch headquarters; 5.4 airline miles south and slightly east of Guadalupe. Date of Sampling: April 19, 1962.
Description by: L. C. Leifer. Collectors: R. E. Nelson, Lothair Grant, G. E. Shipman, C. J. Hilliker, L. C. Leifer.
Classification: Pachic Xerumbrept, clayey-skeletal, montmorillonitic, thermic.
Vegetation: Grass-oak used for range; mostly ripgut brome, a little bur clover and a little Spanish clover, 50 percent coast live-oak canopy, sample site in small opening in trees. Climate: Precipitation 16 inches. Mean annual temperature 57°F., January 49°F., July 63°F. Parent Material: Diatomaceous shale, Monterey. Topography: Generally steep hills, locally smooth slightly convex 25 percent east slope. Elevation: 1400 feet. Drainage: Well drained. Runoff is medium. Permeability is moderate. Soil Moisture: All is nearly dry and moderately moist below.
Remarks: Field determinations of pH by Hellige-Truog triplex indicator. Paired site sample numbers are Santa Lucia S62Calif-42-10-1 through 4.

HORIZON	DESCRIPTION
A11 RSL 62122	0 to 8 inches, very dark gray (10YR 3/1d, 3/1m) shaly clay loam; moderate medium subangular blocky structure, upper 1" strong fine and medium granular on 3/4 surface, where granular lacking due to trampling; hard, friable, sticky and plastic; abundant very fine roots and plentiful medium roots; many very fine and few fine interstitial pores; medium acid (pH 6.0); gradual smooth boundary.
A12 RSL 62123	8 to 22 inches, very dark grayish brown (10YR 3/2) very shaly clay loam, very dark brown (10YR 2/2) when moist; 65 percent by volume of shale fragments larger than 3/4" diameter; strong fine granular structure; slightly hard, friable, sticky and plastic; plentiful very fine and medium, and few fine and coarse roots; many very fine and few fine interstitial pores; very strongly acid (pH 5.0); gradual wavy boundary.
A13 RSL 62124	22 to 36 inches, very dark grayish brown (10YR 3/2) very shaly clay loam, very dark brown (10YR 2/2) when moist; 75 percent by volume of rock fragments larger than 3/4" diameter; strong fine granular structure; slightly hard, friable, sticky and plastic; few very fine, fine, and coarse and plentiful medium roots; many very fine and few fine interstitial pores; very strongly acid (pH 4.5); abrupt irregular boundary.
R RSL 62125	36 to 46 inches + very pale brown (10YR 8/3d) shale, pale brown (10YR 6/3) when moist; shale is fractured and joints contain up to 5 percent A1 soils in joints to depth of 46 inches, less than 1 percent soil below 46 inches.

NOTE: Rock fragments larger than 3/4" discarded from samples going to Riverside Laboratory.

1/ The Santa Lucia series is in a clayey-skeletal, mixed, thermic family of Pachic Ultic Haploxerolls. This pedon has an umbric epipedon with a base saturation percentage of 18 and a montmorillonitic control section.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Pomponio fine sandy loam variant **LOCATION** San Mateo County, California

SOIL FAMILY: Xeric Argialboll, fine, montmorillonitic, mesic

SOIL NOS. S55Ca1.41-3 **LAB. NOS.** 55110-55116

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0- 7	A_{11}	0.4	3.6	13.7	31.6	7.0	25.7	18.0	32.1	12.7	0	fsl
7-13	A_{12}	0.3	2.9	10.9	28.0	8.6	30.2	19.1	37.0	13.6	0	l
13-18	A_{21}	0.2	2.7	9.2	25.8	9.6	36.8	15.7	42.7	15.4	0	l
18-26	A_{22}	0.3	2.8	9.2	26.3	10.5	34.5	16.4	40.6	16.3	0	l
26-37	B_{21}	0.2	1.2	3.0	11.5	7.7	30.0	46.4	29.8	14.3	0	c
37-52	B_{22}	0.1	1.1	2.8	10.9	7.8	32.0	45.3	30.5	15.4	0	c
52-62	C	0.2	1.5	3.6	11.6	7.2	36.9	39.0	31.9	18.5	0	cl

pH 8C1b SATURATED PASTE 1:1	pH 8C1a 1:5	pH 8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	ORGANIC MATTER 6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	8A1a Elec. Conduc. EC×10³ MILLIMHOS PER CM @25°C.	Free Fe_2O_3 6C1b %	GYPSUM me./100g. SOIL	4A3a Bulk Density g/cc.		4B2 Soil water 15 atmos. Pct.
5.7		6.5	3.12	.238	13.1		0.4	1.0		1.26		8.6
5.7		6.6	2.13	.174	12.2		0.4	1.1				6.7
6.0		6.9	0.67	.071	9.4		0.3	1.1		1.56		9.0
6.4		7.2	0.44				0.3	1.1				7.1
6.0		7.1	0.39				1.1	1.6		1.43		22.6
5.6		6.5	0.30				2.8	1.3		1.55		22.0
5.7		6.8	0.20				2.8	1.6		1.60		18.6

5A2a CATION EXCHANGE CAPACITY (-(Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	5B Exch. 5B1b Na 6P2a	5B Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg	6N1a 6O1a HCO_3	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
24.5	9.0	5.1	11.8	0.7	0.3	56	2.5	0.1	2.0	1.4	1.3	36.7
25.3	7.8	5.3	9.1	0.7	0.2	61	2.5	0.1	1.8	1.4	0.4	31.1
23.6	4.4	4.0	6.5	0.5	0.1	58	2.0	<0.1	0.7	0.3	1.3	22.2
14.8	4.2	4.3	3.7	0.7	0.1	72	2.5	<0.1	0.5	0.4	0.7	24.3
36.3	10.5	15.3	4.4	2.4	0.5	91	7.4	<0.1	2.2	0.3	8.8	93.1
38.6	9.9	15.2	4.5	3.2	0.5	86	15.3	0.1	7.4	0.2	24.1	82.9
31.8	11.4	13.2	3.5	3.2	0.4	89	19.7	0.1	9.8	0.2	31.3	64.5

1/ no $CO_3^{=}$ found

POMPONIO FINE SANDY LOAM variant
S55Calif-41-3

Location: San Mateo County, California. On Deeney Ranch, about 3/4 mile east of California highway No. 1. 75 feet west of old picket fence on east edge of pasture, 1/3 mile east of abandoned farm buildings. Date of Sampling: February 23, 1955.

Description by: W. M. Johnson. Collectors: Reuben Nelson, Ralph Nelson, Richard Wagner, Melvin Mello, and W. M. Johnson.

Classification: Xeric Argialboll, fine, montmorillonitic, mesic.

Vegetation: Annual fescue, rye grass, a little bur clover and scattered blackberry. Land Use: Pasture that apparently was once cultivated. Climate: Mean annual rainfall estimated at about 23 inches. June, July, and August are very dry. Fogginess is high in many parts of the year, particularly during summer and fall. Average January temperature is about 48° F., average July temperature about 60° F. On-shore winds carrying salt spray are common. Parent Material: Appears to be clayey sediments of the coastal plain. May be weathered Purissima formation with some local alluvium in the upper layers. Relief: In hilly and steep upland, a slightly concave slope in "cove" position, about 150 feet downslope from crest of hill. Slope about 17 percent, gently concave, facing west. Elevation: About 435 feet. Drainage: Runoff rapid. Permeability moderate in A horizon, very slow in B horizon.

Remarks: A horizon wet, B and upper C horizons moist, lower C slightly moist at time of sampling. Erosion at this site appears to be negligible.

HORIZON		DESCRIPTION
A_{11}	0-7"	**Very dark gray (10YR 3/0.8, dry; 2/0.8, moist) fine sandy loam. Weak coarse and medium granular. Slightly hard, friable, slightly plastic, nonsticky. Roots very numerous. Peds slightly porous. pH 5.7. Clear, wavy lower boundary.**
A_{12}	7 - 13"	Light loam or heavy fine sandy loam of the same color as the A_{11}. Weak very coarse, coarse, and medium granular. Hard, friable, slightly plastic, slightly sticky. Roots very numerous. Peds slightly porous. pH 5.5. Clear, wavy lower boundary.
A_{21}	13 - 18"	Finely mottled dark gray and gray (10YR 4/1 and 6/1, dry; 2/1 and 4/1, moist) loam. Weak medium and fine subangular blocky. Hard, friable, plastic, slightly sticky. Roots numerous. Moderately porous. pH 5.8. Clear, wavy lower boundary.
A_{22}	18 - 26"	Gray (10YR 5/1, dry; 3.5/1.5, moist) loam with common very fine mottles of light gray and few fine mottles of yellowish brown (dry). Weak medium subangular blocky. Very hard, friable, plastic, slightly sticky. Roots numerous. Moderately porous. pH 6.1. Abrupt, wavy lower boundary.
B_{21}	26 - 37"	Very finely mottled light brownish gray and yellowish brown (2.5Y 6/2 and 10YR 5/6, dry; 2.5Y 5/2 and 10YR 4/4, moist) clay. Moderate coarse prismatic, breaking to moderate medium blocky. Extremely hard, very firm, very plastic, very sticky. Moderate continuous clay skins. Few roots, mainly along cracks. Peds nonporous. pH 6.8. Clear, wavy lower boundary.
B_{22}	37 - 52"	Finely, indistinctly mottled light brownish gray and light yellowish brown (2.5Y 6/2 and 1Y 6/4, dry; 2.5Y 5/2 and 1Y 5/4, moist) clay. Moderate medium blocky. Very hard, very firm, very plastic, sticky. Moderate continuous clay skins. Very few roots, mainly along cracks. Peds nonporous. pH 6.3. Clear, wavy lower boundary.
C	52 - 62"+	Finely, indistinctly mottled light brownish gray and light yellowish brown (2.5Y 6/2 and 10YR 6/4, dry; 2.5Y 5/2 and 10YR 5/4, moist) heavy clay loam. Massive. Very hard, firm, very plastic, sticky. Patches of clay skins observed along cracks and in tubular pores. No roots observed. Slightly porous. pH 6.5.

1/ **The Pomponio series is in a fine, montmorillonitic, mesic family of Typic Palexerolls. This pedon has an albic horizon and lacks a paralithic contact.**

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Pomponio fine sandy loam variant **LOCATION** San Mateo County, California

SOIL FAMILY: Xeric Argialboll, fine, montmorillonitic, mesic

SOIL NOS. S55Ca1.41-4-1 thru 8 **LAB. NOS.** 55117-55124

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0- 7	A_{1p}	0.1	0.8	2.2	34.0	18.4	24.7	19.8	58.9	12.2	0	fsl
7-13	A_{12}	0.0	0.7	2.6	33.8	18.2	25.8	18.9	58.5	13.4	0	fsl
13-17	A_{21}	0.0	0.8	2.8	34.7	18.8	25.2	17.7	61.0	11.4	0	fsl
17-21	A_{22}	0.1	1.1	3.1	36.0	20.3	25.8	13.6	63.5	11.9	0	fsl
21-30	B_{21}	0.0	0.5	1.8	25.6	14.7	20.2	37.2	45.0	10.9	0	cl
30-41	B_{22}	0.0	0.5	1.5	26.4	13.0	22.3	36.3	46.5	10.6	0	cl
41-50	B_{23}	0.0	0.4	1.6	30.3	13.1	21.8	32.8	50.8	8.7	0	scl
50-60	C_1	0.0	0.4	1.8	32.3	13.5	24.0	28.0	53.0	10.6	0	scl

8C1b pH SATURATED PASTE 1:1	8C1a pH 1:5	8C1a pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	8A1a Elec. Conduc. EC×10³ MILLIMHOS PER CM @25°C.	Free Fe_2O_3 6C1b %	GYPSUM me./100g. SOIL	4A3a Bulk Density g/cc		4B2 Soil wat r 15 atmos. Pct.
5.7		6.5	2.85	.202	14.1		0.4	0.9		1.25		8.8
5.7		6.5	2.53	.190	13.3		0.3	0.9				9.1
5.8		6.6	1.43	.099	14.4		0.3	0.9		1.51		8.0
5.8		6.8	0.71				0.4	0.9				6.0
6.2		7.5	0.58				0.6	1.3				19.1
6.6		7.7	0.40				1.4	1.1		1.57		18.0
6.7		7.8	0.27				1.7	1.1				17.8
6.6		7.8	0.16				3.1	1.1		1.59		14.5

5A2a CATION EXCHANGE CAPACITY (- Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a Ca+Mg 6O1a	6J1a HCO_3 1/	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil						milliequivalents per liter					
25.3	8.9	4.9	11.3	0.5	0.3	56	2.7	0.1	2.0	1.6	1.2	36.9
25.7	8.8	5.6	11.9	0.6	0.2	56	2.3	<0.1	1.7	1.5	0.8	32.4
20.5	9.5	5.5	8.9	0.6	0.3	64	2.2	<0.1	1.0	0.9	0.4	24.7
14.4	5.5	4.0	5.9	0.5	0.1	63	2.7	<0.1	0.9	0.6	0.7	20.7
24.6	9.9	4.0	5.5	2.0	0.3	75	4.2	<0.1	0.3	0.3	3.5	60.2
31.8	10.4	11.2	3.9	2.7	0.3	86	10.7	0.1	2.6	0.3	11.7	70.3
32.0	10.7	12.4	3.4	3.3	0.3	89	19.4	0.1	5.2	0.3	23.4	67.6
27.6	9.6	11.4	2.9	3.9	0.3	90	21.3	0.1	5.6	0.1	27.5	51.5

1/ No $CO_3^{=}$ found

POMPONIO FINE SANDY LOAM variant 1/
S55Calif-41-4

Location: About 3/4 mile south of Tunitas Creek, 300 yards east of Highway No. 1 on south side of Star Hill Road, San Mateo County, California. See Sheet 21, Soil Survey Report of San Mateo Area, California, 1961.
Date of Sampling: February 24, 1955.
Description by: W. M. Johnson. Collectors: Reuben E. Nelson, Ralph E. Nelson, Richard Wagner, Melvin Mello, and W. M. Johnson.
Classification: Xeric Argialboll, fine, montmorillonitic, mesic.
Vegetation: Formerly cultivated, now in grass pasture. Annual fescue, ryegrass, annual weeds, iris, geranium, and wild buckwheat. Climate: Mean annual rainfall estimated at about 23 inches. June, July and August are very dry. Fogginess is high in many parts of the year, particularly during summer and fall. Average January temperature is about 48° F., average July temperature about 60° F. On-shore winds carrying salt spray are common. Parent Material: Clayey coastal plains sediments. May have some local alluvium in the upper part of the profile. Relief: Hilly and steep upland, in eroded marine terrace breaks. Site about 150 feet down slope from the crest of a hill. Slope about 14 percent, slightly concave, toward the west. Elevation: About 475 feet. Drainage: Runoff is rapid. Permeability moderate in A horizon, very slow in B horizon.
Remarks: Soil appears to have suffered little or no erosion of A horizon. At time samples were taken, soil was wet in the A horizon, moist below.

DESCRIPTION

A_{1p}	0 - 7"	**Very dark gray (10YR 3/1, dry; 2/1, moist) fine sandy loam. Weak coarse and medium granular. Slightly hard, friable, slightly plastic, nonsticky. Roots very numerous. Slightly porous. Many worm casts. pH 5.2. Abrupt smooth lower boundary.**
A_{12}	7 - 13"	Fine sandy loam of the same color as the A_{1p}. Weak coarse and medium granular. Hard, friable, slightly plastic, nonsticky. Roots very numerous. Peds are moderately porous. Very many worm casts. pH 5.5. Clear, slightly wavy lower boundary.
A_{21}	13 - 17"	Very dark gray (10YR 3.5/1, dry; 2/1, moist) fine sandy loam with common medium and fine mottles of light gray (dry). Weak coarse and medium granular. Hard, friable, slightly plastic, nonsticky. Roots are numerous. Peds are moderately porous. pH 5.5. Clear, wavy lower boundary.
A_{22}	17 - 21"	Dark gray (10YR 4/1, dry; 2.5/1, moist) fine sandy loam with common medium and fine mottles of light gray (dry). Weak medium and fine subangular blocky. Hard, friable, slightly plastic, nonsticky. Roots common. Moderately porous. pH 5.7. Abrupt, wavy lower boundary.
B_{21}	21 - 30"	Dark grayish brown (10YR 4/1.5, dry; 3/2, moist) clay loam. Moderate coarse prismatic, breaking to moderate medium blocky. Extremely hard, firm, very plastic, sticky. Moderate continuous clay skins. Has a few conspicuous white spots that are probably gypsum. Very few roots. Peds are nonporous. pH 6.2. Clear, wavy lower boundary.
B_{22}	30 - 41"	Light olive brown (2.5Y 5/3, dry; 4/3, moist) clay loam with common fine black mottles and a few conspicuous, medium, white spots (probably gypsum). Moderate medium blocky. Extremely hard, firm, very plastic, sticky. Moderate continuous clay skins. Very few roots. Peds are nonporous. pH 6.5. Clear, wavy lower boundary.
B_{23}	41 - 50"	Finely mottled light brownish gray and yellowish brown (2.5Y 6/2 and 10YR 5/6, dry; 2.5Y 5/2 and 10YR 4/6, moist) sandy clay loam with a few conspicuous medium spots of white. Weak coarse blocky. Extremely hard, firm, very plastic, sticky. Moderate continuous clay skins. Very few roots. Peds are nonporous. Contains krotovinas that are black in color. pH 6.8. Gradual lower boundary.
C_1	50 - 60"+	Finely mottled light brownish gray and yellowish brown (2.5Y 6/2 and 10YR 5/4, dry; 2.5Y 5/2 and 10YR 4/4, moist) sandy clay loam. Very weak coarse blocky, almost massive. Very hard, firm, very plastic, sticky. Thin patchy clay skins. Very few roots. Very slightly porous. pH 6.5.

1/ **The Pomponio series is in a fine, montmorillonitic, mesic family of Typic Palexerolls. This pedon has an albic horizon and lacks a paralithic contact.**

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Watsonville loam (taxadjunct) **LOCATION** San Mateo County, California

SOIL FAMILY: Abruptic Argiaquoll, fine, montmorillonitic, mesic

SOIL NOS. S55Ca1. 41-11 **LAB. NOS.** 55380-55386

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)							3A1		2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 2/	
0- 9	A_{11}	2.4	3.4	3.8	12.3	15.4	47.1	15.6	49.3	21.3	10	1
9-14	A_{12}	2.7	3.2	4.0	11.6	15.6	46.7	16.2	49.5	20.4	10	1
14-24	B_{21}	1.4	3.0	3.1	9.3	11.4	30.0	41.8	32.6	14.9	11	c
24-33	B_{22}	1.5	3.2	3.4	11.2	12.4	31.5	36.8	37.5	13.8	4	cl
33-44	B_3	2.5	6.1	5.8	12.3	9.8	25.5	38.0	29.6	13.1	10	cl
44-54	C_{11}	3.6	17.0	16.4	14.7	5.2	17.3	25.8	18.1	10.9	23	scl
54-60	C_{12}	0.1	0.3	0.5	1.4	1.0	39.6	57.1	11.0	30.5	0	c

8C1b SATURATED PASTE 1:1	pH 8C1a 1:5	pH 8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	ORGANIC MATTER 6B1a NITROGEN %	C/N	4A3a Bulk Density g./cc.	8A1a Elec. Conduc. EC x 10^3 MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	6F1a GYPSUM me./100g. SOIL	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
5.3		5.9	3.82	.259	14.7	1.22	0.7					10.3
5.5		6.2	1.46	.109	13.4		0.7					6.9
5.0		6.3	0.80	.075	10.7	1.56	0.9					17.7
4.8		5.9	0.56				2.3					15.0
4.6		5.4	0.38				4.7					16.0
4.4		5.3	0.26			1.58	7.8					10.9
4.3		5.2	0.23				5.8					25.8

5A2a CATION EXCHANGE CAPACITY (+ Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a CO_3 Ca+Mg	6J1a HCO_3 1/	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
30.6	6.1	4.5	10.2	1.0	0.4	54	4.8	0.3	4.2	1.8	3.5	48.6
16.4	4.1	4.2	6.6	0.9	0.3	59	5.0	0.2	2.5	1.7	2.5	30.3
35.3	7.3	11.5	7.7	2.5	0.6	74	6.2	0.1	1.3	0.7	4.8	60.0
29.6	7.6	11.4	7.1	3.1	0.4	76	16.8	0.1	5.4	0.4	21.0	53.8
37.6	6.7	13.1	7.3	3.9	0.4	77	33.8	0.3	12.7	0.1	47.8	63.3
23.7	5.3	8.3	6.4	3.0	0.3	73	52.0	0.2	21.2	0.2	24.8	39.9
51.1	11.1	15.0	9.7	25.3	0.5	84 2/	42.0	0.1	11.5	0.1	55.9	89.7

1/ No CO_3 found

2/ Percent of the whole soil

WATSONVILLE LOAM (taxadjunct) 1/
S55Calif-41-11

Location: San Mateo County, California in the San Mateo County SCD. 1.1 miles south and 0.8 miles west of Half Moon Bay on bluff overlooking the Pacific Ocean. Date of Sampling: May 19, 1955.
Description by: Ralph E. Nelson. Collectors: Reuben E. Nelson, Ralph E. Nelson, Rudolph Ulrich, R. J. Wagner.
Classification: Abruptic Argiaquoll, fine, montmorillonitic, mesic.
Vegetation: Annual grasses; soft chess, wild oat; California oat grass (Danthonia Californica), lupine, wild strawberry, coyote brush, Indian soap plant. Climate: 22 inches rainfall. Parent Material: Marine sediments. Relief: First terrace above ocean. Smooth and nearly level. Elevation: 70 feet. Drainage: Surface drainage very slow; internal drainage very slow, restricted due to claypan.
Remarks: Few worms in the All horizon.

HORIZON		DESCRIPTION
A_{11}	0-9"	Gray (10YR 5/1, very dark brown 10YR 2/2 moist) loam. Weak medium to fine subangular blocky. Very hard, friable, very slightly plastic and nonsticky. There are a few fine manganese and iron concretions. Gravel-size siliceous rock fragments scattered throughout this horizon and throughout the entire profile. Many roots and a few worm casts. The reaction is 6.0. The lower boundary is clear and smooth.
A_{12}	9-14"	Gray (10YR 5/1, very dark brown 10YR 2/2, mottled with yellowish brown 10YR 5/6-5/8 moist) loam. Weak medium and fine subangular blocky, Very hard, friable, very slightly plastic and nonsticky. There are many fine shot scattered throughout and a whitish siliceous coating just above the horizon below. There are numerous roots. The reaction is 6.0. The lower boundary is abrupt and smooth.
B_{21}	14-24"	Distinctly mottled dark grayish brown and yellowish brown (10YR 4/2-5/4, very dark grayish brown and dark brown 10YR 3/2-3/3 moist) clay. Strong medium and coarse angular blocky. Extremely hard, very firm, very plastic and sticky. Thick continuous clay skins which are dark brown (10YR 3/2) and very dark grayish brown (2.5Y 3/2 moist). Some fine darker colored iron and manganese shot concretions. Very few roots down the cracks between the structural aggregates. The reaction is 5.5. The lower boundary is clear and smooth.
B_{22}	24-33"	Prominently mottled grayish brown, dark grayish brown, and olive yellow (2.5Y 5/2, 4/2 and 6/6; dark grayish brown, very dark grayish brown and light olive brown 2.5Y 4/2, 3/2 and 5/6 moist) clay. Moderate medium and fine angular blocky. Extremely hard, very firm, very plastic and sticky. The clay skins are very dark gray brown (2.5Y 3/2) thin, and occur mostly on the vertical faces of the structural aggregates. Very few roots along structural cracks. There are numerous fine manganese and iron shot which are very dark brown to black and yellowish brown (10YR 5/6, 5/8). The reaction is 5.5. The lower boundary is clear and smooth.
B_3	33-44"	Prominently mottled light brownish gray and olive yellow (2.5Y 6/2, 6/6; grayish brown and light olive brown 2.5Y 5/2, 5/6 moist) clay. Weak fine subangular blocky. Extremely hard, very firm, very plastic and sticky. There are occasional thin clay skins on the vertical cracks and many fine manganese and iron concretions of very dark and yellowish brown (10YR 5/6, 5/8) color. The reaction is 5.0. The lower boundary is clear and smooth.
C_{11}	44-54"	Distinctly mottled brownish yellow and white (10YR 6/6-6/8; and 8/2 yellowish brown 10YR 5/6-5/8, and strong brown 7.5YR 5/8 moist) sandy clay. Massive. Very hard, firm, plastic and sticky. The reaction is 5.0. The lower boundary is clear and smooth.
C_{12}	54-60"	This horizon is prominently mottled, light brownish gray and light yellowish brown (2.5Y 6/2, 6/4) and brownish yellow (10YR 6/6 and 6/8; grayish brown and light olive brown 2.5Y 5/2, 5/4 and strong brown 7.5YR 5/8 moist) clay. Massive. Extremely hard, very firm, very plastic and very sticky. Reaction is 5.0.

1/ The Watsonville series is in a fine, montmorillonitic, mesic family of Aquic Natrixerolls. This pedon lacks a natric horizon and has mottles in the upper part of the Bt horizon and an abrupt boundary between the A and B horizons.

OIL SURVEY LABORATORY Riverside, California

SOIL TYPE Watsonville loam (taxadjunct) **LOCATION** San Mateo County, California

SOIL FAMILY: Abruptic Argiaquoll, fine, montmorillonitic, mesic

SOIL NOS. S55Cal. 41-12 **LAB. NOS.** 55387-55393

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 2/	TEXTURAL CLASS
0- 9	A_{11}	0.9	2.2	3.1	14.9	11.7	49.9	17.3	62.3	10.2	2	1
9-12	A_{12}	1.0	2.1	3.1	14.2	16.7	43.4	19.5	52.3	18.1	4	1
12-21	B_{21}	0.7	1.7	2.4	8.8	12.2	30.4	43.8	36.8	11.8	2	c
21-36	B_{22}	0.7	1.7	2.4	8.9	12.8	31.5	42.0	36.5	13.9	3	c
36-46	B_{23}	0.4	1.5	1.9	7.5	13.2	36.7	38.8	39.3	15.9	1	c1
46-54	B_3	0.0	0.4	0.5	4.3	19.6	41.5	33.7	47.9	16.8	0	c1
54-64	C	1.8	5.5	5.4	16.9	17.4	30.9	22.1	45.9	13.7	8	1

8C1b SATURATED PASTE 1:1	pH 8C1a 1:5	8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	4A3a Bulk Density g./cc.	8A1a E1g.c. Condtc. EC x 10³ MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	6F1a GYPSUM me./100g. SOIL	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
5.4		6.1	2.53	.185	13.7	1.45	1.2					8.6
5.5		6.3	1.87	.146	12.8		0.7					8.6
5.2		6.4	0.95	.097	9.8	1.58	0.8					17.9
5.0		6.0	0.65				2.4					17.6
4.7		5.9	0.48				4.1					16.6
4.7		5.7	0.28				4.3					16.0
4.7		5.8	0.13			1.62	4.1					11.0

5A2a CATION EXCHANGE CAPACITY (+ Na)	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg	6J1a HCO_3 1/	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
20.5	5.2	4.8	9.1	1.0	0.5	56	7.7	0.3	4.1	2.1	6.4	37.7
18.9	6.2	5.1	8.2	1.2	0.2	61	5.9	0.1	1.8	2.3	2.5	36.2
35.9	7.7	13.9	8.6	2.2	0.4	74	5.8	0.1	1.4	0.7	4.2	58.2
35.2	6.1	10.4	8.0	3.5	0.4	72	8.1	0.1	4.7	0.4	20.0	62.6
35.7	6.5	12.6	8.0	4.5	0.4	75	29.8	0.1	6.6	0.3	33.2	58.0
33.8	4.4	9.3	6.9	4.2	0.2	72	34.0	0.1	5.7	0.4	36.6	61.5
24.6	6.5	12.7	4.2	6.9	0.4	86	32.3	0.2	4.6	0.2	34.9	46.3

1/ No CO_3 found

2/ Percent of the whole soil

3/ ESP 28

WATSONVILLE LOAM (taxadjunct) 1/
S55Calif-41-12

Location: San Mateo County, California in the San Mateo County SCD, 100 feet north of the end of Rose Avenue at ocean. Just off edge of gully.
Date of Sampling: May 19, 1955.
Description by: Ralph E. Nelson. Collectors: Reuben E. Nelson, Ralph E. Nelson, Rudolph Ulrich, and R. J. Wagner.
Classification: Abruptic Argiaquoll, fine, montmorillonitic, mesic.
Vegetation: Annual grasses; soft chess, wild oat, and California oat grass (Danthonia Californica), lupine, wild strawberry, coyote brush, Indian soap plant. Climate: 22 inches rainfall. Parent Material: Marine sediments. Relief: First terrace above ocean, smooth and nearly level. Elevation: 70 feet. Drainage: Surface drainage very slow; internal drainage very slow, restricted due to claypan. Remarks: Few worms in the A11 horizon.

HORIZON		DESCRIPTION
A_{11}	0-9"	Gray (10YR 5/1, very dark brown 2/2 moist) loam. Weak, fine subangular blocky. Very hard, friable, very slightly plastic and nonsticky. There are fine rock particles of siliceous material scattered throughout this horizon and throughout the entire profile. There are a few fine iron and manganese shot concretions. Many roots and few worm casts. The reaction is 6.0. The lower boundary is clear and smooth.
A_{12}	9-12"	Gray (10YR 5/1, very dark brown 2/2 mottled with yellowish brown 10YR 5/6 and 5/8 moist) loam. Weak, fine subangular blocky. Hard, friable, very slightly plastic and nonsticky. There are many fine manganese and iron shot concretions and there is a whitish siliceous coating just above the horizon below. The reaction is 6.0. The lower boundary is abrupt and smooth.
B_{21}	12-21"	Very dark grayish brown (10YR 3/2, dark brown and very dark brown 10YR 3/3-2/2 moist) clay. Strong medium to coarse angular blocky. Extremely hard, very firm, very plastic and sticky. Thick continuous clay skins which are nearly black in color (10YR 2/1 moist). Some fine iron and manganese shot. Few roots down the cracks between the structural aggregates. The reaction is 5.8. The lower boundary is clear and smooth.
B_{22}	21-36"	Prominently mottled gray brown (2.5Y 5/2) and brownish yellow (10YR 6/6, 6/8, very dark grayish brown 2.5Y 3/2 and yellowish brown 10YR 5/6-5/8 moist) clay. Moderate medium angular blocky. Extremely hard, very firm, very plastic and sticky. The clay skins are nearly black (10YR 2/1) and very dark grayish brown (2.5Y 3/2) and are thinner and less continuous than in the horizon above. There are a few roots going down cracks between structural aggregates. The reaction is 5.5. The lower boundary is clear and smooth.
B_{23}	36-46"	This horizon is prominently mottled dark grayish brown and grayish brown (2.5Y 4/2, 5/2; very dark grayish brown and dark grayish brown 2.5Y 3/2 and 4/2 and very dark brown 10YR 2.5/2 moist) clay. Weak medium and fine angular blocky. Extremely hard, very firm, very plastic and sticky. There are thin dark clay skins on the vertical faces of the structural aggregates, and numerous fine iron and manganese segregations. The reaction is 5.0. The lower boundary is clear and smooth.
B_3	46-54"	Distinctly mottled light yellowish brown and light olive brown (2.5Y 6/4-5/4, light olive brown and olive brown 2.5Y 5/4-4/4, and strong brown 7.5YR 5/6-5/8 moist) silty clay. Weak, fine subangular blocky. Extremely hard, very firm, very plastic and slightly sticky. There are many diffuse fine mottles of iron and a few thin light olive brown (2.5Y 5/4) clay skins. There are no roots in this horizon. The reaction is 5.0. The lower boundary is clear and smooth.
C	54-64"	Prominently mottled light yellowish brown and pale yellow (2.5Y 6/4-7/4) and brownish yellow (10YR 6/6-6/8, light olive brown 2.5Y 5/4 and yellowish brown 10YR 5/6-5/8 moist) sandy clay loam. Massive. Hard, firm, slightly plastic and slightly sticky. The reaction is 5.0.

1/ The Watsonville series is in a fine, montmorillonitic, mesic family of Aquic Natrixerolls. This pedon lacks a natric horizon and it has mottles in the upper part of the B2t horizon and an abrupt boundary between the A and B horizons.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Logan silt loam **LOCATION** Lassen County, California

SOIL FAMILY: Typic Calciaquoll, fine-silty, mixed, mesic.

SOIL NOS. S55-Cal. 18-5 **LAB. NOS.** 55516-523

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0-6	A1p	0.6	2.0	2.0	9.7	10.7	46.5	28.5	30.4	34.0	0	cl
6-9	A12	0.4	1.6	1.6	8.9	11.0	47.4	29.1	31.1	33.9	0	cl
9-16	A13	0.3	1.2	1.6	9.3	10.6	46.5	30.5	30.4	33.7	0	cl
16-22	Cca	0.2	1.1	1.4	8.3	9.5	44.5	35.0	28.6	31.6	0	cl
22-35	C1	0.6	1.9	2.0	8.6	10.2	48.7	28.0	29.8	35.4	0	cl
35-42	C2	2.1	3.0	2.2	7.8	9.0	52.6	23.3	29.7	37.4	2	sil
42-53	C3	1.8	2.3	1.3	6.1	9.2	57.3	22.0	28.7	42.3	3	sil
53-65+	C4	1.0	2.3	2.1	10.9	14.5	53.7	15.5	40.4	35.8	7	sil

	pH		ORGANIC MATTER				8F1a Elec. Conduc.	6E1b	6F1a	MOISTURE TENSIONS		
8C1b SATURATED PASTE 1:1	8C1a 1:5	8C1a 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	EC x 10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
7.8		8.4	2.88	.258	11.2		1.0	2	-			20.1
7.9		8.4	2.42	.222	10.9		0.8	2	-			20.9
7.9		8.5	1.43	.164	8.7		0.9	5	-			22.3
7.9		8.6	0.76				0.7	30	-			21.4
7.9		8.5	0.47				1.5	26	-			19.4
7.8		8.5	0.32				0.7	33	-			18.0
7.7		8.4	0.30				0.6	30	-			26.1
7.7		8.5	0.24				0.6	36	-			20.3

5A2a	EXTRACTABLE CATIONS 5B					5D1	SATURATION EXTRACT SOLUBLES 8A1					8A
CATION EXCHANGE CAPACITY ←(Na)	5B1a Ca 6N2b	5B1a Mg 6Q2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	EXCH. Na %	6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg		6K1a	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
34.7				1.2	4.0	3	2.3	1.0	6.8			62.2
35.0				2.1	3.6	6	2.9	0.7	5.9			64.6
34.9				1.8	3.3	5	4.4	0.6	5.7			59.1
27.0				1.1	1.9	4	3.4	0.4	3.9			62.7
27.1				1.1	1.6	4	5.4	0.4	9.4			55.3
27.1				1.3	1.1	5	2.6	0.2	3.9			52.4
35.3				1.9	1.1	5	2.6	0.2	3.7			55.4
35.2				0.9	1.0	3	2.5	0.2	3.9			58.5

1/ Percent of the whole soil

LOGAN SILT LOAM
S55Calif-18-5

Location: Lassen County, California. About 6 miles southeast of Susanville. 150 feet west and 20 feet south of the east quarter corner of Sec. 18, T. 29 N., R. 13 E., Honey Lake Valley SCD. Date of Sampling: August, 1955.

Description by: W. M. Johnson. Collectors: S. B. Johnson, Ralph E. Nelson, Stuart Porter, Reuben E. Nelson, John Cady, E. A. Naphan, and W. M. Johnson.

Classification: Typic Calciaquoll, fine-silty, mixed, mesic.

Vegetation: Judging by fence rows, original vegetation probably includes salt grass, greasewood, rabbitbrush, giant wild rye, and horsetail rush. Land Use: Cultivated, irrigated alfalfa field. Climate: At Susanville the January average temperature is 30.7° F., the July average is 69.5° F., and the frost free period averages 142 days. Summers are hot and dry, winters are cold and snowy. Mean annual rainfall at Susanville is 17.8 inches, most of which falls during the period October to May. Rainfall at this site is estimated to be about 14 inches per year.
Parent Material: Calcareous silty and clayey alluvium, including reworked Lake Lahontan sediments and alluvium from the mountains lying to the south.
Relief: Smooth, nearly level basin floor of old Lake Lahontan. Slope less than 1/2 percent. Elevation: About 4,100 feet. Drainage: Runoff slow or very slow (water must pond sometimes). Permeability moderate down to the water table. Water table sometimes rises to the surface, dropping to below 6 feet at other times. Imperfectly drained.

Remarks: Soil is moist below the upper 1 or 2 inches down to about 36 inches; below 36 inches it is wet at this time.

HORIZON		DESCRIPTION
A_{1p}	0 - 6"	Gray (10YR 5.5/1, dry; 3/1, moist) silt loam. Moderate coarse and medium granular. Very hard, friable, plastic, sticky. Roots are profuse and well distributed. Many worm casts and burrows. Moderately calcareous. pH 8.0. Abrupt, smooth lower boundary.
A_{12}	6 - 9"	Gray (10YR 5/1, dry; 3/1, moist) silt loam. Weak coarse prismatic, breaking to weak coarse and medium granular. Very hard, friable, plastic, sticky. Roots profuse and well distributed. Many worm casts and burrows. Moderately calcareous. pH 8.2. Clear, smooth lower boundary.
A_{13}	9 - 16"	Gray (10YR 5/1.5, dry; 2.5/2, moist) silty clay loam with common white specks and common medium and coarse mottles of grayer material mixed from the horizon above by worm activity. Weak, coarse prismatic structure, the peds being riddled with worm burrows and containing many medium sized worm casts. No clay skins observed. Roots very numerous. Moderately calcareous; lime is mostly in specks and threads. pH 8.4. Clear, wavy lower boundary.
C_{ca}	16 - 22"	Light gray (1Y 7/1, dry; 4/2, moist) silty clay loam. Massive. Friable, plastic, very sticky. Roots are numerous. One krotovina observed. Common worm casts and worm burrows. Very strongly calcareous, the lime being in disseminated form. pH 8.6. Clear, wavy lower boundary.
C_1	22 - 35"	Light brownish gray (10YR 6.5/1.5, dry; 4/2, moist) silt loam with few, faint, very fine mottles of strong brown (dry). Massive. Friable, plastic, sticky. Roots are numerous. Few worm burrows. Very porous. Very strongly calcareous, the lime being in disseminated form. pH 8.6. Gradual, wavy lower boundary.
C_2	35 - 42"	Finely, indistinctly mottled light brownish gray and white (10YR 6/3 and 8/2, dry; 4/1 and 5.5/3, moist) silt loam. Massive. Friable, plastic, sticky. Roots are common. Porous. Very strongly calcareous; lime is disseminated and in common hard rough concretions from ½ to 1 inch in diameter. pH 8.6. Gradual, wavy lower boundary.
C_3	42 - 53"	Light gray (10YR 7/2, dry; 5/2.5, moist) heavy silt loam with common fine white mottles. Massive. Friable, plastic, sticky. Few roots. Porous. Strongly calcareous; lime disseminated and in hard concretions as in the horizon above. pH 8.6. Gradual, wavy lower boundary.
C_4	53 - 65"+	Finely, distinctly mottled white and very pale brown (10YR 8/2 and 7/3, dry; 7/2 and 5/3, moist) silt loam. Massive, laminated. Friable, plastic, sticky. Very few roots. Strongly calcareous, the lime in disseminated form. pH 8.6.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Haplaquoll, fine-loamy, mixed, noncalcareous, mesic

SOIL Ramelli silty clay loam SOIL Nos. S61Calif-32-13 LOCATION Sierra Valley, Plumas County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 61686 - 61694

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.2)			Coarse fragments 2A2: ≥ 2 Pct.	2 – 19 Pct. of < 76 mm	19 – 76 Pct. of < 76 mm
		Pct. of < 2 mm																
0–2	A11	14.4	36.7	48.9	1.1*	2.2*	1.8*	6.3	3.0	9.1	27.6	16.1	7.4			0		
2 –7	A12	22.4	34.4	43.2	0.9	2.4	2.5	9.8	6.8	8.8	25.6	22.0	9.2			0		
7–14	B21	21.7	31.2	47.1	0.9	2.3	2.3	8.8	7.4	7.7	23.5	21.1	8.3			0		
14–21	B22	34.0	31.8	34.2	0.9	3.1	4.0	14.8	11.2	12.4	19.4	33.7	12.7			0		
21–27	IIC1	42.5	32.9	24.6	0.8	3.4	5.8	17.9	14.6	11.4	21.5	37.5	16.4			0		
27–37	IIIC2g	60.7	26.2	13.1	1.5	3.3	4.3	31.5	20.1	11.2	15.0	54.8	17.1			1		
37–42	IIIC3g	67.1	22.5	10.4	0.7	3.1	3.2	37.6	22.5	11.4	11.1	62.8	15.7			0		
42–47	IVC4g	82.0	8.1	9.9	1.7	9.9	23.3	40.0	7.1	3.4	4.7	29.2	56.2			3		
47–64+	VC5g	12.8	36.6	50.6	0.2	1.3	1.6	4.7	5.0	9.4	27.2	17.5	4.7			0		

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N		6E1b Carbonate as $CaCO_3$ Pct.		Bulk density 1/3 bar g/cc	Bulk density 15 bar g/cc	Bulk density g/cc		Water content 1/3 bar Pct.	4B2 Water content 15 bar Pct.			pH 8C1b Sat. Paste	pH 8C1a 1:10
0–2	9.63	0.662	14		–							29.4			6.4	6.9
2 –7	3.35	0.293	11		–							23.1			6.3	7.2
7–14	1.07	0.108	10		–							23.2			6.8	7.8
14–21	0.42	0.043	10		–							19.1			7.1	8.0
21–27	0.12				tr.							15.9			7.4	8.3
27–37	0.10				–							13.2			7.4	8.1
37–42	0.08				–							12.1			7.0	7.6
42–47	0.07				–							8.4			7.0	7.4
47–64+	0.06				–							24.8			6.9	7.9

Depth (In.)	Extractable bases 5B1a: 6N2c Ca	6O2c Mg	6P2a Na	6Q2a K	6H2a Ext. Acidity	Cat. Exch. Cap. 5A2a NaOAc	5B1b Exch. Na	Water extract from saturated paste 8A1: 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K	6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g							meq/liter								mmho/cm
0–2	29.3	10.7	0.7	1.0	8.2	51.8										
2 –7	23.4	9.5	0.6	0.4	4.4	40.6										
7–14	25.4	11.9	0.7	0.3	3.0	40.4	0.6	2.7	2.0	1.9	–	–	4.7	0.2		0.56
14–21	21.0	10.4	0.7	0.3	1.9	33.6										
21–27	20.8	10.3	0.8	0.2	1.3	31.2										
27–37	15.9	8.2	0.7	0.1	1.3	26.5										
37–42	13.9	7.4	0.6	0.1	1.8	24.4										
42–47	9.7	5.1	0.4	0.1	1.2	17.6										
47–64+	23.4	14.2	0.7	0.4	2.3	39.7										

Depth (In.)	8A Water at Saturation Pct.	5C3 Base Sat. (Sum) Pct.	Clay Mineralogy (<0.002 mm.) Montmorillonite X-ray	Vermiculite X-ray	Mica X-ray	Kaolinite X-ray	Kaolinite % DTA
0–2		84	xxx	–	–	t	3
2 –7		88					
7–14	69.8	93					
14–21		94	xxx	x	–	x	8
21–27		96					
27–37		95					
37–42		92					
42–47		92					
47–64+		94					

* Sands are mostly organic matter

– = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

RAMELLI SILTY CLAY LOAM

S61Calif-32-13

Location: Sierra Valley, Plumas County, California. SE corner of the SW1/4 of the NW1/4 of section 35, T. 22 N., R. 15 E., 150 feet south of Baldock loam sample site, Sample No. S61Calif-32-12. Approximately 2 3/4 miles north and 1 3/4 miles west of Loyalton. Date of Sampling: September 14, 1961.
Collectors: Grant Kennedy, Reuben Nelson, John Rogers, Paul Nazar, James McLaughlin, Eugene Begg.
Vegetation: Mostly sedges and bluegrass. Climate: Estimated annual precipitation 13 inches. Nearest weather station (Portola): Mean annual temperature 45.1° F.; January average 28.7° F.; July average 62.6° F.; mean annual precipitation 20.62 inches. Parent Material: Alluvium from mixed sources.
Relief: Bottomland areas; continuous depressed areas between mounds with a smooth slope of less than 1 percent.
Elevation: 4888 feet. Drainage: Imperfectly drained; runoff very slow; permeability moderately slow.
Soil Moisture: Soil is moist at 2½ inches with moisture increasing with depth.
Remarks: This soil is a Humic Gley soil with a structural B horizon. This site was sampled in the driest part of an abnormally dry year. In wetter years it is expected the water table might stand at about 42 inches. The VC5g horizon has manganese shot and manganese stains. The VC5g appears to be old fine-textured lake sediments. The A12 (2½ to 7 inches), the B21 (7 to 14 inches), and the IIIC3g (37 to 42 inches) were sampled for the Bureau of Public Roads and the California State Division of Highways.
Classification: Typic Haplaquoll, fine-loamy, mixed, noncalcareous, mesic.

HORIZON	DESCRIPTION
A11 RSL No. 61686	0 to 2½ inches, gray (10YR 5/1) silty clay loam, black (10YR 2/1) when moist; moderate very fine platy structure; soft, friable, sticky and slightly plastic; abundant very fine and few fine to medium roots; many very fine tubular and interstitial, few fine to medium tubular pores; slightly acid (pH 6.5); clear, smooth boundary.
A12 RSL No. 61687	2½ to 7 inches, very dark gray (10YR 3/1) silty clay loam, black (N 2/) when moist; moderate fine to medium subangular blocky structure; slightly hard, friable, sticky and plastic; abundant very fine to medium roots; many very fine tubular and interstitial, common fine to medium tubular pores; few thin clay films in pores; neutral (pH 7.0); clear, smooth boundary.
B21 RSL No. 61688	7 to 14 inches, dark gray (N 4/) silty clay, black (N 2/) when moist; strong medium prismatic to strong medium angular blocky structure; very hard, firm, very sticky and plastic; abundant very fine common fine to medium mostly exped roots; common very fine and few fine to medium tubular pores; continuous thin clay films in pores and on ped faces; moderately alkaline (pH 7.9); gradual, smooth boundary.
B22 RSL No. 61689	14 to 21 inches, gray (10YR 5/1) clay loam (near clay), very dark gray (10YR 3/1) when moist; strong fine to medium prismatic breaking to strong fine to medium angular blocky structure; very hard, firm, sticky and plastic; plentiful very fine to medium mainly exped roots; common very fine and few fine to medium tubular pores; many thin clay films in pores and on ped faces; moderately alkaline (pH 8.0) (pH 8.1 with thymol blue); clear, wavy boundary.
IIC1 RSL No. 61690	21 to 27 inches, light gray (10YR 7/1) clay loam, dark grayish brown (10YR 4/2) when moist; weak fine to medium prismatic breaking to strong fine to medium angular blocky structure; very hard, very firm, slightly sticky and plastic; few fine to medium roots; common very fine and few fine to medium tubular pores; many moderately thick clay films in pores and on ped faces; moderately alkaline (pH 8.2) (pH 8.0 with thymol blue); gradual, smooth boundary.
IIIC2g RSL No. 61691	27 to 37 inches, light gray (10YR 7/1) sandy clay loam with common medium distinct white (N 8/) and very pale brown (10YR 7/4) mottles, light olive brown (2.5Y 5/4) with common medium distinct mottles, dark yellowish brown (10YR 4/4) when moist; massive breaking to weak medium subangular blocky structure; hard, very firm, sticky and slightly plastic; very few fine roots; few very fine tubular and interstitial pores; common thin clay films in pores; moderately alkaline (pH 8.0) (pH 8.0 with thymol blue); clear, smooth boundary.
IIIC3g RSL No. 61692	37 to 42 inches, light gray (2.5Y 7/2) fine sandy loam with common medium distinct yellow (10YR 7/6) mottles, grayish brown (2.5Y 5/2) with common medium distinct dark yellowish brown (10YR 4/4) mottles when moist; massive; slightly hard, very firm, slightly sticky and slightly plastic; very few fine roots; common very fine and fine tubular and interstitial pores; few thin clay films in pores; mildly alkaline (pH 7.8); abrupt, smooth boundary.
IVC4g RSL No. 61693	42 to 47 inches, light gray (10YR 7/1) and white (N 8/) loamy sand, dark grayish brown (2.5Y 4/2) when moist; massive; soft, friable, nonsticky and nonplastic; very few fine roots; many very fine interstitial and common very fine and few fine tubular pores; mildly alkaline (pH 7.7); abrupt, slightly wavy boundary.
VC5g RSL No. 61694	47 to 64 inches +, light gray (5Y 7/2) silty clay (near silty clay loam), olive gray (5Y 4/2) when moist; massive; hard, firm, very sticky and plastic; very few fine roots; few very fine and fine tubular pores; moderately alkaline (pH 7.9).

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Haplaquoll, clayey over loamy, montmorillonitic, noncalcareous, mesic
SOIL Ramelli silty clay loam (taxadjunct) SOIL Nos. S61Calif-32-1,4 LOCATION Sierra Valley, Plumas County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 61695 - 61705

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.2)	Coarse fragments 2A2: > 2	Coarse fragments: 2 – 19	Coarse fragments: 19 – 76
		Pct. of < 2 mm												Pct.	Pct. of < 76 mm	
0–2	A11	10.1	42.2	47.7	0.7*	1.7*	1.6*	3.4	2.7	6.5	35.7	11.1	5.5	2		
2–7	A12	15.2	37.3	47.5	0.9	2.5	3.4	5.6	2.8	6.7	30.6	12.5	9.4	0		
7–14	A13	14.0	36.2	49.8	0.5	2.4	2.9	4.8	3.4	7.5	28.7	13.4	8.1	0		
14–18	B21	27.0	26.7	46.3	1.2	5.8	6.0	10.1	3.9	7.6	19.1	16.8	17.8	0		
18–26	IIB22	61.6	17.4	21.0	1.6	15.6	17.2	21.8	5.4	6.6	10.8	21.6	46.6	0		
26–28	IIIC1	76.7	11.9	11.4	3.3	28.5	18.6	20.8	5.5	4.9	7.0	20.0	61.6	0		
28–34	IIIC2g	81.3	9.9	8.8	2.0	24.6	21.7	26.9	6.1	4.3	5.6	22.5	63.1	0		
34–45	IIIC3g	71.7	16.9	11.4	5.1	13.9	13.4	28.2	11.1	8.1	8.8	34.7	45.1	3		
45–64	IIIC4g	87.0	7.1	5.9	8.2	22.1	17.5	31.9	7.3	3.7	3.4	27.9	62.8	11		
64–77	IVC5g	94.0	2.8	3.2	23.2	41.0	18.3	10.6	0.9	1.3	1.5	5.9	89.4	24		
77–83+	VC6g	5.9	36.2	57.9	0.1	0.3	0.3	1.6	3.6	9.2	27.0	13.9	1.2	8		

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6E1b Carbonate as $CaCO_3$	6C2a Ext. Iron as Fe	Bulk density			Water content		4B2 15 bar	pH	
	Pct.	Pct		Pct.	Pct.	g/cc	g/cc	g/cc	Pct.	Pct.	Pct.	8C1b Sat. Paste	8C1a 1:10
0–2	10.40	0.800	13	-	0.4						33.0	6.3	6.8
2–7	5.56	0.514	11	-	0.4						28.0	6.4	7.1
7–14	2.25	0.208	11	-	0.4						27.7	6.2	7.2
14–18	1.02	0.095	9	-	0.4						23.0	6.7	7.5
18–26	0.23			tr.	0.6						11.8	7.3	8.0
26–28	0.16			tr.	0.6						8.0	7.6	8.4
28–34	0.10			tr.	0.7						6.8	7.7	8.4
34–45	0.07			tr.	0.8						8.5	7.5	8.2
45–64	0.03			-	0.7						5.0	7.4	7.0
64–77	0.02			-	0.4						3.2	7.4	6.7
77–83+	0.02			-	1.0						28.0	6.5	7.3

Depth (In.)	Extractable bases 5B1a: 6N2c Ca	6O2c Mg	6P2a Na	6Q2a K	6H2a Ext. Acidity	Cat. Exch. Cap. 5A2a NaOAc	5B1b Exch. Na	Water extract from saturated paste 8A1: 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K	6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g							meq/liter								mmho/cm
0–2	31.0	11.8	0.7	1.8	9.8	54.8										
2–7	27.4	11.9	0.9	0.5	7.6	49.4	0.7	3.0	2.3	1.9	-	-	5.5	0.5		0.61
7–14	24.4	10.9	0.8	0.3	5.0	44.4										
14–18	24.0	11.2	0.6	0.3	2.4	40.8										
18–26	16.4	12.1	0.6	0.3	0.8	23.0										
26–28	13.8	6.2	0.5	0.2	0.4	18.7										
28–34	11.7	3.4	0.5	0.1	0.7	14.7										
34–45	13.2	4.4	0.5	0.2	0.5	17.4										
45–64	5.9	3.0	0.3	0.2	1.0	10.7										
64–77	3.6	1.8	0.2	0.1	0.6	7.8										
77–83+	24.5	15.4	0.6	0.4	3.0	45.1										

Depth (In.)	8A Water at Saturation Pct.	Exchangeable Na Pct.	Gypsum Pct.	5C3 Base Sat. (Sum) Pct.
0–2				82
2–7	98.2			84
7–14				88
14–18				94
18–26				97
26–28				98
28–34				96
34–45				97
45–64				90
64–77				90
77–83+				93

* Sands are mostly organic matter

RAMELLI SILTY CLAY LOAM (taxadjunct) 1/

S61Calif-32-14

Location: Sierra Valley, Plumas County, California. 100 feet north and 600 feet east of the center of section 28, T. 22 N., R. 15 E. 600 feet east of Hariot Lane. Approximately two miles north and three miles west of Loyalton. Date of Sampling: September 14, 1961.
Collectors: Grant Kennedy, Reuben Nelson, John Rogers, Paul Nazar, James McLaughlin, Eugene Begg.
Vegetation: Meadow vegetation with a mixture of sedges and big blue grass. Climate: Estimated annual precipitation 13 inches. Nearest weather station (Portola): Mean annual temperature 45.1° F.; January average 28.7° F., July average 62.6° F.; mean annual precipitation 20.62 inches. Parent Material: Alluvium from mixed sources. Relief: This is a continuously depressed bottomland area with a smooth slope of less than 1 percent. Elevation: 4890 feet. Drainage: The soil is imperfectly drained; runoff is very slow; permeability is moderately slow. Soil Moisture: Moist below 7 inches.
Remarks: This is a Humic Gley soil with a structural B horizon. The VC6g consists of fine textured lake sediments. At 90 inches blue (5G 4/1) clay occurs. The A13 (7-14 inches), the B21 (14-18 inches) and the IIC2g (34-45 inches) were sampled for the Bureau of Public Roads and the California State Division of Highways. **Classification: Typic Haplaquoll, clayey over loamy, montmorillonitic, noncalcareous, mesic.**

HORIZON	DESCRIPTION
A11 RSL No. 61695	0 to 2 inches, dark gray (10YR 4/1) silty clay loam, black (10YR 2/1) when moist; moderate very fine platy structure; soft, friable, sticky and slightly plastic; abundant very fine, few fine to medium roots; many very fine tubular and few very fine interstitial pores; medium acid (pH 6.0); clear, smooth boundary.
A12 RSL No. 61696	2 to 7 inches, dark grayish brown (10YR 4/2) silty clay loam, black (10YR 2/1) when moist; weak coarse platy breaking to moderate fine granular structure; soft, friable, sticky and slightly plastic; abundant very fine and plentiful fine to medium roots; many very fine and few fine to medium tubular and few very fine interstitial pores; few thin clay films in pores; medium acid (pH 6.0); gradual, smooth boundary.
A13 RSL No. 61697	7 to 14 inches, gray (N 5/) silty clay loam, black (N 2/) when moist, moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; plentiful very fine to medium roots; many very fine and few fine to medium tubular pores and few very fine interstitial pores; few thin clay films in pores; slightly acid (pH 6.5); clear, smooth boundary.
B21 RSL No. 61698	14 to 18 inches, dark gray (N 4/) silty clay, black (N 2/) when moist; strong medium prismatic breaking to strong coarse angular blocky structure; very hard, firm, very sticky and plastic; plentiful very fine and few fine to medium mainly exped roots; few very fine and fine tubular pores; continuous thin clay films in pores and on ped faces; neutral (pH 7.0); clear, slightly wavy boundary.
IIB2 RSL No. 61699	18 to 26 inches, gray (10YR 5/1) sandy clay, dark gray (10YR 4/1) when moist; strong medium prismatic breaking to strong coarse angular blocky structure; extrememly hard, very firm, sticky and plastic; few very fine to medium mainly exped roots; pores and clay films the same as the horizon above; mildly alkaline (pH 7.5); strongly effervescent, lime occurs in soft masses; clear, slightly wavy boundary.
IIIC1 RSL No. 61700	26 to 28 inches, light brownish gray (10YR 6/2) sandy clay loam, grayish brown (10YR 5/2) when moist; weak medium prismatic structure; extremely hard, very firm, sticky and plastic; few fine to medium roots; plentiful very fine tubular and interstitial and few fine tubular pores; common thin clay films in pores and on ped faces; moderately alkaline (pH 8.0)(pH 8.0 with thymol blue); strongly effervescent, lime occurs in soft masses; gradual, smooth boundary.
IIIC2g RSL No. 61701	28 to 34 inches, light brownish gray (2.5Y 6/2) loamy sand with common medium faint light yellowish brown (2.5Y 6/4) mottles, dark grayish brown (2.5Y 4/2) when moist; massive; slightly hard, firm, nonsticky and nonplastic; few fine to medium roots; common very fine and few fine tubular and common very fine interstitial pores; moderately alkaline (pH 8.0)(pH 8.0 with thymol blue); slightly effervescent, lime occurs in soft masses up to four inches in diameter; clear, smooth boundary.
IIIC3g RSL No. 61702	34 to 45 inches, light brownish gray (2.5Y 6/2) sandy clay loam, near sandy loam, with common medium prominent reddish yellow (7.5YR 6/6) mottles, dark grayish brown (2.5Y 4/2) with common medium prominent strong brown (7.5YR 5/8) mottles when moist; massive; hard, firm, slightly sticky and slightly plastic; very few fine to medium roots; few very fine tubular and interstitial pores; moderately alkaline (pH 8.0)(pH 8.0 with thymol blue); noncalcareous; clear, slightly wavy boundary.
IIIC4g RSL No. 61703	45 to 64 inches, light brownish gray (2.5Y 6/2) coarse sand and fine sand with many large prominent reddish yellow (7.5YR 6/6) mottles, grayish brown (2.5Y 5/2) with many large prominent strong brown (7.5YR 5/8) mottles when moist; massive; soft, slightly firm, nonsticky and nonplastic; very few fine to medium roots; few very fine tubular and common very fine interstitial pores; mildly alkaline (pH 7.5); noncalcareous; abrupt, slightly wavy boundary.
IVC5g RSL No. 61704	64 to 77 inches, gray (N 6/) coarse sand with common medium prominent reddish yellow (7.5YR 6/6) mottles, dark grayish brown (2.5Y 4/2) with common medium prominent strong brown (7.5YR 5/8) mottles when moist; massive; soft, friable, nonsticky and nonplastic; very few fine to medium roots; many very fine and fine interstitial and few fine tubular pores; slightly acid (pH 6.5); noncalcareous; abrupt, slightly wavy boundary.
VC6g RSL No. 61705	77 to 83 inches +, variegated pale olive (5Y 6/4) and pale yellow (5Y 7/3) silty clay, pale olive (5Y 6/3) and olive brown (2.5Y 4/4) when moist; massive; hard, firm, very plastic and sticky; no roots; few very fine tubular pores; slightly acid (pH 6.5); noncalcareous.

1/ **The Ramelli series is in a fine-loamy, mixed, noncalcareous mesic family. This pedon is a taxadjunct because it has contrasting textures in the control section.**

SCS-420
10-64

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Vertic Haplaquoll, very-fine, montmorillonitic, noncalcareous, thermic
SOIL Sacramento clay SOIL Nos. S64Calif-57-10 LOCATION Yolo County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64495 - 64502

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt (0.05–0.02)	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	Coarse fragments 1A2a: > 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76 mm	
0-7	Ap	0.7	42.4	56.9	0.1	0.1	0.1	0.2	0.2	3.2	39.2	3.5	0.5			0		
7-16	A12	0.8	41.5	57.7	tr.	0.1	0.1	0.3	0.3	3.5	38.0	4.0	0.5			0		
16-31	A13	0.7	38.4	60.9	tr.	0.1	0.2	0.2	0.2	4.0	34.4	4.3	0.5			0		
31-38	A14	1.5	35.2	63.3	tr.	0.1	0.3	0.6	0.5	2.1	33.1	2.9	1.0			0		
38-53	A15	3.5	33.6	62.9	tr.	0.2	0.7	1.7	0.9	1.7	31.9	3.5	2.6			0		
53-60	C1	4.3	37.0	58.7	0.7	1.1	0.8	1.1	0.6	3.3	33.7	4.5	3.7			0		
60-69	C2	2.6	44.9	52.5	0.1	0.3	0.4	1.0	0.8	4.2	40.7	5.6	1.8			0		
69-77+	C3	1.4	59.7	38.9	0.1	0.2	0.2	0.4	0.5	12.6	47.1	13.3	0.9			0		

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$		Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven dry		3B2 Cm	Water content	Water content: 4B1c 1/3 bar	Water content: 4B2 15 bar	4D1 Extensibility COLE	4D1 Extensibility COLE	pH: 8C1b Saturated Paste	pH: 8C1a H_2O 1:1	pH: 8C1a H_2O 1:10
	Pct.	Pct.		Pct.	Pct.		g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.	in./in.			
0-7	1.77	0.161	11	1.6	-		1.43	1.76		1.00		29.3	25.2	0.072	0.072		6.0	6.6
7-16	1.38	0.130	11	1.9	-		1.33	1.64		1.00		33.3	27.1	0.070	0.070		6.7	7.4
16-31	0.79	0.110	7	1.4	tr.		1.29	1.63		1.00		32.9	25.8	0.081	0.081		7.5	8.2
31-38	0.84	0.107	8	2.1	tr.		1.30	1.65		1.00		33.1	29.3	0.082	0.082		7.9	8.5
38-53	0.82	0.069	12	2.4	tr.		1.26	1.56		1.00		36.5	30.9	0.075	0.075		7.9	8.4
53-60	0.59			1.9	tr.		1.25	1.59		1.00		35.6	27.9	0.085	0.085		7.8	8.5
60-69	0.59			2.0	tr.		1.30	1.65		1.00		34.7	26.8	0.084	0.084		7.7	8.4
69-77+	0.36			1.3	-		1.48	1.73		1.00		26.5	20.1	0.052	0.052		7.9	8.5

Depth (In.)	Extractable bases 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	5B1a Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 8A1: 6N1b Ca	6O1b Mg	6P1a Na	6Q1a K		6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0-7	20.7	15.8	0.4	0.8	37.7	7.6	42.6		2.1	2.5	1.3	0.2		-	0.1	1.5		0.62
7-16	22.6	17.4	0.5	0.5	41.0	5.0	48.8		0.6	0.6	0.7	0.1		-	0.9	0.3		0.16
16-31	27.0	21.1	1.1	0.6	49.8		53.6		1.2	1.2	1.7	0.1		-	1.8	0.4		0.41
31-38	30.0	23.3	1.4	0.4	55.1		54.8		1.0	0.8	2.2	0.2		-	1.8	0.2		0.40
38-53	30.2	22.2	1.4	0.4	54.2		54.8		1.0	1.0	2.2	0.2		-	1.4	0.7		0.41
53-60	31.5	22.2	1.5	0.4	55.6		58.3		1.4	1.2	2.6	tr.		-	1.3	1.6		0.52
60-69	29.9	21.9	1.3	0.4	53.5		52.4		0.9	0.9	2.0	0.1		-	1.2	0.5		0.34
69-77+	21.8	16.3	1.1	0.4	39.6		41.4		0.8	0.6	2.0	0.1		-	1.2	0.6		0.33

Depth (In.)	8A Water at Saturation	Exch. bases 5B3b Ca	5B3b Mg	5B1b Na	5D2 Exchangeable Na	5E SAR	Gypsum	Atterberg limits: Plastic limit	Liquid limit	Plastic index
	Pct.	meq./100 g.			Pct.		Pct.	Pct. of <0.4 mm		
0-7	64.5			0.3	1	1		25	62	37
7-16	61.3			0.4	1	1				
16-31	67.3			1.0	2	2		33	66	33
31-38	70.3			1.3	3	2				
38-53	72.4			1.2	3	2				
53-60	72.9			1.3	3	2				
60-69	69.2			1.2	2	2				
69-77+	54.6			1.0	3	2		30	43	13

SACRAMENTO CLAY
S64Calif-57-10

Location: Yolo County, California. A pit located about 100 feet east of the intersection of Hwy 45 and Road 112, T.12N, R.2E., (sections not surveyed), located about 2.25 miles northwest of Knights Landing. Photo AHB-41T-131. Date of Sampling: October 1, 1964.
Description by: G. J. Staidl Samples Collected by: R. E. Nelson, B. R. Brasher, G. M. Kennedy, W. F. Andrews, L. A. Bates, G. J. Staidl, C. B. Goudey.
Classification: Vertic Haplaquoll, very-fine, montmorillonitic, noncalcareous, thermic.
Vegetation: Cultivated, disked honey dew melon crop. Climate: Average annual precipitation is 16.36 inches; mean annual temperature 61°F. Parent Material: Mixed fine alluvium.
Topography: Basin; plane; less than one percent slope. Elevation: 26 feet above sea level.
Drainage: Runoff is slow; permeability is slow; drainage class, altered drainage with the soil having been formed under poorly drained conditions and altered to somewhat poorly drained.
Soil Moisture: The profile was moist below 7 inches.
Remarks: (1) Truog soil reaction test used in field pH determination. (2) Paired Sample No. 64 Cal. 57-11. (3) Diagnostic horison--Thick Mollic Epipedon, many pressure faces. (4) Soil temperature - 5"-23.0°C; 12"-19°C; 23"-20°C; 34"-19.5°C; 45"-19.5°C; 57"-19.5°C; 65"-19.0°C; 73"-18.5°C. (5) B.P.R. Sample Horison Ap Inches 0-7, B.P.R. Sample Horison A13 Inches 16-31, B.P.R. Sample Horison C3 Inches 69-77. (6) The C1 (53-60") and C2 (60-69") horisons appear to be darker and may be a buried A horison. (7) Bands of iron like mineral in the A13 horison. (8) The A12 (7-16") appears to be a plow pan and is massive. (9) Continuous films on pressure faces observed on peds throughout the profile.

HORIZON	DESCRIPTION
Ap RSL 64495	0 to 7 inches, gray (5Y 5/1) clay with common fine distinct mottles of strong brown (7.5YR 5/6),very dark gray (5Y 3/1) with common fine distinct mottles of reddish brown (5YR 4/4) moist; strong medium coarse angular blocky breaking to moderate coarse granular structure; hard, firm, sticky, very plastic; few very fine roots; common very fine tubular pores; medium acid (pH 6.0); abrupt smooth boundary.
A12 RSL 64496	7 to 16 inches, gray (5Y 5/1) clay, with many medium distinct mottles of strong brown (7.5YR 5/6),very dark gray (5Y 3/1) with many medium distinct mottles of dark reddish brown (5YR 3/4) moist; massive; hard, very firm, sticky, very plastic; plentiful micro and few very fine vertical roots; common micro tubular pores; continuous films on pressure faces; neutral (pH 6.7); clear wavy boundary.
A13 RSL 64497	16 to 31 inches, gray (5Y 5/1) clay, with common fine distinct mottles of strong brown (7.5YR 5/6),very dark gray (5Y 3/1)with common fine distinct mottles of brown (7.5YR 4/4) moist; moderate coarse prismatic breaking to moderate coarse angular blocky structure; hard, firm, sticky, very plastic; plentiful micro and few very fine vertical roots; many micro and few very fine tubular pores; continuous films on pressure faces; mildly alkaline (pH 7.5); very slightly effervescent disseminated lime; diffuse boundary.
A14 RSL 64498	31 to 38 inches,mottled,gray(5Y 5/1) light olive gray (5Y 6/2) strong brown (7.5YR 5/6) clay, very dark gray (5Y 3/1)olive (5Y 5/3) reddish brown (5YR 4/4) moist; moderate coarse prismatic breaking to moderate coarse angular blocky structure; hard, very firm, sticky, very plastic; plentiful micro and few very fine vertical roots; many micro and few very fine tubular pores; continuous films on pressure faces; moderately alkaline (pH 7.9); very slightly effervescent disseminated lime; clear wavy boundary.
A15 RSL 64499	38 to 53 inches, gray (5Y 5/1) clay, with common fine distinct strong brown (7.5YR 5/6) mottles, very dark gray (5Y 3/1) and olive gray (5Y 5/2) with common fine distinct reddish brown (5YR 4/4) mottles when moist; moderate coarse angular blocky structure; hard, very firm, sticky and very plastic; plentiful micro and few very fine vertical roots; many micro and common very fine tubular pores; continuous films on pressure faces; very slightly effervescent disseminated lime; moderately alkaline (pH 7.9); clear wavy boundary.
C1 RSL 64500	53 to 60 inches, gray (5Y 5/1) clay, with common fine distinct strong brown (7.5YR 5/6) mottles, very dark gray (5Y 3/1) and olive gray (5Y 5/2) with common fine distinct reddish brown (5YR 4/4) mottles when moist; massive; hard, firm, sticky and very plastic; few micro random roots; many micro and few very fine tubular pores: continuous films on pressure faces; very slightly effervescent disseminated lime; mildly alkaline (pH 7.8); abrupt wavy boundary.
C2 RSL 64501	60 to 69 inches, gray (5Y 5/1) clay, with many fine distinct strong brown (7.5YR 5/6) mottles, very dark gray (5Y 3/1) and olive gray (5Y 5/2) with many fine distinct dark reddish brown (5YR 3/3) mottles when moist; massive; hard, firm,sticky and very plastic; few micro random roots; many micro and few very fine tubular pores; continuous films on pressure faces; very slightly effervescent disseminated lime; mildly alkaline (pH 7.7); clear wavy boundary to gray
C3 RSL 64502	69 to 77 inches, light gray/(5Y 6/1) light brownish gray (2.5Y 6/2) and strong brown (7.5YR 5/8) silty clay, mottled gray (5Y 5/1) olive (5Y 5/3) and reddish brown (5YR 4/4) when moist; massive; hard, firm, slightly sticky and very plastic; few micro random roots; many micro, few very fine to fine and medium tubular pores; continuous films on pressure faces; moderately alkaline (pH 7.9)

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Vertic Haplaquoll, very-fine, montmorillonitic, noncalcareous, thermic
SOIL Sacramento clay SOIL Nos. 864Calif-57-11 LOCATION Yolo County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64503 - 64510

Depth (in.)	Horizon	1B1b Total: Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	Coarse fragments 1A2a: > 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76 mm	
0-8	Ap	0.9	30.7	68.4	0.1	0.1	0.1	0.3	0.3	2.1	28.6	2.6	0.6			0		
8-22	A12	1.3	30.4	68.3	tr.	0.1	0.2	0.5	0.5	2.0	28.4	2.8	0.8			0		
22-30	A13	3.0	33.2	63.8	tr.	0.1	0.3	1.3	1.3	3.2	30.0	5.3	1.7			0		
30-41	A14	2.0	39.2	58.8	tr.	0.1	0.2	1.0	0.7	1.9	37.3	3.2	1.3			0		
41-48	A15	1.3	45.8	52.9	0.1	0.3	0.2	0.4	0.3	3.0	42.8	3.5	1.0			0		
48-62	C1	2.9	48.4	48.7	0.7	0.6	0.3	0.5	0.8	2.9	45.5	4.0	2.1			0		
62-74	C2	3.9	50.6	45.5	0.9	0.9	0.4	0.8	0.9	4.2	46.4	5.5	3.0			0		
74-84+	C3	3.6	52.3	44.1	0.5	0.7	0.5	0.9	1.0	4.3	48.0	5.7	2.6			0		

Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Atterberg limits: Plastic limit	Liquid limit	Plastic index	Water content: 4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility COLE†	4D1 Extensibility COLE	pH: 8C1b Saturated Paste	8C1a H_2O 1:1	8C1a H_2O 1:10
	Pct.	Pct.		Pct.	Pct.	Pct. of <0.4 mm			Pct.	Pct.	in./in.	in./in.			
0-8	2.12	0.204	10		-	34	69	35						6.7	7.1
8-22	1.67	0.176	9		-									7.0	7.3
22-30	1.35	0.208	6		tr.									7.8	8.2
30-41	0.79	0.059	13		tr.	41	72	31						7.7	8.2
41-48	0.61	0.035	17		tr.									7.9	8.5
48-62	0.48				2									8.0	8.6
62-74	0.45				2									8.1	8.7
74-84+	0.43				2	30	55	25						8.1	8.7

Depth (in.)	Extractable bases 6N2a Ca	6O2a Mg	6P2a Na	5B1a 6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 8A1: 6N1b Ca	6O1b Mg	6P1a Na	6Q1a K		6I1a CO_3	6J1a HCO_3	6K1a Cl	6L1a SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0-8	26.4	19.6	1.2	0.8	48.0		49.0		2.5	2.8	2.8	0.1		-	0.5	4.1		0.82
8-22	26.9	20.1	1.4	0.6	49.0		43.9		2.4	2.7	3.3	0.1		-	0.8	3.3		0.84
22-30	31.9	24.4	4.2	0.4	60.9		59.1		11.2	14.0	14.9	tr.		-	1.1	13.4	26.8	3.56
30-41	28.1	23.5	3.7	0.5	55.8		48.4		9.0	10.6	13.2	tr.		-	1.1	12.2	21.0	2.97
41-48	26.6	23.3	2.8	0.4	53.1		44.5		4.5	6.3	7.8	tr.		-	1.4	5.8	12.0	1.83
48-62	23.8	19.4	2.1	0.4	45.7		36.0		2.8	4.2	6.0	0.1		-	1.5	3.5	8.5	1.28
62-74	25.5	18.0	1.4	0.4	45.3		40.1		2.7	3.2	4.4	tr.		-	1.5	2.9	6.3	1.05
74-84+	25.9	19.3	1.2	0.4	46.8		39.3		2.2	2.6	3.0	0.1		-	1.6	1.8	4.3	0.78

Depth (in.)	8A Water at Saturation	Exch. bases: 5B3b Ca	5B3b Mg	5B1b Na	5D2 Exchangeable Na	5E SAR	6F1a Gypsum	Clay mineralogy (<0.002 mm.): Mont.	Verm.	Mica	Kaolin.
	Pct.	meq./100 g.			Pct.		Pct.	X-ray			
0-8	68.5			1.0	2	2					
8-22	75.5			1.1	2	2					
22-30	80.5			3.0	5	4	-				
30-41	82.3			2.6	5	4	-				
41-48	71.8			2.2	4	3					
48-62	62.8			1.7	5	3					
62-74	60.7			1.2	3	3					
74-84+	58.5			1.0	2	2					

SACRAMENTO CLAY
S64Calif-57-11

Location: Yolo County, California. A pit located 3/4 mile northeast of State Hwy. 45 and County Road 109A, 50 feet southeast of Road 109A, T.12N., R.2E. (section lines not surveyed), 4 miles northwest of Knights Landing. Photo ABB-41T-134. Date of Sampling: October 1, 1964.
Description by: C. B. Goudey. Collectors: R. E. Nelson, B. R. Brasher, G. M. Kennedy, W. F. Andrews, L. A. Bates, G. J. Staidl, C. B. Goudey.
Classification: Vertic Haplaquoll, very-fine, montmorillonitic, noncalcareous, thermic.
Vegetation: Fallow, chiseled and planed. Climate: 16 inches average annual precipitation and mean annual temperature of 61°F. Parent Material: Mixed fine alluvium. Topography: Basin; plane; less than one percent, field was leveled (very slight cuts and fills). Elevation: 24 feet. Drainage: Runoff-slow; permeability - slow; altered drainage class (soil formed under poor drainage, presently imperfectly drained). Soil Moisture: Profile was moist throughout below 8 inches.
Remarks: (1) Truog field pH determinations; (2) Paired profile 64 Cal. 57-10; (3) Diagnostic features--Thick mollic epipedon; common slickensides; more than 30 percent clay; profile mottled throughout (surface mottling due to rice culture); (4) Soil temperature - Ap-30°C, C3-19°C.; (5) B.P.R. samples taken from the Ap, A14 and C3 horizons; (6) Grayish brown lenses banded about one inch wide; occur in the A14 horizon.

HORIZON	DESCRIPTION
Ap RSL 64503	0 to 8 inches, gray (5Y 5/1) silty clay with common fine distinct yellowish brown (10YR 5/8) mottles, very dark gray (5Y 3/1) with common fine distinct dark yellowish brown (10YR 4/4) mottles when moist; plowed; hard, friable, sticky and plastic; abundant micro and very fine roots; common micro and very fine tubular pores; slightly acid (pH 6.5); clear smooth boundary.
A12 RSL 64504	8 to 22 inches, mottled gray (5Y 5/1) light olive gray (5Y 6/2) and yellowish brown (10YR 5/8) silty clay, very dark gray (5Y 3/1) olive gray (5Y 5/2) and dark yellowish brown (10YR 4/4) when moist; weak coarse angular blocky structure; hard, very firm, sticky and plastic; abundant micro and very fine vertical roots; common micro to very fine tubular pores; few slickensides; moderately alkaline (pH 8.0); clear wavy boundary.
A13 RSL 64505	22 to 30 inches, gray (10YR 5/1) clay, with common fine distinct yellowish brown (10YR 5/8) mottles, black (10YR 2/1) with common fine distinct dark yellowish brown (10YR 4/4) mottles when moist; moderate coarse prismatic breaking to moderate coarse angular blocky structure; hard, very firm, very sticky and very plastic; plentiful micro and very fine random roots; common micro and very fine tubular pores; few slickensides; strongly effervescent segregated lime in seams; moderately alkaline (pH 8.0); abrupt wavy boundary.
A14 RSL 64506	30 to 41 inches, gray (10YR 5/1) and white (2.5Y 8/2) clay with many fine prominent yellowish red (5YR 5/6) mottles, very dark gray (10YR 3/1) and olive brown (2.5Y 4/4) with many fine prominent yellowish red (5YR 4/6) mottles when moist; moderate coarse prismatic structure; hard, firm, sticky and very plastic; plentiful micro and very fine random roots; common micro and very fine interstitial and tubular pores; few slickensides; strongly effervescent segregated lime in seams; moderately alkaline (pH 8.0); clear wavy boundary.
A15 RSL 64507	41 to 48 inches, gray (10YR 5/1) clay with many fine distinct yellowish brown (10YR 5/8) mottles, black (10YR 2/1) with many fine distinct dark yellowish brown (10YR 4/4) mottles when moist; moderate coarse prismatic structure; hard, firm, sticky and very plastic; plentiful micro and very fine random roots; many micro and common very fine tubular pores; common slickensides; strongly effervescent segregated lime in seams; moderately alkaline (pH 8.0); clear wavy boundary.
C1 RSL 64508	48 to 62 inches, gray (5Y 5/1) silty clay, with common fine distinct light olive brown (2.5Y 5/6) mottles, very dark grayish brown (2.5Y 3/2) with common fine distinct olive brown (2.5Y 4/4) mottles when moist; moderate coarse angular blocky structure; very hard, firm, sticky and very plastic; plentiful micro random roots; common micro and very fine tubular pores; common slickensides; strongly effervescent segregated lime in seams and soft masses; moderately alkaline (pH 8.0); diffuse boundary.
C2 RSL 64509	62 to 74 inches, gray (5Y 5/1) silty clay with many fine distinct yellowish brown (10YR 5/8) mottles, very dark grayish brown (2.5Y 3/2) with many fine distinct olive brown (2.5Y 4/4) mottles when moist; moderate coarse angular blocky structure; very hard, friable, sticky and very plastic; plentiful micro random roots; common micro and very fine tubular pores; common prominent slickensides; slightly effervescent disseminated lime; moderately alkaline (pH 8.0); gradual smooth boundary.
C3 RSL 64510	74 to 84 inches plus, light gray to gray (5Y 6/1) silty clay, with many medium distinct yellowish brown (10YR 5/8) mottles, very dark grayish brown (2.5Y 3/2) with many medium distinct brown to dark brown (7.5YR 4/4) mottles when moist; massive; very hard, friable, sticky and very plastic; few micro random roots; common micro and very fine tubular pores; strongly effervescent disseminated lime; moderately alkaline (pH 8.0).

CONSECUTIVE PEDON NUMBER C 68112 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES SECCA SHALLOW VARIANT SOIL NO. S68 CALI. 29-35 SAMPLE NO. 8 839-8 843 NEVADA COUNTY AREA

SOIL FAMILY TYPIC ARGIXERDLL LOAMY-SKELETAL,MIXED,MESIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION SAND 2-.05	SILT .05-.002	CLAY LT .002	SANDS VCS 2-1	CS 1-.5	MS .5-.25	FS .25-.10	VFS .1-.05	SILTS CSI .05-.02	FSI .02-.002	CLAYS CO. 2-.2U	FINE LT .2U	CARBO NATE 3A1A	INT. II .2-.02	COARSE FRAGMENTS PCT. OF WHOLE SOIL	I 20-75 PCT. OF	II 20-5	III 5-2 LT 75
			PERCENT OF LESS THAN 2MM														1A2A			
8 839	0- 5	A1	44.0	42.7	13.3	6.9	9.7	4.8	10.7	11.9	23.9	18.8				42.3	19A	--	3	16
8 840	5- 15	A3	43.4	40.1	16.5	8.3	9.5	5.0	10.1	10.5	21.3	18.8				37.8	75*	47	13	5
8 841	15- 48	B T	52.7	23.7	23.6	16.3	15.1	5.7	8.4	7.2	10.9	12.8				22.4	69*	48	4	13
8 842	48- 79	C	46.9	36.7	16.4	8.1	12.6	6.0	10.6	9.6	14.2	22.5				29.8	28A	5	13	10
8 843	0- 15	A1															29A	--	5	24

SAMPLE NO.	DEPTH CM.	ORG.MATTER CARBON 6A1A -PERCENT-	NITROGEN 6B1A -PERCENT-	CARBONATE AS CACO3 LT 2 6E1B	2-20 6E1B	SESQUIOXIDES DI-CIT FE 6C2B -PERCENT-	EXT AL 6G7A -PERCENT-	PYROP EXT FE 6C5A -PERCENT-	AL 6G5A -PERCENT-	ATTERBERG LIMIT LL 4F2 PCT.	PL 4F1 NO.40	BULK DENSITY EST. 1/3 BAR 4A1F GRAMS	1/3 BAR 4A1H PER CC	DRY 3B2	CM WATER CONTENT 1/10 BAR 4B1C -PERCENT-	1/3 BAR 4B1C -PERCENT-	15 BAR 4B2 -PERCENT-	EXTNSBLTY LEF 4D1 -PERCENT-	LE 4D1 -PERCENT-
8 839	0- 5	1.93	0.100			4.3	0.2						1.38	1.39	0.89	14.4	8.9	0.2	0.2
8 840	5- 15	1.59	0.084			4.7	0.1					1.40			0.39		12.1		
8 841	15- 48	0.53	0.040			4.1	0.2			41	23		1.15	1.84	0.51	47.4	13.0	17.0	7.3
8 842	48- 79	0.19				1.8	0.2						1.46	1.72	0.82	29.3	14.8	5.6	4.5
8 843	0- 15	1.33	0.070									1.39			0.82		7.4		

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6Q2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACI-DITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 5A3A	NH4-OAC 5A6A	BASE SATURATION SUM+ ACI-	SUM+ AL	NH4-OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA-CL2 8C1E
		MEQ/100G									PERCENT					
8 839	0- 5	7.7	6.9	TR	0.4	15.0	5.9		20.9	18.6	72		81		6.0	5.6
8 840	5- 15	9.1	9.0	TR	0.1	18.2	7.7		25.9	22.4	70		81		6.0	5.5
8 841	15- 48	13.1	12.7	0.1	0.1	26.0			26.0	27.5	100+		95		6.4	6.0
8 842	48- 79	22.7	20.1	TR	TR	42.9			42.9	44.3	100+		97		6.7	6.2
8 843	0- 15														6.2	5.7

SAMPLE NO	DEPTH CM.	CLAY MINERALOGY LESS THAN 0.002 MM X RAY 7A2E I	7A2E II	7A2E III	7A2E IV	DTA 7A3 -PERCENT-	7A3	L.T. 0.0002 MM X RAY 7A2E I	7A2E II	7A2E III	MINERAL CODE	RELATIVE AMOUNT
8 839	0- 5											1 TRACE
8 840	5- 15										MT MONTMORT	2 SMALL
8 841	15- 48	MT 4	VR 3	KK 1							VR VERMICLT	3 MODERATE
8 842	48- 79										KK KAOLINIT	4 ABUNDANT
8 843	0- 15											5 DOMINANT
												6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
*=THE 75-250MM FRACTION IS INCLUDED.

SECCA GRAVELLY LOAM, SHALLOW VARIANT 1/
S68Calif-29-35

Location: Nevada County, California; 1,000 feet north of the S 1/4 corner of sec. 3, T. 16 N., R. 8 E., 600 feet north of California Highway 49, 2½ miles WNW of Nevada City, California. Date of Sampling: September 9, 1968.
Description by: T. M. Ryan and L. A. Brittan. Collectors: L. A. Brittan, G. Staidl, C. B. Goudey, T. M. Ryan, G. M. Kennedy.
Classification: Typic Argixeroll, loamy-skeletal, mixed, mesic.
Vegetation: Scrub live oak, yerba santa, Digger pine, vinegar weed, rabbit brush (?) orchardgrass, perennial rye, toyon. Cultivated. Climate: Average annual precipitation is 46 inches. Mean annual temperature is 56°F. Parent Material: Ultrabasic rock. Topography: Moderately sloping, plain slope, 20 percent, east aspect, mid-slope. Elevation: 2,425 feet. Drainage: Well drained; runoff is medium; permeability is moderate over very slow in the subsoil. Soil Moisture: Profile dry to 2 inches, very slightly moist below.
Remarks: pH taken by Hellige method. This area has been cleared and planted to orchardgrass and perennial ryegrass. This is the second planting of these grasses. In neither case has the stand established itself. This is very possibly due to the erosion of the A1 horizon and the fact that this soil is on ultrabasic rock. There is a gravel mulch or a pavement on the surface. In the A3 horizon there are 25 percent cobbles by volume.

HORIZON	DESCRIPTION
	(0-5 cm.)
A1	0 to 2 inches, reddish brown (5YR 4/4) gravelly loam, dark reddish brown (5YR 3/3)
RSL	moist; weak coarse and very coarse platy structure; soft, very friable, slightly
68839	sticky, slightly plastic; few very fine and fine random roots; common very fine interstitial pores; 25 percent by volume gravel; medium acid (pH 6.0); abrupt wavy boundary.
	(5-15 cm.)
A3	2 to 6 inches, reddish brown (5YR 4/4) cobbly clay loam, dark reddish brown (5YR 3/3)
RSL	moist; moderate fine and medium subangular blocky structure; slightly hard, friable,
68840	sticky, plastic; common very fine and fine random roots; common very fine interstitial and tubular pores; common thin clay films on faces of peds, lining pores, and as bridges; 20 percent by volume gravel; slightly acid (pH 6.5); clear wavy boundary.
	(15-48 cm.)
Bt	6 to 19 inches, reddish brown (5YR 4/4) cobbly clay, dark reddish brown (5YR 3/3) moist;
RSL	moderate medium and coarse subangular blocky structure; hard, firm, sticky, plastic;
68841	common very fine and fine random and common medium horizontal roots; few very fine interstitial and few fine tubular pores; many moderately thick clay films line pores and as bridges; slightly acid (pH 6.5); clear wavy boundary.
	(48-79 cm.)
C	19 to 31 inches, light yellowish brown (2.5Y 6/4) clay loam, dark yellowish brown
RSL	(10YR 4/4) moist; massive; hard, firm, slightly sticky, plastic; few very fine and
68842	fine random and common medium horizontal roots; common very fine and fine interstitial and few very fine tubular pores; common moderately thick brown and dark brown (7.5YR 4/4 moist) clay films line pores and as bridges; neutral (pH 6.7); clear wavy boundary.
	(79-97 cm.)
R	31 to 38 inches, slightly weathered ultrabasic rock.

1/ The Secca series is in a fine, mixed, mesic family of Mollic Haploxeralfs. This pedon has a mollic epipedon and is in a loamy-skeletal family.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE: Livermore very gravelly loam (taxadjunct) **LOCATION** Alameda County, California

SOIL FAMILY: Typic Argixeroll, loamy-skeletal, mixed, thermic.

SOIL NOS. S59Calif-01-4 **LAB. NOS.** 59224 thru 59229

DEPTH INCHES *	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 **	TEXTURAL CLASS
0-5	A_{11p}	12.3	12.2	6.2	8.8	8.7	38.9	12.9	32.6	20.1	61	1
5-13	A_{12p}	13.8	13.0	5.9	7.6	7.8	37.3	14.6	29.6	19.8	59	1
13-23	A_{13}	11.1	14.6	8.8	10.1	7.3	30.2	17.9	26.0	17.0	51	1 - cosl
23-30	B_2	21.6	22.6	11.9	10.3	4.0	15.7	13.9	15.1	9.3	61	cosl
30-38	C_1	21.3	33.1	14.2	11.6	2.6	8.7	8.5	11.1	5.1	77	lcos
38-60	C_2	44.2	31.7	4.8	3.4	1.6	7.4	6.9	6.7	4.0	74	lcos

pH 8C1b Saturated Paste 1:1	pH 8C1a 1:10	Organic Matter 6A1a Organic Carbon Pct.	6B1a Nitrogen Pct.	C/N	6E1b $CaCO_3$ Equivalent Pct.	8A1a Elec. Condue. mmhos/cm at 25°C.	4B2 Soil water 15 atmos. Pct.
8.0	8.5	0.88	0.075	11.7		1.0	5.2
7.6	7.8	0.80	0.076	10.5		0.5	6.1
7.1	7.4	0.67	0.068	9.9		0.4	7.0
7.3	7.3	0.32	0.043	7.4		0.3	5.7
7.2	7.2	0.21				0.4	4.3
7.4	6.9	0.12				0.4	3.5

5A2a CATION EXCHANGE CAPACITY (+4 Na +)	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
11.4	12.0	2.3	1.0	0.2	0.5	94	1.7	0.4				25.8
13.2	8.7	3.1	2.0	0.2	0.5	86	1.0	0.2				26.2
14.7	7.9	5.9	2.2	0.2	0.3	87	1.2	0.1				24.2
11.8	5.2	5.0	1.6	0.2	0.3	87	1.1	0.1				20.2
9.2	3.7	3.9	1.5	0.2	0.2	84	1.1	<0.1				19.8
7.1	3.3	3.4	1.0	0.1	0.2	88	1.1	0.1				18.9

* Stones and gravel >1" diameter discarded at time of sampling

Horizon A_{13} - 30%

B_2 - 30%

C_1 & C_2 - 40%

** Percent of the whole soil <1 inch

LIVERMORE VERY GRAVELLY LOAM (taxadjunct) 1/
S59Calif-01-4

Location: Alameda County, California. 36 feet east of Tesla Road at the junction with Marina Avenue, about 1.5 miles southeast of the center of Livermore.
Description by: Larry E. Welch. Collectors: R. C. Huff, L. E. Welch, and L. H. Grant. Date of Sampling: May 5, 1959.
Classification: Typic Argixeroll, loamy-skeletal, mixed, thermic.
Vegetation: Cultivated vineyard. Climate: Mean annual rainfall about 15 inches. Parent Material: Alluvium from sedimentary rocks. Relief: Nearly level, slightly convex slope of less than 1 percent, on a low terrace. Elevation: 550 feet. Drainage: Well drained, slow runoff, moderate to moderately rapid permeability. Soil Moisture: Moist throughout.
Remarks: This is a minimal Noncalcic Brown soil. Numerous types of soil amendments and fertilizers have been added to this field which probably explains the high pH of the surface horizons. Some cobbles and stones throughout.

DESCRIPTION

HORIZON		
A_{11p}	0-5"	**Grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) when moist; very weak very fine granular structure; slightly hard when dry, friable when moist, slightly plastic and slightly sticky when wet; abundant fine and very fine roots; many fine and very fine pores; moderately alkaline, pH 8.0; gradual smooth lower boundary.**
A_{12p}	5-13"	**Dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) when moist; massive; slightly hard when dry, friable when moist; slightly plastic and slightly sticky when wet; abundant fine and very fine roots; many fine and very fine pores; moderately alkaline, pH 8.0; gradual, smooth lower boundary.**
A_{13}	13-23"	Dark grayish brown (10YR 4/2) heavy loam, very dark grayish brown (10YR 3/2) when moist; weak fine granular structure; slightly hard when dry, friable when moist; slightly sticky and slightly plastic when wet; plentiful fine and very fine roots; many fine and very fine pores; neutral, pH 7.0; gradual smooth lower boundary.
B_2	23-30"	Dark grayish brown (10YR 4/2) gravelly sandy clay loam, very dark grayish brown (10YR 3/2) when moist; hard when dry, friable when moist, sticky and plastic when wet; few fine or very fine roots; many fine and very fine pores; colloid mainly in bridges and films covering sand and gravel; slightly acid, pH 6.5; gradual, wavy lower boundary.
C_1	30-38"	Dark grayish brown (10YR 4/2) gravelly sandy loam, dark brown (10YR 3/3) when moist; massive; slightly hard when dry, friable when moist; few roots; many fine and very fine pores; colloid mainly in bridges and on sand grains; slightly acid, pH 6.5; gradual smooth lower boundary.
C_2	38-60"	Dark grayish brown (10YR 4/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) when moist; massive; similar to above but slightly less colloid present.

1/ The Livermore series is in a loamy-skeletal, mixed, thermic family of Typic Haploxerolls. This pedon has a thicker mollic epipedon than is permitted in the series.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Argixeroll, coarse-loamy, mixed, thermic
SOIL Chualar sandy loam (taxadjunct) SOIL Nos. S65Calif-27-17 LOCATION Monterey County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65434 - 65442

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Noncarbonate clay	* Coarse fragments 1A2a: >2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76 mm	
0-8	Ap1	68.6	22.5	8.9	16.2	19.9	10.5	14.3	7.7	12.1	10.4	27.2	60.9	0	9	20	17	3
8-19	Ap2	63.2	25.6	11.2	13.3	18.7	9.3	14.0	7.9	13.6	12.0	29.3	55.3	0	11	18	18	0
19-29	A13	64.2	25.3	10.5	15.6	19.4	8.6	12.6	8.0	13.2	12.1	27.5	56.2	0	11	19	19	0
29-35	A3	63.5	25.9	10.6	15.1	19.0	8.8	13.1	7.5	13.9	12.0	28.1	56.0	0	11	17	17	0
35-43	B1t	67.8	21.9	10.3	17.4	18.0	8.8	15.3	8.3	11.6	10.3	28.1	59.5	0	10	23	23	0
43-58	B21t	63.0	20.0	17.0	18.0	16.3	8.0	13.6	7.1	9.7	10.3	23.7	55.9	0	17	24	24	0
58-79	B22t	57.4	25.6	17.0	11.3	14.9	8.3	14.2	8.7	12.9	12.7	29.1	48.7	0	17	24	24	0
79-105	C1	67.4	17.9	14.7	16.7	17.5	9.0	15.3	8.9	9.6	8.3	26.7	58.5	0	15	30	30	0
105-114	C2	53.2	29.0	17.8	12.8	13.4	7.4	11.8	7.8	13.0	16.0	27.0	45.4	0	18	27	27	0

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonates as $CaCO_3$	Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven dry	Bulk density: (g/cc)	Water content: 4B1c 1/3 bar	Water content: 4B2 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH: 8C1b Saturated Paste	pH: 8C1a H_2O 1:1	pH: 8C1a H_2O 1:10
	Pct.	Pct.		Pct.	Pct.	g/cc	g/cc	g/cc	Pct.	Pct.	in./in.	in./in.			
0-8	0.96	0.099	10	0.5	-					4.8				5.3	
8-19	0.48	0.048	10	0.7	-					4.9				6.9	
19-29	0.40			0.6	-					4.7				7.1	
29-35	0.22			0.6	-					4.7				7.0	
35-43	0.12			0.6	-					4.9				7.6	
43-58	0.09			0.8	-					8.0				8.5	
58-79	0.06			0.8	-					7.1				8.6	
79-105	0.06			0.6	-					7.6				7.9	
105-114	0.06			1.0	-					8.6				7.8	

Depth (In.)	Extractable bases: 6N2a Ca	6O2a Mg	6P2a Na	5B1a 6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 8A1: 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K	6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter								mmho/cm
0-8	5.8	2.0	0.3	1.2	9.3			7.2									
8-19	5.6	1.7	0.5	0.2	8.0			7.8									
19-29	5.6	1.6	0.6	0.1	7.9			7.9									
29-35	4.2	1.8	0.5	0.1	6.6			6.9									
35-43	3.6	2.6	0.6	0.1	6.9			7.0									
43-58	7.2	4.6	1.4	0.2	13.4			12.7									
58-79	7.1	4.6	1.9	0.2	13.8			12.5	0.7	0.6	8.6	0.1	-	4.4	3.2		1.0
79-105	7.3	4.7	1.9	0.2	14.1			13.9									
105-114	7.4	4.8	2.0	0.3	14.6			14.6									

Depth (In.)	8A Water at Saturation	5D2 Exchangeable Na	5B1b Exch. Na meq./100g.	Gypsum	5C1 Base Sat. NH_4OAc	Clay mineralogy (<0.002 mm.) 7A: Mont.	Verm.	Mica	Kaolin.
	Pct.	Pct.		Pct.	Pct.	X-ray			
0-8					100+			xxx	x
8-19		6			100+				
19-29		7			100				
29-35		7			96			xxx	x
35-43		9			98				
43-58		11			100+	xx		xxx	x
58-79	25.1	14	1.7		100+				
79-105		14			100+				
105-114		14			100	t		xxx	t

* From characterization sample (5Kg)(except as noted).
** 2-19 mm. from characterization sample, 19-76 mm. from field volume estimate.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

CHUALAR SANDY LOAM (taxadjunct) 1/
S65Calif-27-17

Location: Monterey County, California, 0.35 mile northwest from Gloria Road, 0.57 mile along Gloria Road from Iverson Road, 20 feet southwest into field from dirt road. Date of Sampling: May 22, 1965.
Description by: Lewis C. Leifer. Collectors: W. D. Nettleton, B. R. Brasher, C. J. Weisel, R. D. Waggoner, F. J. Pecarich; site selection by T. D. Cook.
Classification: Typic Argixeroll, coarse-loamy, mixed, thermic. Noncalcic Brown (medial with brunizemic properties).
Vegetation: Irrigated cropland, beans. Climate: Precipitation 12 inches; mean annual temperature 58°F., mean January 50°F., mean July 65°F. Parent Material: Alluvium from phaneritic, intermediate igneous rocks. Topography: Slightly convex, smooth alluvial fan with a gently sloping surface of 1½ percent. Elevation: 450 feet. Drainage: Well drained, moderately slow subsoil permeability, medium runoff. Soil Moisture: Moist throughout. About field capacity.
Remarks: Field determinations by Truog Kit. Paired samples are S65Calif-27-13-1 through 7. Reaction of Ap2 horizon unnaturally high, may be due to fertilizers or amendments, all of horizon somewhat more alkaline than typical.

HORIZON	DESCRIPTION
Ap1 RSL 65434	0 to 8 inches, dark grayish brown (10YR 4/2) heavy coarse sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium angular blocky structure; somewhat compacted by tillage and somewhat stronger brown (7.5YR 4/3) moist when broken and rubbed; hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine interstitial and few very fine tubular pores; neutral (pH 7.0); clear smooth boundary.
Ap2 RSL 65435	8 to 19 inches, dark grayish brown (10YR 4/2) heavy coarse sandy loam, very dark grayish brown (10YR 3/2) moist; moderate coarse angular blocky structure, somewhat compacted by tillage; very hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine interstitial and few very fine tubular pores; moderately alkaline (pH 8.0), noncalcareous; gradual smooth boundary.
A13 RSL 65436	19 to 29 inches, dark grayish brown (10YR 4/2) heavy coarse sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium angular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine interstitial, few very fine and few fine tubular pores; mildly alkaline (pH 7.5); clear wavy boundary.
A3 RSL 65437	29 to 35 inches, brown (10YR 5/3) heavy sandy loam, dark brown (7.5YR 3/2) moist; a little lighter in color (7.5YR 4/3) moist when rubbed; weak coarse subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine interstitial pores; few thin clay films in bridges; mildly alkaline (pH 7.5); gradual smooth boundary.
B1t RSL 65438	35 to 43 inches, brown (10YR 5/3) heavy coarse sandy loam, brown (7.5YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; no roots; common very fine interstitial and few very fine tubular pores; few thin clay films in bridges; moderately alkaline (pH 8.0), noncalcareous; horizon feels somewhat brittle; clear smooth boundary.
B21t RSL 65439	43 to 58 inches, brown (7.5YR 5/4) sandy clay loam, darker brown (7.5YR 4/3) moist; massive; very hard, firm, sticky and plastic; common very fine interstitial pores; many thin clay films in bridges; moderately alkaline (pH 8.0), noncalcareous; diffuse smooth boundary.
B22t RSL 65440	58 to 79 inches, brown (7.5YR 5/4) light sandy clay loam, darker brown (7.5YR 4/4) moist; massive; very hard, firm, sticky and plastic; common very fine interstitial pores; common thin and few moderately thick clay films in bridges and pores; moderately alkaline (pH 8.0), noncalcareous; gradual smooth boundary.
C1 RSL 65441	79 to 105 inches, brown (7.5YR 5/4) heavy sandy loam, darker brown (7.5YR 4/4) moist; massive; soft, very friable, slightly sticky and slightly plastic; common very fine interstitial, common very fine and few fine tubular pores; few thin clay films as bridges; moderately alkaline (pH 8.0), noncalcareous; sampled and examined by auger; gradual boundary.
C2 RSL 65442	105 to 114 inches, as above except texture is sandy loam and no apparent clay films, examination and description primarily from auger sample.

1/ The Chualar series is in a fine-loamy, mixed, thermic family of Typic Argixerolls. This pedon has an argillic horizon with slightly less than 18 percent clay.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Carlsbad gravelly sandy loam variant **LOCATION** San Diego County, Calif.

SOIL FAMILY: Typic Argixeroll, fine-loamy, mixed, thermic.

SOIL NOS. S56-Cal.-37-1 **LAB. NOS.** 56206-213

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2	
0- 6	A1	1.4	21.8	25.5	17.7	3.8	21.8	8.0	24.2	9.1	23	sl
6-12	A12	0.4	17.6	26.7	22.1	4.4	21.3	7.5	28.2	7.6	32	sl
12-18	A21	0.6	17.2	27.2	25.0	4.4	19.2	6.4	28.6	6.8	54	sl
18-24	A22	1.0	15.9	25.9	26.4	4.9	20.3	5.6	30.3	7.8	46	sl
24-30	B1	4.0	17.4	23.6	21.2	3.7	16.8	13.3	20.2	10.2	21	sl
30-36	B21	0.6	16.5	24.4	20.6	2.9	13.8	21.2	17.9	8.2	3	scl
36-45	B22	0.2	16.3	23.4	19.7	2.9	11.8	25.7	16.6	7.2	0	scl
45-55	B3	0.3	15.0	22.2	17.5	2.9	8.6	33.5	13.8	5.6	0	scl
84-96	B'2m	10.1	38.0	23.9	18.4	4.3	2.0	3.3		2.4	0	cos

pH			ORGANIC MATTER			6C1b	ELECTRICAL CONDUCTIVITY EC x 10³ MILLIMHOS PER CM @25°C *	8A1 6P1a Saturation Extract No	8A MOISTURE AT SATURATION	MOISTURE TENSIONS		
8C1b SATURATED PASTE 1:1	8C1a 1:5	8C1a 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	Free Fe_2O_3 Pct.				4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
6.7		7.6	2.24	0.144	15.6	0.4	1.3	3.2	27.6	17.4	11.8	4.3
6.9		7.6	0.83	0.051	16.3	0.4	0.5	2.3	20.6	14.4	8.6	3.2
6.7		7.1	0.40	0.031	12.9		0.5	2.5	17.2	11.6	6.8	2.6
6.9		7.1	0.24	0.022		0.3	0.5	3.5	14.8	10.8	6.7	2.4
6.6		7.1	0.11			0.8	0.8	5.9	17.5	13.2	9.7	4.2
6.7		7.2	0.11			1.4	0.9	7.0	22.9			7.0
6.8		7.3	0.11			1.0	1.1	8.9	26.2			8.2
6.9		7.7	0.09			1.5	1.5	11.9	34.0			12.5
						1.5						

5A2a	EXTRACTABLE CATIONS 5B					BASE SAT. % 5C3	Clay mineralogy (<0.002 mm.) 1/					
CATION EXCHANGE CAPACITY (+ Na)	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a		Mont.	Verm.	Mixed layer Mica-Verm.	Mica	Kaolin	Other
	milliequivalents per 100g. soil →						← X-ray 7A →					
16.0	9.6	11.5	2.7	0.4	0.3	89				x	xx	Qtz,Fld.
10.3	5.4	6.8	1.6	0.2	0.2	89				x	xx	Qtz,Fld.
6.2	2.4	3.6	1.0	0.2	0.1	86		x		x	xx	Qtz.
5.0	1.0	2.2	0.9	0.3	0.1	80	x	x		x	xxx	Qtz,Fld.
6.4	1.1	3.0	1.2	0.5	0.1	80				x	xxx	Qtz,Fld.
8.5	1.0	3.8	1.4	0.8	0.1	80				x	xxx	Qtz,Fld.
10.1	1.1	4.5	0.9	1.2	0.1	88				x	xxx	Qtz,Fld.
16.3	1.6	7.9	2.8	2.3	0.1	81					xxx	Qtz.

* Saturation Extract Soluble

x = detected
xx = moderate
xxx = abundant
xxxx = dominant

1/ By L. D. Whittig, Beltsville Soil Survey Laboratory

CARLSBAD GRAVELLY SANDY LOAM variant 1/
856Calif-37-1

Collectors: L. D. Whittig and R. E. Nelson on May 31, 1956.
Location: Approximately two miles west of Linda Vista, San Diego County, California, and 2-1/4 miles east of Pacific Ocean.
Elevation: Approximately 400 feet. Description by: R. C. Roberts on 2-18-53.
Relief: Flat topped old sea terrace or possible crest of old beach line.
Vegetation: Dominantly chamise, buckwheat, sumac and laurel, with understory of cheat grass and wild alfalfa (Melilotus alba) with some salvia.
Drainage: Some surface runoff, slow penetration through the profile after the A_1 and A_2 horizons become saturated. Slow permeability below 24 inches.
Parent Material: Medium to coarse-textured, mixed coastal plains material, possibly old beach deposits.
Classification: Typic Argixeroll, fine-loamy, mixed, thermic.
Climate: At San Diego, which is approximately 10 miles south, the January average temperature is 55.1°F., the July average temperature is 67.5°F., and the growing season is 365 days. Mean annual precipitation for a 40-year period is 10.11 inches.

HORIZON		DESCRIPTION
A_1	0- 6"	Brown (7.5YR 4/2) dark brown (7.5YR 3/2) moist, friable fine sandy loam, which has weak fine granular structure and is hard when dry; pH 7.0 and very little digestion with H_2O_2. This layer has a few hard iron concretions about the size of peas and gradually grades into layer below.
A_{12}	6-12"	Brown (7.5YR 4/4) dark brown (7.5YR 3/3) moist, fine sandy loam which is friable when moist, hard when dry, and slightly sticky when wet. It is weak fine granular to massive; pH 6.8 with very little digestion with H_2O_2. This horizon has more iron concretions than the layer above and they are about as hard. They consist of about the same texture as the surrounding soil but are redder in color, especially when wet (5YR 4/4).
A_{21}	12-18"	Brown (7.5YR 5/4) dark brown (7.5YR 4/4) moist, shotty light fine sandy loam; massive; friable when moist, and slightly plastic when wet; pH 6.6 and no reaction with H_2O_2. This is the zone of maximum iron concretion accumulation. Probably nearly 50 percent of the mass consists of hard concretion accumulation. Probably nearly 50 percent of the mass consists of hard concretion ranging from pin head size to 1 inch in diameter.
A_{22}	18-24"	Light brown (7.5YR 6/4) dark brown (7.5YR 4/4) moist, massive loamy fine sand that is nonsticky and nonplastic; pH 6.6 and rather abruptly rests on layer below.
B_1	24-30"	Light yellowish brown (10YR 6/4) strong brown (7.5YR 5/6) wet, friable fine sandy loam which is slightly plastic when wet, friable when moist; massive to fine subangular blocky; pH 6.5. Less concretions than layer above and they are not quite so hard.
B_{21}	30-36"	Reddish yellow (7.5YR 6/6) strong brown (7.5YR 5/6) moist, moderately plastic sandy clay loam that is weak medium subangular blocky to prismatic; pH 6.4. This horizon has very few concretions and they are fairly soft.
B_{22}	36-45"	Strong brown (7.5YR 5/6) yellowish red (5YR 5/6) moist, plastic sticky sandy clay loam which is mostly prismatic and has pH of 6.2.
B_3	45-55"	Reticulate mottled red, gray and brown plastic heavy clay loam or clay. The gray layer is the most plastic and finest textured. It appears to swell and contract more than the adjacent red and brown material; pH 6.2. Rests abruptly on layer below.
B'2m	55"+	Reticulate mottled iron hardpan with large prismatic structure. Shows evidence of root penetration at one time with roots 6 to 12 inches in diameter.

Remarks: This site had been described and sampled by R. C. Roberts and party on February 18, 1953.

1/ The Carlsbad series is in a sandy, mixed, thermic family of Haplic Durochrepts. This pedon has a mollic epipedon and an argillic horizon and its duripan is below 1 meter.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Argixeroll, fine-loamy, mixed, thermic

SOIL Chualar sandy loam SOIL Nos. S65Calif-27-13 LOCATION Monterey County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65427 - 65433

Depth (cm)	Horizon	1B1b Size class and particle diameter (mm) 3A1 — Total: Sand (2-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Sand: Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Silt: (0.05-0.02)	Int. III (0.02-0.002)	Int. II (0.2-0.02)	2-0.1			Coarse fragments 1A2a: > 2 Pct. of whole soil	2-19 Pct. of <76mm	19-76 Pct. of <76mm
		Pct. of <2 mm																
0-18	Ap	62.1	27.7	10.2	15.4	16.7	8.7	13.1	8.2	16.2	11.5	31.4	53.9			11	11	0
18-53	A12	62.0	27.0	11.0	13.0	16.9	9.0	13.7	9.4	15.8	11.2	32.6	52.6			14	14	0
53-76	B1t	57.3	28.5	14.2	12.2	15.2	7.8	13.1	9.0	16.3	12.2	32.7	48.3			10	10	0
76-110	B21t	49.2	28.4	22.4	9.1	11.0	5.3	12.8	11.0	14.7	13.7	33.9	38.2			16	16	0
110-140	B22t	57.9	24.3	17.8	17.5	14.8	6.2	10.8	8.6	12.6	11.7	27.6	49.3			21	21	0
140-150	B3	79.8	11.5	8.7	25.7	24.0	10.8	13.7	5.6	6.3	5.2	18.7	74.2			32	29	3
150-205	IIC	91.1	4.4	4.5	20.6	31.1	17.8	17.8	3.8	2.6	1.8	14.1	87.3			35	32	3

Depth (cm)	6A1a Organic carbon a/ Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. iron as Fe Pct.	Carbonate as $CaCO_3$: 6E1b <2 mm Pct.	3A1a <0.002 mm Pct.	Bulk density: 4A1f 1/3 bar g/cc	4A1h Oven dry g/cc	Est. 1/3 bar g/cc	3B2 Cm	Water content:	4B1c 1/3 bar Pct.	4B2 15 bar Pct.	4D1 Extensibility COLEf cm/cm	4D1 Extensibility COLE cm/cm	8C1b Saturated paste	pH: 8C1a H_2O 1:1	8C1c IN KCl 1:1
0-18	0.89	0.080	11	0.6	-				1.60	0.93			4.6				7.6	
18-53	0.70	0.063	11	0.7	-		1.61	1.64		0.91		10.7	5.0	0.006	0.005		8.1	
53-76	0.32			0.9	-		1.79	1.82		0.93		12.0	5.8	0.006	0.005		8.0	
76-110	0.21			1.4	-		1.81	1.89		0.88		15.1	10.0	0.015	0.013		7.3	
110-140	0.16			1.1	-		1.85	1.91		0.84		13.3	8.0	0.011	0.009		7.2	
140-150	0.07			0.6	-		1.65	1.68		0.77		8.4	4.2	0.006	0.004		6.9	
150-205	0.06			0.4	-				1.65	0.75			2.6				7.0	

Depth (cm)	Extractable bases: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	5B1a Sum of bases	6H2a Ext. acidity	Cation exch. capacity: 5A1a NH_4OAc	5A3a Sum of cations	6G1a KCl ext. Al +++	Ratios to clay 8D1: CEC NH_4OAc	Ext. iron	15 bar water	Atterberg limits: Plastic limit	Liquid limit	Plastic index	Base saturation: 5C3 Sum of cations Pct.	5C1 NH_4OAc Pct
	meq/100g												Pct.	br <0.4 mm			
0-18	7.3	2.0	0.3	0.6	10.2		8.0			0.78	0.06	0.45					100+
18-53	7.7	1.8	0.4	0.4	10.3		8.1			0.74	0.06	0.45	15	18	3		100+
53-76	6.7	2.2	0.4	0.2	9.5		8.8			0.62	0.06	0.41	15	21	6		100+
76-110	9.2	6.9	0.5	0.3	16.9		17.4			0.78	0.06	0.45					97
110-140	8.5	6.5	0.5	0.2	15.7		15.9			0.89	0.05	0.45	16	29	13		99
140-150	4.1	3.4	0.3	0.1	7.9		7.4			0.85	0.07	0.48					100+
150-205	2.4	1.9	0.2	0.1	4.6		4.6			1.02	0.09	0.58					100

Depth (cm)	b/ Clay fraction mineralogy 3A1: 7A2 X-ray c/	7A3 DTA Pct.
0-18	MI4, KK1	
18-53		
53-76	MT5, MT1, KK1	
76-110		
110-140	MT4, MI3, KK2	
140-150		
150-205	MT4, MI4, KK2	

a/ 8.0 kg of organic carbon per square meter to a depth of 1 meter

b/ Mineral code
- MT = montmorillonite
- MI = mica
- KK = kaolinite

c/ Approximate weight fraction (X-ray)
- 5 = more than half
- 4 = one-third to half
- 3 = one-fifth to one-third
- 2 = one-twentieth to one-fifth
- 1 = less than one-twentieth

CHUALAR SANDY LOAM
S65Calif-27-13

Location: Monterey County, California, 0.45 mile SW on Chualar Road from Old Stage Road to pumphouse on north side of road, 830 feet northwest on dirt road, 20 feet northeast into field. **Date of Sampling:** May 20, 1965.

Description by: Lewis C. Leifer. **Collectors:** W. D. Nettleton, B. R. Brasher, C. J. Weisel, R. D. Waggoner, F. J. Pecarich; site selection by T. D. Cook.

Classification: Typic Argixeroll, fine-loamy, mixed, thermic family. (Noncalcic Brown (medial with brunizemic properties).

Vegetation: Irrigated cropland, beans. **Climate:** Precipitation 12 inches; mean annual temperature 58°F., mean January 50°F., and mean July 65°F. **Parent Material:** Alluvium from phaneritic, intermediate igneous rocks. **Topography:** Very gently sloping smooth fan of 1½ percent slope, facing west. **Elevation:** 180 feet. **Drainage:** Well drained, moderately slow subsoil permeability, medium runoff. **Soil Moisture:** Moist throughout, about field capacity.

Remarks: Field pH determinations by Truog Kit. Paired samples are S65Calif-27-17-1 through 9. Asterisks indicate samples taken for California Division of Highways.

Alkaline reaction of the A and possibly the upper B due to fertilizers or amendments.

HORIZON	DESCRIPTION
Ap RSL No. 65427	0-7 inches (0-18 cm.), dark grayish brown (10YR 4/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium granular and weak medium subangular blocky structure; hard (dry), friable (moist), slightly sticky and slightly plastic (wet); plentiful very fine roots; many very fine interstitial pores; 7 percent gravel by volume; clear smooth boundary.
A12 * RSL No. 65428	7-21 inches (18-53 cm.), dark grayish brown (10YR 4/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium and coarse granular structure; hard (dry), friable (moist), slightly sticky and slightly plastic (wet); few very fine roots; many very fine interstitial pores; 9 percent gravel by volume; clear wavy boundary.
B1t * RSL No. 65429	21-30 inches (53-76 cm.), yellowish brown (10YR 5/4) heavy coarse sandy loam, dark brown (10YR 3/3) moist; massive; hard (dry), friable (moist), sticky and plastic (wet); few very fine roots; many very fine interstitial, common very fine and few fine tubular pores; common thin clay skins in bridges and pores; considerable rodent activity; 7 percent gravel by volume; clear smooth boundary.
B21t RSL No. 65430	30-44 inches (76-110 cm.), brown (7.5YR 5/4) heavy loam, dark brown (7.5YR 3/2) moist; brown to dark brown (7.5YR 4/4) crushed; massive, distinct vertical joints suggest some structure with continuous thin clay skins on major joints; very hard (dry), firm (moist), very sticky and plastic (wet); no roots; common very fine interstitial pores; continuous thin clay skins in bridges and pores; 12 percent gravel by volume; diffuse smooth boundary.
B22t * RSL No. 65431	44-55 inches (110-140 cm.), brown (7.5YR 5/4) heavy finely gravelly coarse sandy loam, dark brown (7.5YR 3/2) moist, brown to dark brown (7.5YR 4/4) rubbed; massive; very hard (dry), firm (moist), very sticky and plastic (wet); common very fine interstitial and few very fine tubular pores; continuous thin clay skins in bridges and pores and a few moderately thick bridges; 16 percent gravel by volume; clear smooth boundary.
B3 RSL No. 65432	55-59 inches (140-150 cm.), brown (7.5YR 5/4) finely gravelly loamy coarse sand, brown to dark brown (7.5YR 4/4) moist; massive; slightly hard (dry), friable (moist), slightly sticky and slightly plastic (wet); many very fine interstitial pores; few thin clay skins in bridges; 23 percent gravel by volume; abrupt smooth boundary.
IIC RSL No. 65433	59-80 inches (150-205 cm.), brown (7.5YR 5/4) finely gravelly coarse sand, brown to dark brown (7.5YR 4/4) moist; single grain; soft (dry), loose, nonsticky and nonplastic (wet); many fine interstitial pores.

CONSECUTIVE PEDON NUMBER C 69 54 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CHUALAR TAXADJUNCT SOIL NO. S69 CALI. 36-21 SAMPLE NO. 9 287-9 290 SAN BERNARDINO AREA

SOIL FAMILY TYPIC ARGIXEROLL FINE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SAMPLE NO.	DEPTH CM.	HORZ.	SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION 2- .05 .05 .002 LT .002	SILT	CLAY	SANDS VCS 2-1	CS 1- .5	MS .5- .25	FS .25- .1	VFS .1- .05	CSI .05- .02	FSI .02- .002	SILTS-- CO. 2- .2U	CLAYS---- FINE LT .2U	CARBO NATE 3A1A.02	1A2A INT. II .2- .02 WHOLE SOIL	-COARSE FRAGMENTS- PCT. OF I 75- PCT.	II 20-5 OF 20	III 5-2 LT 75
			PERCENT OF LESS THAN 2MM																	
9 287	0- 18	AP	32.1	45.5	22.4	0.8	1.9	2.4	7.3	19.7	27.0	18.5	--	--	51.4	--A	--	--	--	
9 288	18- 30	B1	26.7	45.4	27.9	0.2	1.0	1.6	5.4	18.5	24.6	20.8			46.6	--A	--	--	--	
9 289	28- 42	B23T	25.6	46.4	28.0	0.3	0.9	1.2	5.3	17.9	24.9	21.5			46.3	--A	--	--	--	
9 290	105-155	2B3 T	15.8	37.1	47.1	1.3	1.4	1.1	3.5	8.5	15.9	21.2			26.7	--A	--	--	--	

SAMPLE NO.	DEPTH CM.	ORG.MATTER CAR- BON 6A1A -PERCENT--	NITRO GEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	19-2 6E1B	EXT. IRON FE 6C2B PCT.	ATTERBERG L I M I T LL 4F2 PCT.	PL 4F1 NO.40	BULK DENSITY EST 1/3 BAR 4A1F	1/3 BAR 4A1F	DRY 4AH	CM 3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2 -----PERCENT---	EXTENSBLTY LEF 4D1 -PERCENT--	LE 4D1	-----PH------- H2O 1/1 8C1A	H2O 1/10 8C1A	CACL2 8C1E
									GRAMS PER CC											
9 287	0- 18	1.88	0.193			0.8				1.34	1.57	1.00		24.9	9.9	5.4	5.4	6.7		6.6
9 288	18- 30	0.79	0.084			0.8			1.40			1.00			11.3			7.0		6.5
9 289	28- 42	0.36		TR		0.9				1.47	1.80	1.00		25.6	13.4	7.0	7.0	7.9		7.0
9 290	105-155	0.22		5		0.7			1.50			1.00			21.0			8.0	9.3	7.6

SAMPLE NO.	DEPTH CM.	-----EXTRACTABLE BASES--- CA 5B4A 6N2E	MG 5B4A 6D2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	BASE SAT. PCT.	--C E C-- NA- OAC 5A2A	NH4- OAC 5A6A	EC 8A1A MMHO	------WATER EXTRACT FROM SATURATED PASTE 8A1 ----- CA	MG	NA	K	CO3	HCO3	CL	SO4	B	PH SAT. PASTE 8C1B
		-MEQ/100G--------						-MEQ/100G			----------MEQ/1000 ML----------								PPM	
9 287	0- 18	15.2	4.8	0.5	2.0	22.5	100+		21.3											
9 288	18- 30	20.4	7.6	0.6	0.6	29.2	100+		28.0											
9 289	28- 42	21.5	8.6	3.9	0.5	34.5	100+		30.9	1.01										
9 290	105-155	37.2	11.6	10.1	0.5	59.4	100+		43.3	1.85	1.8	1.1	19.2	0.1		3.9	4.2	10.4		7.8

SAMPLE NO.	DEPTH CM.	WATER AT SAT. 8A PCT.	EXCHANGBLE NA 5B4B MEQ.	NA 5D2 PCT.	SAR 5E	-GYPSUM- AMT. 6F1B PERCENT	REQ. 6P3A	---------- C L A Y M I N E R A L O G Y ---------- --LESS THAN 0.002 MM--- -L.T. .0002 MM- ------X RAY-------- DTA ----X RAY------ 7A2E I	7A2E II	7A2E III	7A2E IV	7A3 PCT.	7A2E I	7A2E II	7A2E III	MINERAL CODE	RELATIVE AMOUNT
9 287	0- 18		0.5	2				MI 5	MM 2							MI MICA	1 TRACE
9 288	18- 30		0.6	2												MM MT/MICA	2 SMALL
9 289	28- 42		3.9	13				MT 4	MI 2								3 MODERATE
9 290	105-155	84.1	8.5	20	16											MT MONTMORT	4 ABUNDANT
																	5 DOMINANT
																	6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

CHUALAR LOAM (TAXADJUNCT) 1/
S69Calif-36-21

Location: San Bernardino County, California, 75 feet east and 600 feet south of Pine and Central Avenue intersection, NW¼ SW¼ of sec. 31, T.2S., R.7W. Date of Sampling: June 9, 1969.
Description by: A. A. Knecht, W. Z. Brock. Collectors: A. A. Knecht, W. Z. Brock.
Classification: Typic Argixeroll, fine-loamy, mixed, thermic.
Vegetation: Small grain stubble, some bindweeds, mustard and thistle. Climate: Average annual precipitation about 16 inches; mean temperature about 61°F. Parent Material: Fine textured alluvium. Topography: Alluvial fan, nearly level, about 1 percent slope. Elevation: 550 feet. Drainage: Moderately well drained; slow runoff, slow permeability. Area above flood plain and water table is below five feet. Soil Moisture: Profile was dry throughout when sampled.
Remarks: Field reaction was determined by Truog method. Four horizons (0-7"; 7-12"; 28-42" and 42-60") were analyzed in the Riverside Soil Survey Laboratory.
*Some soil properties slightly outside the range for the series as currently defined.

HORIZON	DESCRIPTION
	(0-18 cm.)
Ap RSL 69287	0 to 7 inches, dark grayish brown (2.5Y 4/2) loam, very dark grayish brown (2.5Y 3/2) moist; weak very coarse angular blocky structure; very hard, firm, sticky, plastic; many very fine roots; many very fine continuous and vertical inped simple pores; slightly acid (pH 6.5); clear wavy boundary.
	(18-30 cm.)
B1 RSL 69288	7 to 12 inches, brown (10YR 4/3) clay loam, very dark grayish brown (10YR 3/2) moist; weak coarse angular blocky structure; very hard, firm, very sticky, very plastic; common very fine roots; many very fine continuous vertical inped simple pores; neutral (pH 7.0); clear smooth boundary.
	(30-46 cm.)
B21t	12 to 18 inches, brown (10YR 4/3) clay loam, very dark grayish brown (10YR 3/2) moist; weak coarse angular blocky structure; very hard, very firm, very sticky, very plastic; common very fine roots; common very fine and few fine continuous vertical inped simple pores; common thin clay films on faces of peds; mildly alkaline (pH 7.5); clear smooth boundary.
	(46-71 cm.)
B22t	18 to 28 inches, brown (10YR 4/3) clay loam, dark grayish brown (10YR 4/2) moist; weak coarse subangular blocky structure; extremely hard, very firm, very sticky,very plastic; few very fine roots; common very fine and few fine continous vertical inped simple pores; many thin clay films on faces of peds and common moderately thick clay films line tubular pores; mildly alkaline (pH 7.5); gradual smooth boundary.
	(71-105 cm.)
B23t RSL 69289	28 to 42 inches, brown (10YR 4/3) clay loam, very dark grayish brown (10YR 3/2) moist; moderate very coarse prismatic structure; extremely hard, very firm, very sticky, very plastic; few very fine roots; common very fine and few fine continuous vertical inped simple pores; many thin clay films on faces of peds and common moderately thick clay films line tubular pores; moderately alkaline (pH 8.0); gradual smooth boundary.
	(105-155 cm.)
IIB3t RSL 69290	42 to 62 inches, olive brown (2.5Y 4/4) clay, dark yellowish brown (10YR 3/4) moist; strong very coarse prismatic parting to moderate very coarse angular blocky structure; extremely hard, very firm, very sticky, very plastic; few very fine roots; few very fine inped simple pores; continuous thick clay films occur on faces of peds and line tubular pores; strongly effervescent; medium generally rounded segregated lime occurs in soft masses; moderately alkaline (pH 8.0); clear wavy boundary.
	(155-170 cm.)
IIC	62 to 67 inches, light gray (2.5Y 7/2) clay loam, light olive brown (2.5Y 5/4) moist; massive; extremely hard, very firm, sticky, very plastic; few very fine roots; few very fine discontinuous inped open pores; strongly effervescent; moderately alkaline (pH 8.0).

1/ The Chualar series is in a fine-loamy, mixed, thermic family of Typic Argixerolls. This pedon has more than 35 percent clay in the lower part of the argillic horizon.

OIL SURVEY LABORATORY Riverside, California

SOIL TYPE Lobitos loam (taxadjunct) **LOCATION** San Mateo County, California

SOIL FAMILY: Typic Argixeroll, fine-silty, mixed, mesic.

SOIL NOS. S55Ca1. 11-13 **LAB. NOS.** 55394-55398

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 — VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0- 9	A_{11}	0.0	0.2	0.2	1.7	29.0	46.7	22.2	57.6	19.6	0	1
9-18	A_{12}	0.0	0.1	0.2	1.7	31.0	41.9	25.1	58.3	16.1	3	1
18-29	B_2^2	0.0	0.1	0.2	1.2	25.5	41.9	31.1	52.6	15.8	38	c1
29-34	C_2	0.0	0.1	0.2	1.5	26.0	46.3	25.9	55.8	17.8	75	1
34+	D_r	not analysed										

DEPTH INCHES	pH 8C1b SATURATED PASTE 1:1	pH 8C1a 1:5	pH 8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	ORGANIC MATTER 6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
0- 9	5.9		6.5	2.84	.233	12.2							15.1
9-18	5.9		6.3	1.44	.142	10.1							15.1
18-29	5.7		6.7	0.77									16.8
29-34	5.8		6.8	0.54									17.0

DEPTH INCHES	5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Na 6P2a	K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE Na	K	MOISTURE AT SATURATION %
		milliequivalents per 100g. soil						milliequivalents per liter		
0- 9	31.7	16.2	7.7	8.0	1.1	1.7	76.9			
9-18	30.5	14.8	9.5	6.3	1.3	0.5	80.5			
18-29	34.5	14.6	12.0	5.9	1.4	0.5	82.8			
29-34	30.7	15.6	11.7	4.9	1.5	0.4	85.6			
34+		not analysed								

1/ Percent of the whole soil

LOBITOS LOAM (taxadjunct) 1/
S55Calif-41-13

Location: 2,300 feet northeast of junction of Irish Creek Road and Tunitas Road on west side of Irish Creek Road, San Mateo County, California. See Sheet 15, Soil Survey Report, San Mateo Area, California, May, 1961. Date of sampling: May 19, 1955.
Description by: Ralph E. Nelson. Collectors: Reuben E. Nelson, Ralph E. Nelson, Rudolph Ulrich, and R. J. Wagner.
Classification: Typic Argixeroll, fine-silty, mixed, mesic.
Vegetation: Annual grasses and a few scattered perennial grasses as understory to poison oak, baccharis, California sage, and ceanothus. Climate: 25 to 40 inches rainfall.
Parent material: Silty sandstone or shale of the Purisima formation. Topography: Steep hills to mountainous; slope at sampling location about 60 percent; plain toward southeast.
Elevation: 300 feet. Drainage: Runoff very rapid; internal drainage moderate.
Remarks: Worms and worm casts down to 9 inches.

HORIZON	DESCRIPTION
Aoo and Ao	1 or ½-0 inches (no sample taken), loose, dark colored fresh and rotting twigs, leaves, and grass blades; abrupt smooth lower boundary.
A11 RSL No. 55394	0-9 inches, dark grayish brown (10YR 4/2, very dark brown 2/2 moist) loam or silt loam. Weak, medium to fine subangular blocky, hard friable, slightly plastic and nonsticky. There are some worm casts and numerous roots. The reaction is 6.5. The lower boundary is clear and wavy.
A12 RSL No. 55395	9-18 inches, dark grayish brown (10YR 4/2, indistinctly mottled very dark brown and very dark grayish brown 10YR 2/2-3/2 moist) loam or silt loam. Weak medium to fine subangular blocky, hard, friable, slightly plastic and nonsticky. There are many roots and some rock fragments. The reaction is 6.1. The lower boundary is clear and wavy.
B2 RSL No. 55396	18-29 inches, light olive brown (2.5Y 5/4, olive brown 4/4 moist) silty clay loam; moderate fine subangular blocky, hard firm, plastic and slightly sticky. There are thin patchy olive colored clay skins. Rotten rock fragments give the soil a rather angular gravelly appearance. Numerous roots. The readion is 6.5. The lower boundary is clear and wavy.
C2 RSL No. 55397	29-34 inches, light olive brown (2.5Y 5/4, olive brown 4/4 moist) loam. Massive. Numerous pieces of rotten rock throughout the horizon. Hard, friable, very slightly plastic and nonsticky. Reaction is 6.3. Few roots. Lower boundary clear and wavy.
Dr RSL No. 55398 (shattered)	34 inches +, light olive brown, coarsely angular, slightly weathered fragments of silty Purisima sandstone or shale and some loosened soil material. Many feet thick.

1/ The Lobitos series is in a fine-loamy, mixed, mesic family of Typic Argixerolls. This pedon has more than 50 percent silt + very fine sand.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Aquic Argixeroll, coarse-loamy, mixed, mesic
SOIL Beckwourth coarse sandy loam **SOIL Nos.** S61Calif-32-15 **LOCATION** Sierra Valley, Plumas County, California
SOIL SURVEY LABORATORY Riverside, California **LAB. Nos.** 61706 - 61711

Depth (In.)	Horizon	1B1b Total: Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.2)			Coarse fragments 2A2: ≥ 2 Pct.	2 – 19 Pct. of < 76 mm	19 – 76 Pct. of < 76 mm
		Pct. of < 2 mm														Pct.		
0–2½	A11	81.2	11.4	7.4	13.6	27.9	18.1	17.5	4.1	5.0	6.4	16.6	69.6			6		
2½–15	A12	84.5	9.0	6.5	13.5	25.6	20.0	20.4	5.0	4.2	4.8	18.2	70.5			7		
15–23	B1	82.3	10.8	6.9	6.0	20.9	20.6	27.5	7.3	5.5	5.3	25.9	61.9			8		
23–34	B2t	77.0	11.6	11.4	6.2	21.9	20.2	22.5	6.2	5.5	6.1	22.1	60.4			7		
34–48	C1	87.4	5.2	7.4	13.9	26.1	19.6	23.7	4.1	2.7	2.5	16.6	73.5			14		
48–58+	C2	94.1	2.2	3.7	10.5	32.2	28.6	21.5	1.3	1.1	1.1	9.2	86.0			9		

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N		6E1b Carbonate as $CaCO_3$ Pct.	6C2a Ext. Iron as Fe Pct.	Bulk density g/cc	g/cc	g/cc		Water content Pct.	Pct.	4B2 15 bar Pct.			pH 8C1b Sat. Paste	8C1a 1:10
0–2½	4.60	0.305	15		–	0.4							10.1			5.3	5.7
2½–15	0.56	0.050	11		–	0.3							4.1			6.2	6.5
15–23	0.18				–	0.5							4.1			6.8	7.0
23–34	0.12					0.5							6.7			8.2	9.1
34–48	0.09					0.3							4.6			8.4	8.7
48–58+	0.05					0.3							2.8			8.3	8.2

Depth (In.)	Extractable bases 6N2c Ca	602c Mg	6P2a Na	5B1a 6Q2a K	6H2a Ext. Acidity	Cat. Exch. Cap. 5A2a NaOAc	5B1b Exch. Na	Water extract from saturated paste 8A1: 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K		6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g							meq/liter									mmho/cm
0–2½	9.2	2.1	0.1	0.9	7.5	18.9	0.1	10.7	5.7	0.5	2.8		–	2.8	0.5		2.08
2½–15	4.2	1.4	0.1	0.2	1.8	8.6	0.1	1.9	1.1	0.7	0.3		–	1.4	0.3		0.38
15–23	4.0	2.0	0.3	0.1	1.2	8.2	0.3	1.0	0.5	2.5	–		–	2.2	0.4		0.40
23–34	8.2	4.9	2.3	0.1	0.3	13.0	2.1	0.9	0.7	9.9	–		1.3	6.7	1.0		1.03
34–48	5.0	2.8	1.4	0.1	0.4	10.2	1.3	0.6	0.4	7.4	–		0.5	5.2	1.0		0.80
48–58+	3.4	1.8	0.6	0.1	0.2	5.9	0.5	0.7	0.8	5.1	–		0.2	2.9	2.0		0.68

Depth (In.)	8A Water at Saturation Pct.	5D1 Exchangeable Na Pct.		Gypsum Pct.	5C3 Base Sat. (Sum) Pct.		
0–2½	46.6	<1			62		
2½–15	22.8	1			90		
15–23	19.3	4			84		
23–34	23.2	16			98		
34–48	22.7	13			96		
48–58+	22.1	8			97		

BECKWOURTH COARSE SANDY LOAM

Calif-32-15

Location: Sierra Valley, Plumas County, California. 0.6 mile north and 0.2 mile west of the southeast corner of section 21, T. 22 N., R. 15 E. 0.1 mile north of road. About 4.7 miles north and 3.2 miles west of Loyalton. Date of Sampling: September 15, 1961.
Collectors: Grant Kennedy, Reuben Nelson, John Rogers, Paul Nazar, James McLaughlin, Eugene Begg.
Vegetation: The vegetation is silver sage. The silver sage has been sprayed with almost 100 percent kill.
Climate: Estimated annual precipitation 15 inches. Nearest weather station (Portola): Mean annual temperature 45.1° F.; January average 28.7° F.; July average 62.6° F.; mean annual precipitation 20.62 inches. Parent Material: Alluvium dominantly from granitic sources. Relief: Very slightly hummocky flood plain with a slope of less than 1 percent. Elevation: 4880 feet. Drainage: Moderately well drained; very slow runoff; the permeability is rapid in the upper part of the profile and moderate in the lower part. Soil Moisture: Slightly moist below 2½ inches; moist below 15 inches.
Remarks: This is a Chestnut soil with a weakly developed Bt horizon. A water table occurred at 60 inches. This is a perched water table held up by fine textured lake sediments. At this site auger borings in the pit located these sediments at 66 inches. Krotovinas are common in the B1 extending to the top of the B2t. This profile was quite moist considering the date of the sampling. It was slightly moist below 2½ inches and moist below 15 inches. The vegetation in this field was silver sage which had been sprayed. There was very little living vegetation, consequently the moist condition. The A12 (2½ to 15 inches), the B2t (23 to 34 inches) and the C1 (34 to 48 inches) were sampled for the Bureau of Public Roads and the California State Division of Highways.
Classification: Aquic Argixeroll, coarse-loamy, mixed, mesic. 1/

HORIZON	DESCRIPTION
A11 RSL No. 61706	0 to 2½ inches, very dark gray (10YR 3/1) coarse sandy loam, black (10YR 2/1) when moist; moderate very fine platy structure; soft, very friable, nonsticky and nonplastic; abundant very fine, few fine to medium roots; many very fine tubular and interstitial pores; medium acid (pH 6.0); clear, smooth boundary.
A12 RSL No. 61707	2½ to 15 inches, dark grayish brown (10YR 4/2) coarse sandy loam, very dark brown (10YR 2/2) when moist; weak coarse platy structure; soft, very friable, nonsticky and nonplastic; few very fine to coarse roots; many very fine interstitial and common very fine and fine tubular pores; medium acid (pH 5.0); clear, slightly wavy boundary.
B1 RSL No. 61708	15 to 23 inches, brown (10YR 5/3) coarse sandy loam, dark brown (10YR 4/3) when moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine to coarse roots; many very fine interstitial and common very fine and fine tubular pores; few thin clay films in pores; neutral (pH 6.8); clear, smooth boundary.
B2t RSL No. 61709	23 to 34 inches, pale brown (10YR 6/3) sandy clay loam (near sandy loam), with common medium distinct white (10YR 8/2) mottles, brown (10YR 5/3) when moist; massive; hard, firm, slightly sticky and slightly plastic; few very fine to coarse roots; common very fine interstitial and common very fine and fine tubular pores; common thin clay films in pores and bridges; moderately alkaline (pH 8.3); strongly effervescent, lime occurs in soft masses; clear, smooth boundary.
C1 RSL No. 61710	34 to 48 inches, light yellowish brown (10YR 6/4) loamy coarse sand, brown (10YR 4/3) with common fine faint very dark grayish brown (10YR 3/2) mottles, when moist; massive; soft, friable, nonsticky and nonplastic; very few fine roots; common fine interstitial pores; moderately alkaline (pH 8.2); very slightly effervescent, lime occurs in soft masses; gradual, smooth boundary.
C2 RSL No. 61711	48 to 58 inches +, pale brown (10YR 6/3) coarse sand, dark brown (10YR 4/3) when moist; massive; soft, very friable, nonsticky and nonplastic; many very fine interstitial pores; moderately alkaline (pH 8.2); very slightly effervescent, lime occurs in soft masses.

1/ The amount of organic carbon is regarded as adequate for a mollic epipedon.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Aridic Argixeroll, ashy, mesic, shallow

SOIL Casuse sandy loam (taxadjunct) SOIL Nos. S66Calif-25-2 LOCATION Modoc County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 66319 - 66322

Depth (In.)	Horizon	1B1b Total Sand (2–0.05) Pct. of < 2 mm	Total Silt (0.05–0.002) Pct. of < 2 mm	Total Clay (< 0.002) Pct. of < 2 mm	Sand: Very coarse (2–1) Pct. of < 2 mm	Sand: Coarse (1–0.5) Pct. of < 2 mm	Sand: Medium (0.5–0.25) Pct. of < 2 mm	Sand: Fine (0.25–0.1) Pct. of < 2 mm	Sand: Very fine (0.1–0.05) Pct. of < 2 mm	Silt: 0.05–0.02 Pct. of < 2 mm	Silt: Int. III (0.02–0.002) Pct. of < 2 mm	Int. II (0.2–0.02) Pct. of < 2 mm	(2–0.1) Pct. of < 2 mm	3A1a Non-carbonate clay Pct. of < 2 mm	1/ Coarse fragments 1A2a: > 2 Pct.	2 - 19 Pct. of < 76mm	19 - 76 Pct. of < 76mm
0-1½	A1	60.2	24.1	15.7	7.3	14.2	10.5	18.4	9.8	10.5	13.6	29.5	50.4	16	9	8	1
1½-6	B21t	50.9	23.0	26.1	4.2	11.8	9.3	16.3	9.3	9.8	13.2	27.6	41.6	26	7	6	1
6-11	B22t	43.7	21.2	35.1	4.6	8.9	7.5	14.6	8.1	9.0	12.2	25.0	35.6	35	26	20	6
11+	R																

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. Iron as Fe Pct.	6E1b Carbonate as $CaCO_3$ Pct		Bulk density: 4A1f 1/3 bar g/cc	Bulk density: 4A1h Oven dry g/cc	Bulk density: g/cc	3B2 C'	Water content: Pct	Water content: 4B1c 1/3 bar Pct.	Water content: 4B2 15 bar Pct.	4D1 Extensibility COLEF in./in.	4D1 Extensibility COLE in./in.	pH: 8C1a H_2O 1:1		
0-1½	1.10	0.088	13	1.0			1.24	1.30		0.96		22.4	10.3	0.014	0.014	6.2		
1½-6	0.82	0.081	10	1.1			1.24	1.34		1.00		24.3	13.9	0.027	0.027	6.5		
6-11	0.85	0.093	9	1.3			1.25	1.41		1.00		27.9	19.9	0.040	0.040	6.6		
11+																		

Depth (In.)	Extractable bases 5B1a: 6N2a Ca meq/100 g	6O2a Mg meq/100 g	6P2a Na meq/100 g	6Q2a K meq/100 g	Sum of bases meq/100 g	6H2a Ext. Acidity meq/100 g	Cation Exch. Capacity: 5A1a NH_4OAc meq/100 g	Cation Exch. Capacity: 5A3a Sum meq/100 g	6G1d KCl Ext. Al^{+++} meq/100 g	Base saturation: 5C1 NH_4OAc Pct.	Base saturation: 5C3 Sum Pct.
0-1½	9.7	3.8	0.2	1.6	15.3	4.8	19.5	20.1		78	76
1½-6	14.2	5.6	0.3	1.9	22.0	3.7	26.1	25.7		84	86
6-11	20.0	7.9	0.3	2.3	30.5	4.2	34.7	34.7		88	88
11+											

Depth (In.)	Clay mineralogy (<0.002 mm) 7A: Mont. X-ray	Verm. X-ray	Mica X-ray	KaoHin X-ray
0-1½	xx			t
1½-6				
6-11	xx			t
11+				

1/ From characterization sample (5 kg). Since the 2-76 mm. fractions of samples 66320 and 66321 are porous they were considered fine earth in calculating C' and COLE.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

CASUSE SANDY LOAM (taxadjunct) 1/
S66Calif-25-2

Location: Modoc County, California. SE¼ SW¼ of Sec. 23, T42N, R12E; 1130 feet due east of the west side road; 190 feet west of the east boundary fence line and 630 feet north of the south boundary fence line. 1-3/4 miles SW of Alturas. Date of Sampling: April 7, 1966.

Description by: G. J. Badura. Collectors: K. W. Flach, S. B. Johnson, G. J. Badura.

Classification: **Aridic** Argixeroll, ashy, mesic, **shallow.**

Vegetation: Native vegetation, used for range; few Junipers, big sagebrush (Artemisia tridentata), quackgrass (Agropyron repens), squirreltail (Sitanion hystrix), cheatgrass (Bromus tectorum) and numerous annual forbs. Climate: Precipitation 12 to 14 inches, much of which is snow. Mean annual temperature is 47°F., January 29°F., July 66°F. Parent Material: Pumice tuff, nonindurated (Rhyolitic tuff). Topography: Rolling terrace-like, 4 percent west slope. Elevation: 4428 feet. Drainage: Well drained, A horizons have moderately rapid permeability and B horizons are moderately permeable, runoff is medium. Soil Moisture: The entire profile was moist at the time of sampling.

Remarks: Field determinations of pH by bromthymol blue indicator.

HORIZON	DESCRIPTION
A1 RSL 66319	0 to 1½ inches, brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, nonsticky, nonplastic; many very fine to medium roots; many very fine and fine vesicular pores; slightly acid (pH 6.4); clear smooth boundary.
B21t RSL 66320	1½ to 6 inches, brown (10YR 4/3) light sandy clay loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure that breaks to weak very fine platy; slightly hard, friable, slightly sticky, slightly plastic; many very fine to medium roots; many very fine and fine interstitial and tubular pores; common thin clay bridges; neutral (pH 6.7); gradual to diffuse smooth boundary.
B22t RSL 66321	6 to 11 inches, brown (10YR 4/3) sandy clay loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; hard, friable, sticky, plastic; many very fine to medium roots; many very fine and fine interstitial and tubular pores; few moderately thick clay films in pores and many thin clay bridges; neutral (pH 7.0); abrupt to clear boundary.
R RSL 66322	11 inches plus, weakly fractured soft tuff with pumice.

NOTE: Pumice in the tuff ranges in size mainly from 1/8 inch to 1 inch.

1/ **The Casuse series is in a loamy, mixed, mesic, shallow family of Aridic Argixerolls. This pedon is in the same subgroup but has 28 percent volcanic glass and more weathered glass than other sand grains.**

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Aridic Argixeroll, loamy, mixed, mesic, shallow
SOIL Casuse sandy loam SOIL Nos. S66Calif-25-3 LOCATION Modoc County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 66323 - 66326

Depth (in.)	Horizon	1B1b Total: Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Non-carbonate clay	1/ Coarse fragments 1A2a: > 2	2 – 19	19 – 76
		Pct. of < 2 mm												Pct.	Pct.	Pct. of < 76mm	
0-1½	A1	65.1	25.3	9.6	10.4	15.6	10.7	17.3	11.1	12.5	12.8	32.1	54.0	10	25	23	2
1½-6	B21t	47.8	26.4	25.8	7.2	9.8	7.4	13.8	9.6	10.9	15.6	27.5	38.2	26	18	17	1
6-14	B22t	49.6	22.3	28.1	6.3	10.4	7.9	14.7	10.3	8.9	13.4	27.2	39.2	28	14	14	-
14+	R																

Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Bulk density: 4A1f 1/3 bar	4A1h Oven dry		3B2	Water content:	4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH: 8C1a H_2O 1:1		
	Pct	Pct.		Pct.	Pct	g/cc	g/cc	g/cc	C'	Pct.	Pct.	Pct	in./in.	in./in.			
0-1½	0.73	0.067	11			1.30	1.32		0.86		17.6	7.6	0.006	0.005	6.3		
1½-6	0.62	0.069	9			1.19	1.27		0.91		28.0	15.4	0.022	0.020	6.4		
6-14	0.47	0.056	8			1.15	1.26		0.93		28.3	16.5	0.031	0.029	6.4		
14+															-		

Depth (in.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	5A3a Sum	6G1d KCl Ext. Al^{+++}	Base saturation: 5C1 NH_4OAc	5C3 Sum
	meq/100 g									Pct.	Pct
0-1½	6.3	3.1	0.1	1.1	10.6	2.6	13.6	13.2		78	80
1½-6	14.0	6.7	0.4	1.9	23.0	3.8	26.7	26.8		86	86
6-14	14.0	6.8	0.4	1.7	22.9	3.8	28.9	26.7		79	86
14+											

Depth (in.)	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Mica	Kaolin	X-ray

1/ From characterization sample (5 kg).

CASUSE SANDY LOAM
S66Calif-25-3

Location: Modoc County, California. NE¼ SE¼ of Sec. 30, T42N, R11E; 1110 feet due north of the railroad intersection and about 40 feet east of the road; 11 miles west by southwest of Alturas and 7 miles due east of Canby. Date of Sampling: April 7, 1966.

Description by: G. J. Badura. Collectors: K. W. Flach, S. B. Johnson, G.J. Badura.

Classification: **Aridic Argixeroll, loamy, mixed, mesic, shallow.**

Vegetation: Native vegetation, used for range; scattered Junipers, big sagebrush (Artemisia tridentata), cheatgrass (Bromus tectorum), and annual forbs. Climate: Precipitation 12 to 14 inches, much of which is snow. Mean annual temperature 47°F., January 29°F., July 66°F. Parent Material: Pumice tuff, nonindurated (Rhyolitic tuff). Topography: Rolling terrace-like, 6 percent west slope. Elevation: 4380 feet. Drainage: Well drained; A horizons have moderately rapid permeability and B horizons are moderately permeable; runoff is medium. Soil Moisture: The top 1½ inches were dry but moist below at the time of sampling.

Remarks: Field determinations of pH by bromthymol blue indicator.

HORIZON	DESCRIPTION
A1 RSL 66323	0 to 1½ inches, grayish brown (10YR 5/2) sandy loam, dark brown (10YR 3/3) moist; massive to weak medium platy structure; slightly hard, very friable, nonsticky and nonplastic; common very fine to medium roots; many vesicular and interstitial pores; neutral (pH 6.6); clear smooth boundary.
B21t RSL 66324	1½ to 6 inches, dark grayish brown (10YR 4/4) light sandy clay loam, dark brown (10YR 3/3) moist; weak medium to coarse subangular blocky structure that breaks to weak medium platy; slightly hard, friable, slightly sticky, slightly plastic; many very fine to medium roots; many very fine tubular and interstitial pores; many thin clay bridges; neutral (pH 6.6); clear smooth boundary.
B22t RSL 66325	6 to 14 inches, brown (10YR 4/3) with some pale yellow pumice, sandy clay loam, brown to dark brown (10YR 4/3 to 3/3) moist; moderate medium subangular blocky structure; hard, friable, sticky, plastic; many very fine to medium roots; many very fine tubular pores; common moderately thick clay films on ped faces and many moderately thick clay bridges; neutral (pH 6.7); clear smooth boundary.
R RSL 66326	14 inches plus, weakly fractured tuff and pumice.

NOTE: Pumice in the tuff ranges in size but is mainly between ¼ and 1 inch.

CONSECUTIVE PEDON NUMBER C 69 58 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CHUALAR VARIANT SOIL NO. S69 CALI. 36-27 SAMPLE NO. 9 304-9 308 SAN BERNARDINO AREA

SOIL FAMILY CALCIC ARGIXEROLL FINE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL SAND 2-.05	FRACTION SILT .05-.002	CLAY LT .002	VCS 2-1	CS 1-.05	MS .5-.25	FS .25-.10	VFS .1-.05	CSI .05-.02	FSI .02-.002	CO. CLAY 2-.2U	FINE CLAY LT .2U	CARBO NATE 3A1A	INT. II .2-.02	COARSE FRAGMENTS PCT. OF WHOLE SOIL I 75-20	II 20-5	III 5-2
			PERCENT OF LESS THAN 2MM														PCT. OF LT 75		
9 304	0- 28	AP	29.5	45.8	24.7	1.1	1.0	1.2	7.2	19.0	27.8	18.0				51.8	--A	--	--	--
9 305	28- 48	B21T	27.0	42.4	30.6	0.5	0.7	1.2	6.9	17.7	26.4	16.0				49.1	--A	--	--	--
9 306	48- 97	B22T	24.3	42.9	32.8	0.4	0.7	0.9	5.8	16.5	24.7	18.2				45.4	--A	--	--	--
9 307	97-150	B23T	44.3	30.4	25.3	1.4	2.7	4.0	16.0	20.2	18.5	11.9				49.2	--A	--	--	--
9 308	150-185	B3	27.2	41.4	31.4	0.5	1.0	1.1	9.6	15.0	20.8	20.6				43.1	--A	--	--	--

SAMPLE NO.	DEPTH CM.	ORG.MATTER CARBON 6A1A -PERCENT--	NITROGEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	19-2 6E1B	EXT. IRON FE 6C2B PCT.	ATTERBERG L L 4F2 PCT.	P L 4F1	P I 4A1F NO.40	T 4A1F	BULK DENSITY EST 1/3 BAR 4AH	1/3 BAR	DRY 3B2	CM WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2 ----PERCENT----	EXTENSBLTY LEF 4D1 -PERCENT--	LE 4D1	PH H2O 1/1 8C1A	H2O 1/10 8C1A	CACL2 8C1E
											GRAMS PER CC										
9 304	0- 28	2.02	0.156								1.43	1.68	1.00		26.6	11.6	5.5	5.5	6.7		6.3
9 305	28- 48	0.52	0.051						1.44				1.00			13.5			7.6		6.9
9 306	48- 97	0.35									1.44	1.84	1.00		27.3	15.0	8.5	8.5	7.8		7.0
9 307	97-150	0.07			1				1.46				1.00			12.5			7.7	8.7	7.3
9 308	150-185	0.06							1.48				1.00			18.7			7.6	8.4	7.3

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6Q2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	BASE SAT. PCT.	C E C NA- OAC 5A2A	NH4- OAC 5A6A	EC 8A1A MMHO	WATER EXTRACT FROM SATURATED PASTE CA 6N1B	MG 6O1B	NA 6P1A	K 6Q1A	CO3 6I1A	HCO3 6J1A	CL 6K1A	SO4 6L1B	B 6T1A PPM	8A1 PH SAT. PASTE 8C1B
		MEQ/100G					PCT.	-MEQ/100G		MMHO	MEQ/1000 ML									
9 304	0- 28	17.7	6.8	0.3	0.7	25.5	100+		25.3											
9 305	28- 48	21.6	9.7	1.4	0.4	33.1	100+		31.0											
9 306	48- 97	22.3	11.6	2.2	0.4	36.5	100+		34.1	0.83										
9 307	97-150	27.6	9.7	2.2	0.4	39.9	100+		26.4	2.42	13.3	8.9	12.9	0.2		2.2	1.0	29.5		7.5
9 308	150-185	28.9	11.5	3.6	0.5	44.5	100+		34.2	2.96	15.9	9.4	16.0	0.1		2.7	6.4	29.5		7.2

SAMPLE NO.	DEPTH CM.	WATER AT SAT. 8A PCT.	EXCHANGBLE NA 5B4B MEQ.	NA 5D2 PCT.	SAR 5E	GYPSUM AMT. 6F1B PCT.	REQ. 6P3A	CLAY MINERALOGY --LESS THAN 0.002 MM-- X RAY I 7A2E	II 7A2E	III 7A2E	-L.T. .0002 MM- DTA IV 7A3	PCT.	X RAY I 7A2E	II 7A2E	III 7A2E	MINERAL CODE	RELATIVE AMOUNT
9 304	0- 28		0.3	1				MI 5	MT 2	MM 2						MI MICA	1 TRACE
9 305	28- 48		1.4	5												MT MONTMORT	2 SMALL
9 306	48- 97		2.2	6				MI 5	MT 2	MM 2						MM MT/MICA	3 MODERATE
9 307	97-150	56.4	1.5	6	4												4 ABUNDANT
9 308	150-185	64.9	2.6	7	4												5 DOMINANT
																	6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

CHUALAR LOAM, CALCAREOUS VARIANT 1/
S69Calif-36-27

Location: San Bernardino County, California; about 90 feet north of Carbon Canyon Road, about 1/4 mile west of Pipeline Road, SW¼ SE¼ NE¼ of sec. 21, T. 2 S., R. 8 W. Date of Sampling: June 11, 1969.
Description by: A. A. Knecht, W. Z. Brock. Collectors: A. A. Knecht, W. Z. Brock.
Classification: Calcic Argixeroll, fine-loamy, mixed, thermic.
Vegetation: Annual grasses and bindweeds. Climate: Average annual precipitation about 16 inches; mean temperature about 61°F. Parent Material: Mixed alluvium. Topography: Alluvial fan, gently sloping, about four percent slopes. Elevation: 750 feet. Drainage: Well drained; medium runoff, moderately slow permeability. Soil Moisture: This profile was dry throughout when sampled.
Remarks: Field reaction was determined by the Truog method. All horizons were analyzed by the Riverside Soil Survey Laboratory. *The Chualar series does not have secondary lime or sodium increasing with depth in the lower part of the solum. There are other minor differences.

HORIZON	DESCRIPTION
	(0-28 cm.)
Ap RSL 69304	0 to 11 inches, dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate very coarse angular blocky structure; very hard, very firm, sticky, plastic; many very fine roots; many very fine vertical discontinuous tubular pores; slightly acid (pH 6.5); clear smooth boundary.
	(28-48 cm.)
B21t RSL 69305	11 to 19 inches, grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; strong very coarse prismatic structure; very hard, very firm, sticky, plastic; many very fine roots; many very fine interstitial pores; strongly alkaline (pH 8.5); clear smooth boundary.
	(48-97 cm.)
B22t RSL 69306	19 to 38 inches, brown (10YR 5/3) clay loam, dark grayish brown (10YR 4/2) moist; strong very coarse prismatic structure; extremely hard, extremely firm, very sticky, very plastic; few very fine roots; common very fine random interstitial pores; few thin clay films on faces of peds and lining pores; strongly alkaline (pH 8.5); gradual wavy boundary.
	(97-150 cm.)
B23t RSL 69307	38 to 59 inches, yellowish brown (10YR 5/4) clay loam, brown (10YR 4/3) moist; moderate very coarse prismatic structure; very hard, firm, very sticky, very plastic; common very fine pores; common moderately thick clay films on faces of peds and lining pores; strongly effervescent; fine irregularly shaped lime occurs in filaments and in soft masses; strongly alkaline (pH 8.5); gradual smooth boundary.
	(150-185 cm.)
B3 RSL 69308	59 to 73 inches, brownish yellow (10YR 6/6) clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; very hard, firm, very sticky, very plastic; few very fine tubular pores; few moderately thick clay films line pores; strongly effervescent; fine disseminated lime occurs in soft masses; strongly alkaline (pH 8.5).

1/ The Chualar series is in a fine-loamy, mixed, thermic family of Typic Argixerolls. This pedon has secondary lime and increasing amounts of sodium in the lower solum.

SOIL SURVEY LABORATORY Riv rside, California

SOIL TYPE Vallecitos gravelly loam (taxadjunct) **LOCATION** Alameda County, California

SOIL FAMILY: Lithic Argixeroll, clayey, montmorillonitic, thermic

SOIL NOS. S59Calif-01-8 **LAB. NOS.** 59238 thru 59242

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0-1½	A_{11}	11.1	13.4	7.1	11.0	7.2	37.1	13.1	29.9	20.5	30	1
1½-6	A_{12}	10.1	12.5	6.7	11.0	7.6	41.4	10.7	29.7	25.6	29	1
6-12	B_2	7.8	8.6	3.9	6.8	5.5	30.3	37.1	21.9	18.0	8	cl
12-16	B_3	6.4	7.9	4.3	7.9	6.3	29.7	37.5	21.4	19.4	8	cl
16+	D_r	Not sampled										

pH 8C1b Saturated Paste 1:1	pH 8C1a 1:10	Organic Matter 6A1a Organic Carbon Pct.	6B1a Nitrogen Pct.	C/N	6E1b $CaCO_3$ equivalent Pct.	8A1a Elec. conduc. mmhos/cm. at 25°C.	4B2 Soil water 15 atmos. Pct.
6.6	6.7	2.06	0.168	12.3		0.9	6.4
6.5	6.8	0.95	0.075	12.7		0.3	5.8
6.6	7.3	0.60	0.052	11.5		0.3	11.5
7.0	7.5	0.41	0.044	9.3		0.3	10.8

5A2a CATION EXCHANGE CAPACITY (+ Na)	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
17.0	7.1	5.2	4.2	<0.1	0.5	75	1.0	0.4				37.6
17.0	7.1	6.2	3.7	0.1	0.2	79	0.8	0.1				25.1
31.2	12.0	13.6	4.0	0.2	0.3	87	0.6	<0.1				38.5
26.9	10.2	11.7	1.2	0.2	0.2	95	0.8	<0.1				38.6

1/ Percent of <1 inch material, about 5 percent stones and gravel >1 inch discarded from A12 horizon.

VALLECITOS GRAVELLY LOAM (taxadjunct) 1/
S59Calif-01-8

Collectors, R. C. Huff, L. E. Welch, Lothair Grant.
Description by: L. E. Welch.
Date of Sampling: May 7, 1959.

Location: Alameda County, California, in the SW1/4 of the SW1/4 of the NW 1/4 of Sec. 9, T5S, R4E, about .05 mile north and .1 mile east of the W1/4 corner of Sec. 9 in the SE corner of the county.

Elevation: About 2,480 feet.

Relief: Sloping uplands on 25 percent convex, southeast facing slope.

Drainage: Well drained, moderate runoff, moderately slow permeability.

Parent Material: Metasedimentary rocks.

Climate: About 25 inches of rainfall.

Vegetation: Grass with scattered oaks and some rabbitbrush and chamise.

Remarks: The soil is a medial Noncalcic Brown soil.
Classification: Lithic Argixeroll, clayey, montmorillonitic, thermic.

HORIZON		DESCRIPTION
A_{11}	0-1 1/2"	Brown (10YR 5/3) light loam, dark brown (10YR 3/3) when moist; weak fine granular structure; soft when dry, friable when moist; abundant very fine roots; many very fine pores; medium acid, pH 6.0; clear, smooth lower boundary.
A_{12}	1 1/2- 6"	Brown (10YR 5/3) clay loam, dark brown (10YR 3/3) when moist; massive; hard when dry, friable when moist, plastic and slightly sticky when wet; abundant very fine roots; many very fine pores; slightly acid, pH 6.5; abrupt, wavy lower boundary.
B_2	6-12"	Reddish brown (5YR 4/3) clay, dark reddish brown (5YR 3/3) when moist; nearly massive; very hard when dry, firm when moist, very plastic and slightly sticky when wet; plentiful very fine roots; many very fine pores; thin continuous clay films in pores and in bridges; neutral, pH 7.0; clear, smooth lower boundary.
B_3	12-16"	Brown (10YR 5/3) clay, dark brown (10YR 4/3) when moist; massive; very hard when dry, firm when moist, very plastic and slightly sticky when wet; few very fine roots; common very fine pores; thin and continuous clay films in pores; colloid mainly in bridges; neutral, pH 7.0; abrupt, irregular lower boundary.
D_r	16"+	Bluish gray (5B 5/1) dry, metamorphosed fine-grained sandstone with calcite seams; clay films along cleavage planes.

1/ **The Vallecitos series is in a clayey, montmorillonitic, thermic family of Ruptic-Entic-Lithic Mollic Haploxeralfs. This pedon has a mollic epipedon and a continuous argillic horizon.**

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Vallecitos gravelly loam (taxadjunct) **LOCATION** Alameda County, California

SOIL FAMILY: Lithic Argixeroll, clayey, montmorillonitic, thermic

SOIL NOS. S 59Calif-01-9 **LAB. NOS.** 59243 thru 59247

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0-1	A_{11}	9.8	10.8	6.0	8.8	6.0	46.0	12.6	37.1	19.8	17	l
1-7	A_{12}	7.8	11.8	6.5	10.2	7.9	41.0	14.8	31.7	23.1	15	l
7-14	B_{21}	5.4	7.2	3.7	6.1	5.2	30.3	42.1	21.0	18.1	14	c
14-18	B_{22}	4.8	8.6	3.9	6.5	5.4	27.7	43.1	19.5	17.4	38	c
18+	D_r	Not sampled										

pH 8C1b Saturated Paste 1:1	pH 8C1a 1:10	Organic Matter 6A1a Organic Carbon Pct.	6B1a Nitrogen Pct.	C/N	6E1b $CaCO_3$ Equivalent Pct.	8A1a Elec. Conduc. mmhos/cm. at 25°C.	4B2 Soil water 15 atmos. Pct.
6.6	6.8	2.53	0.203	12.5		1.2	7.2
6.6	6.8	0.90	0.086	10.5		0.3	6.4
6.6	7.3	0.52	0.056	9.3		0.2	12.8
6.8	7.4	0.40	0.051	6.9		0.3	11.4

5A2a CATION EXCHANGE CAPACITY (+ Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
18.4	8.8	4.4	4.9	<0.1	0.7	74	0.8	0.9				42.9
17.3	7.9	12.7	3.5	0.1	0.3	81	1.0	0.1				25.2
33.2	13.8	13.9	4.6	0.3	0.3	86	0.6	<0.1				40.7
26.3	11.3	11.1	1.7	0.3	0.3	93	0.9	<0.1				42.0

1/ Percent of the whole soil

VALLECITOS GRAVELLY LOAM (taxadjunct) 1/

S59Calif-01-9

Collectors: R. C. Huff, L. E. Welch, Lothair Grant.
Description by: L. E. Welch.
Date of Sampling: May 5, 1959.

Location: Alameda County, California, in the NE1/4 of the SE1/4 of the SW 1/4 of Sec. 4, T5S, R4E, in the southeast corner of the county.

Elevation: 2,350 feet.

Relief: Sloping uplands on a convex slope of 20 percent facing south.

Drainage: Well drained, moderate runoff, moderately slow permeability.

Parent Material: Metasedimentary rocks.

Climate: Rainfall about 25 inches.

Vegetation: Grass with scattered oaks and some rabbitbrush and chamise.

Remarks: This is a medial Noncalcic Brown soil.

Classification: Lithic Argixeroll, clayey, montmorillonitic, thermic.

DESCRIPTION

HORIZON		
A_{11}	0- 1"	Brown (10YR 5/3) loam, dark brown (10YR 3/3) when moist; weak fine granular structure; slightly hard when dry, friable when moist, slightly sticky when wet; abundant very fine roots; many very fine pores; slightly acid, pH 6.5; clear, smooth lower boundary.
A_{12}	1- 7"	Brown (10YR 5/3) loam, dark brown (10YR 3/3) when moist; massive; hard when dry, friable when moist, slightly sticky when wet; abundant very fine roots; many very fine pores; slightly acid, pH 6.5; clear, smooth lower boundary.
B_{21}	7-14"	Brown (7.5YR 5/4) clay loam, reddish brown (5YR 4/3) when moist; massive; very hard when dry, firm when moist, slightly plastic and slightly sticky when wet; plentiful very fine roots; many very fine pores; thin continuous clay films in pores; neutral, pH 6.8; clear, smooth lower boundary.
B_{22}	14-18"	Brown (10YR 5/3) clay, dark brown (7.5YR 4/3) when moist, massive; very hard when dry, firm when moist, plastic and slightly sticky when wet; few very fine roots; many very fine pores; moderately thick continuous clay films in pores and bridges; neutral, pH 7.0; abrupt, irregular lower boundary.
D_r	18"+	Dark greenish gray schist.

1/ The Vallecitos series is in a clayey, montmorillonitic, thermic family of Ruptic-Entic Lithic Mollic Haploxeralfs. This pedon has a mollic epipedon and a continuous argillic horizon.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Denison clay loam (taxadjunct) **LOCATION** San Mate County, Calif rnia

SOIL FAMILY: Pachic Argixeroll, fine-loamy, mixed, isomesic.

SOIL NOS. S55Ca1.41-2 **LAB. NOS.** 55103-55109

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 2/	TEXTURAL CLASS
0- 4	A_{1p}	7.1	10.1	5.9	11.7	7.7	32.4	25.1	33.9	13.1	0	1
4- 8	A_{12}	5.3	9.5	6.1	12.3	8.4	32.7	25.7	32.9	15.5	2	1
8-16	B_{21}	5.2	7.6	4.7	9.0	7.4	34.3	31.8	33.9	13.2	1	c1
16-29	B_{22}	4.5	7.3	4.8	8.6	7.5	36.7	30.6	31.1	18.3	1	c1
29-45	B_3	3.0	6.4	5.7	12.4	10.7	31.9	29.9	37.1	12.7	2	c1
45-55	C_1	3.1	6.1	5.0	10.3	9.2	39.0	27.3	39.3	15.1	2	c1
55-63	C_2	5.4	9.1	6.4	14.2	9.7	31.2	24.0	37.7	11.7	2	1

8C1b SATURATED PASTE 1:1	pH 8C1a 1:5	8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	8A1a Elec. Conduc. EC×10³ MILLIMHOS PER CM @25°C.	Free Fe_2O_3 Pct. 6C1b	6F1a GYPSUM me./100g. SOIL	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
6.4		7.5	2.54	.140	18.1		0.6	1.1				11.7
6.3		7.6	2.51	.145	17.3		0.5	1.3				12.0
6.3		7.6	2.08	.118	17.6		0.5	1.2				14.2
6.2		7.5	2.22	.121	18.3		1.0	1.4				14.4
6.8		8.0	0.23	.036			1.5	1.7				13.6
7.0		8.1	0.12	.031			1.0	1.7				12.1
7.2		8.5	0.08	.020			0.8	1.3				10.8

5A2a CATION EXCHANGE CAPACITY (+ Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. Na 5B1b 6P2a	Exch. K 5B1b 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg	6P1a 6I1a CO_3+ HCO_3 1/	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
30.6	13.8	9.7	6.7	1.4	0.2	79	3.7	0.1	1.7	2.5	2.7	34.6
31.4	13.7	9.9	6.6	1.1	0.2	79	4.8	<0.1	1.4	2.5	1.6	33.7
39.2	14.9	12.8	7.2	1.6	0.2	80	4.1	<0.1	1.1	1.8	1.5	41.5
39.5	14.2	13.2	7.1	2.1	0.2	81	7.1	<0.1	2.0	0.8	6.2	42.9
27.5	8.7	9.3	2.4	2.5	0.2	90	10.6	<0.1	2.5	0.4	10.1	42.3
20.9	6.5	7.3	2.7	2.1	0.2	86	10.7	<0.1	2.1	0.4	12.9	41.8
19.4	5.8	6.3	3.5	2.1	0.1	80	8.4	<0.1	1.1	0.4	16.9	34.5

1/ only HCO_3^- found

2/ Percent of whole soil

DENISON CLAY LOAM (taxadjunct) 1/
S55Calif-41-2

Location: 0.41 miles north of Miramar Hotel, Miramar Village, San Mateo County, California. About 125 feet east of edge of sea cliff.
Date of Sampling: February 23, 1955.
Description by: W. M. Johnson. Collectors: Reuben Nelson, Ralph Nelson, Richard Wagner, Melvin Mello, and W. M. Johnson.
Classification: Pachic Argixeroll, fine-loamy, mixed, isomesic.
Land Use: Cultivated field now lying fallow. Commonly used for Brussels sprouts and artichokes, with some irrigation. Climate: Mean annual rainfall is about 25 inches, most of which comes during the months from November through March. June, July, and August are very dry. Fogginess is high in many parts of the year, particularly during summer and fall. Average January temperature is about 48° F., average July temperature about 60° F. On-shore winds carrying salt spray are common. Parent Material: Alluvium derived mainly from soils of the Coast Range Mountains developed in quartz diorite. High in quartz sand, and contains considerable mica. Relief: Smooth, very gently sloping alluvial fan overlying marine terrace. Slope about ½ percent, plane, toward the west. Elevation: About 18 feet. Drainage: Runoff, slow. Permeability, moderate in A1, slow below. Moderately well drained.
Remarks: Soil moist throughout when sampled.

HORIZON		DESCRIPTION
A_{1p}	0 - 4"	Black (10YR 2.5/0.8, dry; 1.5/0.8, moist) heavy loam with common fine white specks due to quartz grains. Cloddy due to tillage; breaks to weak fine granular. Very hard, friable, plastic, sticky. Very many roots. Numerous worm casts. pH 6.8. Abrupt, smooth lower boundary.
A_{12}	4 - 8"	Heavy loam of the same color as the A_{1p}. Weak coarse prismatic, breaking to weak medium granular. Extremely hard, plastic, sticky. Very many roots. pH 6.5. Clear, wavy lower boundary.
B_{21}	8 - 16"	Clay loam of the same color as the A horizon. Moderate very coarse prismatic, breaking to weak coarse and medium blocky. Very firm, very plastic, very sticky. Moderate continuous clay skins. Slickensides are common. Many roots. pH 6.3. Clear, wavy lower boundary.
B_{22}	16 - 29"	Clay loam of the same color as the A horizon. Moderate very coarse prismatic, breaking to weak medium and coarse blocky. Moderate continuous clay skins. Very firm, very plastic, very sticky. Moderate number of roots. Many slickensides. pH 6.3. Clear, irregular lower boundary.
B_3	29 - 45"	Finely mottled yellowish brown and pale brown (10YR 5/6 and 6/3, dry; 4/6 and 5/3, moist) clay loam with common medium mottles of dark gray (dry) on ped surfaces, and common fine white specks. Moderate very coarse prismatic, breaking to weak medium and coarse blocky. Moderate clay skins on vertical faces. Very firm, very plastic, very sticky. Many slickensides. Few roots. pH 7.0. Clear, irregular lower boundary.
C_1	45 - 55"	Finely mottled light gray and yellowish brown (2.5Y 7/2 and 10YR 5/6, dry; 2.5Y 5/3 and 10YR 4/6, moist) light clay loam with common dark gray skins on ped surfaces, and fine white specks. Weak very coarse prismatic. Friable, plastic, sticky. Moderate patchy clay skins on vertical surfaces. Very few roots. Slickensides are common. pH 7.0. Gradual, wavy lower boundary.
C_2	55 - 63"+	Finely mottled light gray and yellowish brown (2.5Y 7/2 and 10YR 5/4, dry; 2.5Y 5/2 and 10YR 4/4, moist) loam with common dark gray films on ped surfaces and fine white specks. Massive, with coarse pattern of vertical carcks. Friable, plastic, sticky. Moderate patchy clay skins on vertical surfaces and in linings of tubular pores. pH 7.4.

1/ The Denison series is in a fine, montmorillonitic, isomesic family of Pachic Argixerolls. This pedon has slightly less than the 35 percent clay needed for the series.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Pachic Argixeroll, fine-loamy, mixed, thermic
SOIL Lockwood shaley loam SOIL Nos. S65Calif-27-1 LOCATION Monterey County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65482 - 65488

Depth (in.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand (2–1)	Sand (1–0.5)	Sand (0.5–0.25)	Sand (0.25–0.1)	Sand (0.1–0.05)	Silt (0.05–0.02)	Silt Int III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	1/ Coarse fragments > 2 Pct.	1A2a 2 – 19 Pct. of < 2 mm	1A2a 19–76 Pct. of < 76mm
		Pct. of < 2 mm																
0-3	Ap1	33.0	45.8	21.2	4.7	6.0	3.6	6.5	12.2	27.3	18.5	43.2	20.8	0	21			tr.
3-16	Ap2	37.0	43.6	19.4	6.2	6.9	3.9	6.5	13.5	26.4	17.2	43.6	23.5	0	19			tr.
16-26	A13	34.8	44.6	20.6	4.2	6.0	3.8	6.1	14.7	28.2	16.4	46.4	20.1	0	21			1
26-40	A14	35.8	44.6	19.6	4.8	6.0	3.7	6.3	15.0	29.0	15.6	47.7	20.8	0	20			12
40-57	B21t	55.2	26.7	18.1	17.0	13.2	5.8	8.3	10.9	14.5	12.2	29.6	44.3	0	18			24
57-82	B22t	56.8	18.7	24.5	15.9	14.8	6.6	9.5	10.0	9.1	9.6	23.9	46.8	0	25			26
82+	IIC	30.0	41.5	28.5	3.4	4.0	2.4	6.5	13.7	23.0	18.5	40.7	16.3	0	29			0

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. Iron as Fe Pct.	6E1b Carbonate as $CaCO_3$ Pct.	Bulk density 4A1f 1/3 bar g/cc	Bulk density 4A1h Oven dry g/cc		3B2 Cm Pct.	Water content 4B1c 1/3 bar Pct.	Water content 4B2 15 bar Pct.	4D1 Extensibility COLEF in./in.	4D1 Extensibility COLE in./in.	pH 8C1a H_2O 1:1		
0-3	2.21	0.211	10		-						19.5			4.9		
3-16	1.48	0.078	19		-	1.17	1.20		1.00	30.0	19.8	0.008	0.008	5.5		
16-26	0.79				-	1.11	1.14		1.00	31.5	19.0	0.009	0.009	6.8		
26-40	0.62				-	1.11	1.14		1.00	31.2	18.7	0.010	0.010	7.2		
40-57	0.21				-	1.18	1.23		1.00	34.4	28.6	0.013	0.013	7.0		
57-82	0.21				-	1.14	1.17		1.00	38.0	32.8	0.009	0.009	6.9		
82+	0.19				-	1.08	1.14		1.00	41.2	26.2	0.018	0.018	6.8		

Depth (in.)	Extractable bases 5B1a 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity 5A1a NH_4OAc	5A3a Sum		6G1d KCl Ext. Al^{+++}	Atterberg limits Plastic limit	Liquid limit	Plastic index	5D2 Exch. Na		Base saturation 5C1 NH_4OAc Pct	Pct.
	meq/100 g										Pct. of <0.4 mm			Pct.			
0-3	13.2	4.0	0.5	1.4	19.1		20.7									92	
3-16	12.3	4.8	0.7	1.4	19.2		18.8									100+	
16-26	12.5	4.6	0.8	1.0	18.9		17.8				26	32	6			100+	
26-40	11.8	4.8	1.1	0.5	18.2		17.8							6		100+	
40-57	10.7	5.7	1.9	0.3	18.6		18.4				28	40	12	10		100+	
57-82	11.2	7.5	2.8	0.4	21.9		23.3							12		94	
82+	12.0	7.5	1.9	0.3	21.7		22.0							9		99	

Depth (in.)	Clay mineralogy (<0.002 mm) 7A Mont.	Verm.	Mica	Kaolin	X-ray

1/ Apparent coarse fragments dispersed readily. Hence the <19 mm. material was ground whole and included in the characterization sample. All chemical and physical data are on <19 mm. basis. The 19-76 mm. fraction was determined from field weights.

LOCKWOOD SHALY LOAM
S65Calif-27-1

Location: Monterey County, California, 100 feet SW, 50 feet NW, from corner of Teague and Central Avenue, about 7 miles NW of King City. Date of Sampling: May 17, 1965. Description by: Lewis C. Leifer. Collectors: W. D. Nettleton, B. R. Brasher, C. J. Weisel, R. D. Waggoner, F. J. Pecarich. Site selection by T. D. Cook. Classification: Pachic Argixeroll, fine-loamy, mixed, thermic. (minimal) Brunizem. Vegetation: Mature walnut orchard, cultivated. Climate: Precipitation 12 inches, mean annual temperature 59°F., January mean 50°F., July mean 65°F. Parent Material: Alluvium. Almost wholly from diatomaceous (Monterey) shale. Topography: Gently sloping smooth fan, slightly over 1 percent slope. Elevation: 400 feet. Drainage: Well drained, moderately slow permeability, medium runoff. Soil Moisture: Moist (field capacity) throughout below 3 inches.
Remarks: Field determination of pH by Hellige-Truog triplex indicator. Paired site sample number is S65Calif-27-2-1 through 7. Soils are marginally shaly and probably perform on moisture relations as non-shaly soils to a depth of 26 inches. Asterisks indicate horizons sampled for California Division of Highways.

HORIZON	DESCRIPTION
Ap1 RSL 65482	0 to 3 inches, gray (10YR 5/1) shaly loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine interstitial pores; very strongly acid (pH 5.0); A horizons contain about 10 to 15 percent by volume of fine gravel-size shale fragments, low surface pH due to amendments or pesticides, low pH temporary; abrupt smooth boundary.
Ap2 RSL 65483	3 to 16 inches, gray (10YR 5/1) shaly loam, very dark brown (10YR 2/2) moist; weak very coarse angular blocky crushing to moderate medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and plentiful fine roots; common very fine interstitial and very few fine tubular pores; slightly acid (pH 6.5); horizon strongly compacted due to tillage; gradual smooth boundary.
*A13 RSL 65484	16 to 26 inches, gray (10YR 5/1) shaly loam, very dark brown (10YR 2/2) moist; strong medium granular structure; slightly hard toward soft, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine interstitial, common fine and medium tubular pores; neutral (pH 7.0); gradual smooth boundary.
A14 RSL 65485	26 to 40 inches, gray (10YR 5/1) heavy shaly loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; soft, very friable, slightly sticky and slightly plastic; few fine and medium roots; many very fine interstitial and common fine tubular pores due to worms; neutral (pH 7.0); 12 percent by weight shale fragments 3/4 to 3 inches in diameter excluded from sample going to Riverside laboratory; clear irregular boundary.
*B21t RSL 65486	40 to 57 inches, brown (10YR 5/3) shaly clay loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, sticky and plastic; no roots; many very fine interstitial pores; continuous thin clay films in bridges and few moderately thick films; mildly alkaline (pH 7.5); suggestion of 1/2 inch thick dark brown horizontal clay bands; gradual wavy boundary.
B22t RSL 65487	57 to 82 inches, brown (10YR 5/3) shaly clay loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, sticky and plastic; many very fine interstitial pores; continuous thin clay films in bridges and few moderately thick films; mildly alkaline (pH 7.5); suggestion of clay bands as above; clear smooth boundary.
IIC RSL 65488	82 inches, pale brown (10YR 6/3) heavy loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few thin clay films in pores; mildly alkaline (pH 7.5).

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Pachic Argixeroll, fine-loamy, mixed, thermic
SOIL Lockwood shaly loam SOIL Nos. S65Calif-27-2 LOCATION Monterey County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65489 - 65497

Depth (in.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand Very coarse (2–1)	Sand Coarse (1–0.5)	Sand Medium (0.5–0.25)	Sand Fine (0.25–0.1)	Sand Very fine (0.1–0.05)	Silt 0.05–0.02	Silt Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)		1/ Coarse fragments 1A2a > 2	2 – 19	19 – 76
		Pct. of < 2 mm													Pct.	Pct. of < 76mm	
0-4	Ap1	39.8	41.1	19.1	6.7	8.6	4.7	8.3	11.5	25.4	15.7	41.4	28.3	0	19		tr.
4-13	Ap2	33.7	43.7	22.6	5.6	7.6	4.0	6.2	10.3	25.8	17.9	39.6	23.4	0	23		tr.
13-34	A13	35.4	43.4	21.2	6.6	8.5	4.0	6.3	10.0	25.2	18.2	38.8	25.4	0	21		4
34-47	A3	46.3	33.7	20.0	11.0	11.5	5.2	8.1	10.5	17.0	16.7	31.9	35.8	0	20		20
47-57	B2t	48.6	29.4	22.0	9.6	11.7	5.9	10.0	11.4	13.0	16.4	29.9	37.2	0	22		20
57-71	B3t	24.2	45.0	30.8	4.6	4.1	1.8	4.2	9.5	17.8	27.2	30.0	14.7	0	31		2
71-85	IIC	32.4	42.4	25.2	4.6	4.4	2.7	6.7	14.0	18.9	23.5	37.2	18.4	0	25		7
57-71*	bands	8.8	50.8	40.4	0.2	0.4	0.3	1.8	6.1	15.5	35.3	22.9	2.7	0	40		
57-71**	Inter-bands	25.2	50.1	24.7	0.4	0.8	1.1	7.6	15.3	22.2	27.9	42.7	9.9	0	25		

Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Bulk density 4A1f 1/3 bar	Bulk density 4A1h Oven dry	Bulk density	Water content	Water content 4B1c 1/3 bar	Water content 4B2 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH 8C1a H_2O 1:1		
	Pct	Pct.		Pct.	Pct.	g/cc	g/cc	g/cc	Pct.	Pct.	Pct.	in./in.	in./in.			
0-4	2.25	0.216	10		-						22.2			5.5		
4-13	1.15	0.116	10		-						23.8			6.5		
13-34	0.79				-						25.5			7.4		
34-47	0.35				-						31.0			7.5		
47-57	0.23				-						33.9			7.1		
57-71	0.15				-						31.4			7.1		
71-85	0.22				-						30.2			7.0		
57-71*	bands										34.6			6.9		
57-71**	Inter-bands										28.1			7.1		

Depth (in.)	Extractable bases 5B1a 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity 5A1a NH_4OAc	5A3a Sum		6G1d KCl Ext. Al^{+++}				5D2 Exch. Na		Base saturation 5C1 NH_4OAc	
	meq/100 g													Pct.		Pct.	Pct.
0-4	12.9	4.4	0.5	1.7	19.5		21.5									91	
4-13	17.2	6.3	1.0	0.6	25.1		23.7									100+	
13-34	15.0	6.1	1.5	0.4	23.0		22.9							7		100	
34-47	12.4	6.7	2.1	0.3	21.5		21.0							10		100+	
47-57	11.9	8.6	2.5	0.3	23.3	4.0	20.9							12		100+	
57-71	13.1	9.2	2.1	0.3	24.7		24.2							9		100+	
71-85	11.7	8.2	2.1	0.2	22.2		22.8							9		97	
57-71*	bands																
57-71**	Inter-bands																

Depth (in.)	Clay mineralogy (<0.002 mm) 7A Mont.	Verm.	Mica	Kao-Hn	X-amorphous
	X-ray				
0-4	t		xx	t	xx
4-13					
13-34					
34-47					
47-57	xx		x	t	xx
57-71					
71-85	xx		x	t	xx
57-71*	xx		x	t	xx
57-71**	bands Inter-bands				

1/ Apparent coarse fragments dispersed readily. Hence the <19 mm. material was ground whole and included in the characterization sample. All chemical and physical data are on <19 mm. basis. The 19-76 mm. fraction was determined from field weights.

* Bands of B3t horizon.

** Interband material within the B3t horizon.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

LOCKWOOD SHALY LOAM
S65Calif-27-2

Location: Monterey County, California, .6 mile northwest, .45 mile southwest from Central Avenue and Hobson Avenue, NW of King City, 8th row NW, 5½ rows NE in walnut grove from SW corner of grove. Date of Sampling: May 17, 1965.
Description by: Lewis C. Leifer. Collectors: W. D. Nettleton and B. R. Brasher, C. J. Weisel, R. D. Waggoner, F. J. Pecarich. Site selection by T. D. Cook.
Classification: **Pachic Argixeroll, fine-loamy, mixed, thermic. (minimal) Brunizem.**
Vegetation: Mature irrigated walnut grove in fallow condition. Climate: Precipitation is 12 inches, mean annual temperature 59°F., January mean 50°F., July mean 65°F. Parent Material: Alluvium. Almost wholly from diatomaceous (Monterey) shale. Topography: Gently sloping smooth fan, slightly over 1 percent slope. Elevation: 525 feet. Drainage: Well drained; **moderately slow permeability; medium runoff.** Soil Moisture: Moist throughout (field capacity).
Remarks: Field pH by Truog Kit. Matched profile S65Calif-27-1-1 through 7. This site slightly more shaly than first profile and not quite 1 value darker. Low pH of Ap1 due to fertilizer or amendments, probably temporary; pH was 6.5 to 7.0 a few weeks before sampling.

HORIZON	DESCRIPTION
Ap1 RSL 65489	0 to 4 inches, dark gray (10YR 4/1) shaly heavy loam, very dark brown (10YR 2/2) moist; weak medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; abundant very fine roots; many very fine interstitial pores; very strongly acid (pH 5.0); about 25 percent by volume fine gravel shale fragments; clear smooth boundary.
Ap2 RSL 65490	4 to 13 inches, dark gray (10YR 4/1) shaly heavy loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; hard, friable, slightly sticky and slightly plastic; many very fine interstitial and few fine and few medium tubular pores; slightly acid (pH 6.5); clear smooth boundary.
A13 RSL 65491	13 to 34 inches, dark gray (10YR 4/1) shaly heavy loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; hard, friable, slightly sticky and slightly plastic; few very fine and few medium roots; many very fine interstitial pores, common fine and few medium tubular pores; slightly acid (pH 6.5); gradual smooth boundary.
A3 RSL 65492	34 to 47 inches, grayish brown (10YR 5/2) gravelly light clay loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; slightly hard, slightly sticky and slightly plastic; very few very fine roots; many very fine interstitial pores, common very fine tubular pores; few thin clay films in tubular pores; moderately alkaline (pH 8.0), noncalcareous; A3, B2t, and B3t horizons have large irregular pockets,due to gophers, filled with A soil material; clear wavy boundary.
B2t RSL 65493	47 to 57 inches, very pale brown (10YR 7/3) gravelly light clay loam, dark brown (10YR 4/3) moist; massive; slightly hard, friable, sticky and plastic; no roots; common very fine interstitial and few very fine tubular pores; continuous thin and moderately thick clay films in pores in bands; moderately alkaline (pH 8.0), noncalcareous; contains 3 clay bands 1/2 inch thick 5 inches apart, (7.5YR 3/2m); clear smooth boundary.
B3t RSL 65494	57 to 71 inches, very pale brown (10YR 7/3) gravelly light clay loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, sticky and plastic; common very fine interstitial and common very fine tubular pores; clay films in bands only; moderately alkaline (pH 8.0), noncalcareous; two 1/2 inch bands; clear smooth boundary.
IIC RSL 65495	71 to 85 inches, very pale brown (10YR 7/3) heavy silt loam, brown (10YR 5/3) moist; massive; slightly hard, firm, sticky, slightly plastic; few very fine interstitial and many very fine and common fine tubular pores; few thin clay films on joints and very few thin films in some tubular pores; moderately alkaline (pH 8.0), noncalcareous; 3 weak 1/2 inch clay bands.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Denison clay loam **LOCATION** San Mateo, California

SOIL FAMILY: Pachic Argixeroll, fine, montmorillonitic, isomesic.

SOIL NOS. S55Ca1.41-1 **LAB. NOS.** 5594-55102

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 2/	
0- 5	A_{1p}	4.9	6.3	3.8	8.8	7.9	34.6	33.7	30.9	17.2	1	cl
5-10	A_{12}	4.8	5.7	3.9	9.3	8.2	35.1	33.0	33.2	16.0	2	cl
10-23	B_{21}	2.3	4.5	3.0	6.7	6.0	32.3	45.2	23.1	19.4	1	c
23-34	B_{22}	3.5	5.3	3.5	7.1	6.3	30.8	43.5	24.6	16.8	1	c
34-45	B_3	5.0	6.3	3.6	6.4	6.7	32.3	39.7	26.1	16.8	3	cl
45-52	C_1	2.9	4.3	2.6	5.1	6.8	39.1	39.2	27.9	21.2	1	cl
52-61	C_2	2.1	3.3	2.0	4.1	5.8	45.8	36.9	27.2	27.1	0	sicl
61-70	D_{g1}	13.3	13.3	6.0	10.7	7.7	32.5	16.5	31.7	15.0	5	l
70-77	D_{g2}	5.0	6.6	4.3	8.6	9.2	39.5	26.8	37.8	16.2	2	l

8C1b pH SATURATED PASTE 1:1	8C1a pH 1:5	8C1a pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	8C1a Elec. Conduc. EC×10³ MILLIMHOS PER CM @25°C.	Free Fe_2O_3 Pct. 6C1b	6F1a GYPSUM m.e./100g. SOIL	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
5.8		6.6	3.67	.266	13.8		1.0	0.9				16.4
6.3		7.2	3.42	.260	13.2		0.7	0.8				16.6
6.2		7.3	3.15	.189	16.7		0.7	0.6				21.3
6.5		7.6	2.19	.121	18.1		0.7	0.5				19.6
7.0		8.2	0.48	.030	16.0		0.6	0.6				17.2
7.3		8.5	0.34	.018	18.9		0.5	1.0				17.9
7.5		8.6	0.16	.017			0.5	1.3				18.4
7.3		8.5	0.12	.030			0.7	1.2				11.1
7.2		8.6	0.17	.027			0.6	1.7				13.2

5A2a CATION EXCHANGE CAPACITY	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6Q2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a Ca+Mg	6O1a CO_3+HCO_3 1/	6K1a Cl	8A MOISTURE AT SATURATION
← (Na)	← milliequivalents per 100g. soil →						← milliequivalents per liter →					%
45.8	25.2	12.8	10.1	1.3	0.4	80	3.9	0.1	8.6	1.4	1.9	53.0
44.1	29.5	14.5	7.6	1.5	0.4	86	3.3	0.1	3.6	2.4	1.9	53.5
53.8	30.0	20.3	8.4	1.9	0.3	86	3.7	0.1	3.2	3.7	2.3	67.2
45.4	19.8	19.8	2.8	1.9	0.3	94	3.8	<0.1	2.4	1.4	2.3	63.3
37.3	18.5	16.6	4.9	1.7	0.3	88	3.6	<0.1	1.6	0.6	2.1	59.5
37.7	19.6	17.3	2.8	2.1	0.3	93	3.6	<0.1	1.3	0.7	1.9	61.6
41.2	21.3	17.2	3.5	2.3	0.3	92	3.5	<0.1	1.1	0.7	2.1	60.8
33.2	16.5	11.2	2.4	1.9	0.2	93	4.4	<0.1	1.5	0.6	3.2	40.0
27.8	13.4	9.9	2.7	1.4	0.2	90	4.2	<0.1	1.1	0.4	3.3	42.7

1/ only HCO_3^- found

2/ Percent of whole soil

DENISON CLAY LOAM
S55Calif-41-1

Location: 1/4 mile east of Princeton, 40 feet east of the sea cliff, 1/8 mile SW of junction of Highway 1 and Piose Rd. on east side of Piose Rd., San Mateo County, California. See Sheet 6, Soil Survey Report of San Mateo Area, California, May 1961. Date of Sampling: February 23, 1955.
Description by: W. M. Johnson. Collectors: Reuben Nelson, Ralph Nelson, Richard Wagner, Melvin Mello, and W. M. Johnson.
Classification: Pachic Argixeroll, fine, montmorillonitic, isomesic.
Use: Cultivated; lying fallow at time of sampling. Fields are usually irrigated for some crops. Common crops are Brussels sprouts and artichokes. Climate: Mean annual rainfall is about 25 inches, most of which comes during the months from November through March. June, July, and August are very dry. Fogginess is high in many parts of the year, particularly during summer and fall. Average January temperature is about 48°F, average July temperature, about 60° F. On-shore winds carrying salt spray are common. Parent Material: Alluvium derived from soils and rocks of adjacent hills, mainly from quartz diorite. Alluvium is clay loam or sandy clay loam in texture, rather high in sharp quartz sand. Relief: Smooth, very gently sloping alluvial fan overlying marine terrace. Slope about ½ percent, plane, toward the west. Elevation: About 20 feet. Drainage: Runoff slow. Permeability, slow. Moderately well drained.
Other Features: Entire profile was moist when samples were taken. History of fertilization not known. Reaction: pH's were measured with Truog Triplex indicator.

HORIZON	DESCRIPTION
A1p RSL No. 5594	0 to 5 inches, black (10YR 2/1, dry; 1.5/1, moist) clay loam with common fine white specks (these are quartz grains). Cloddy, due to tillage. Clods break to weak fine granules. Very hard, friable, plastic, sticky. Worms and worm casts are numerous. Roots very numerous. pH 6.0. Abrupt, smooth lower boundary.
A12 RSL No. 5595	5 to 10 inches, black (10YR 2/1, dry; 1.5/1, moist) clay loam. Weak very coarse and coarse prismatic, breaking to weak medium granular. Friable, plastic, sticky. Many earthworms and worm casts. Roots are numerous. pH 6.5. Clear, wavy lower boundary.
B21 RSL No. 5596	10 to 23 inches, black (10YR 2/1, dry; 1.5/1, moist) clay. Strong very coarse prismatic, breaking to weak coarse blocky. Extremely hard, firm, very plastic, very sticky. Moderate continuous clay skins. Contains a very few hard shot concretions 1/8 inch in diameter. Roots moderately numerous. pH 6.3. Clear, wavy lower boundary.
B22 RSL No. 5597	23 to 34 inches, black (10YR 2/1, dry; 1.5/1, moist) clay. Moderate very coarse prismatic, breaking to weak coarse and medium blocky. Moderate continuous clay skins. Contains an occasional hard black shot concretion about 1/8 in diameter. Extremely hard, very firm, very plastic, very sticky. Few roots. Many slickensides. pH 6.3. Clear, irregular lower boundary.
B3 RSL No. 5598	34 to 45 inches, mottled, dark-gray (2.5Y 4/1) and light yellowish-brown (2.5Y 6/3) clay, very dark gray (2.5Y 3/1) and olive brown (2.5Y 4/3) moist, with common fine white specks due to quartz grains. Weak coarse prismatic, breaking to moderate medium blocky. Extremely hard, firm, very plastic, very sticky. Moderate continuous clay skins. Common slickensides. "Tongues" of B2 horizon penetrate this horizon. Very few fine roots. pH 7.0. Clear, wavy lower boundary.
C1 RSL No. 5599	45 to 52 inches, olive-gray (5Y 5.5/3, dry; 4.5/3, moist) with common fine and medium mottles of black, yellowish brown, and white. Heavy clay loam. Weak coarse prismatic, breaking to weak medium fine and very fine blocky. Firm, very plastic, sticky. Moderate continuous clay skins. Very few fine roots. Slickensides common. pH 7.4. Clear, wavy lower boundary.
C2 RSL No. 55100	52 to 61 inches, pale-olive (5Y 6/3, dry; 4.5/3, moist) silty clay loam with few medium mottles of black and common fine mottles of yellowish brown and white. Moderate coarse prismatic, breaking to moderate coarse and medium blocky. Firm, very plastic, sticky. Moderately developed clay skins on vertical surfaces; numerous root holes filled and lined with dark-colored clay. No roots observed. Slickensides common. pH 7.8. Abrupt, smooth lower boundary.
Dg1 RSL No. 55101	61 to 70 inches, light olive-brown (2.5Y 5.5/3, dry; 4/3, moist) loam with few medium black mottles and common fine yellowish-brown and white mottles. Massive, with common, widely spaced vertical cracks. The cracks have prominent dark olive-brown clay skins. Numerous tubular pores lined with dark-colored clay. Friable, plastic, sticky. pH 7.0. Abrupt, smooth lower boundary
Dg2 RSL No. 55102	70 to 77 inches, light yellowish-brown (2.5Y 6/3, dry; 4.5/3, moist) light clay loam with many fine mottles of strong brown, few medium mottles of black, and common fine white specks. Massive, with vertical cracks spaced 6-15 inches apart. Friable, and very plastic, sticky. Numerous tubular pores from 1/8 to 3/8 inch in diameter with dark-colored clay linings. pH 7.0.

OIL SURVEY LABORATORY Riverside, California

SOIL TYPE Lobitos silt loam (taxadjunct) **LOCATION** San Mateo County, California

SOIL FAMILY: Pachic Ultic Argixeroll, fine, montmorillonitic, mesic.

SOIL NOS. S55Ca1. 41-14 **LAB. NOS.** 55399-55403

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		1B1b VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0- 8	A_{11}	0.2	2.0	5.8	11.5	5.8	38.7	36.0	27.2	21.9	4	cl
8-15	A_{12}	0.1	1.9	5.3	10.7	4.9	39.2	37.9	25.7	22.7	16	cl
15-28	B_2	0.7	2.1	2.9	5.7	3.7	42.9	42.0	19.2	30.2	52	sic
28-36	C_2	0.7	2.5	2.0	3.9	3.8	52.4	34.7	12.8	45.7	57	sicl
36+	D_r	not analyzed										

pH			ORGANIC MATTER				ELECTRICAL CONDUCTIVITY			MOISTURE TENSIONS		
8C1b SATURATED PASTE 1:1	8C1a 1:5	8C1a 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	EC×10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
5.8		6.4	3.84	.310	12.4							17.6
5.7		6.4	2.42	.231	10.5							19.9
5.4		6.4	1.01	.112	9.0							26.3
5.3		6.3	0.69	.099	7.0							28.2

5A2a	EXTRACTABLE CATIONS 5B					BASE SAT. %	SATURATION EXTRACT SOLUBLE			
CATION EXCHANGE CAPACITY (Na)	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Na 6P2a	K 6Q2a	5C3	Na	K		MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →			
36.3	19.9	10.0	11.5	0.8	0.8	73.2				
37.0	19.6	13.1	10.6	0 8	0.5	76.2				
44.8	27.0	14.5	9.7	1.0	0.6	81.6				
47.4	22.5	17.0	9.8	1.3	0.6	80.9				
				not analysed						

1/ Percent of the whole soil

LOBITOS SILT LOAM (taxadjunct) 1/
S55Calif-41-14

Location: San Mateo County, California, San Mateo County SCD, 1/4 mile southeast of Lobitos. Date of Sampling: May 20, 1955.
Description by: Ralph E. Nelson. Collectors: Reuben E. Nelson, Ralph E. Nelson, Rudolph Ulrich, R. J. Wagner.
Classification: Pachic Ultic Argixeroll, fine, montmorillonitic, mesic.
Vegetation: Annual grasses, poison oak, wild blackberries, ferns and miscellaneous forbs. Climate: 25 to 40 inches rainfall. Parent Material: Silty sandstone or shale of the Purisima formation. Relief: Rolling hills to mountainous. Sample site located on 30 percent slope, slightly convex, toward northeast.
Elevation: 320 feet. Drainage: Runoff rapid; internal drainage moderate.
Remarks: Many worms down to 15 inches.

HORIZON		DESCRIPTION
S55 Calif-41-14-1		
A_{11}	0- 8"	Very dark grayish brown to very dark gray (10YR 3/2-3/1, very dark brown to almost black 10YR 2/2-2/1 moist) silt loam. Moderate medium and fine subangular blocky. Hard, friable, slightly plastic and very slightly sticky. There are numerous rock fragments scattered throughout the profile. There are abundant worm casts and roots. The reaction is 6.4. The lower boundary is clear and smooth.
S55 Calif-41-14-2		
A_{12}	8-15"	Very dark grayish brown to very dark gray (10YR 3/2-3/1, very dark brown to almost black 10YR 2/2-2/1 moist) silt loam. Moderate medium to fine subangular blocky. Hard, friable, slightly plastic and very slightly sticky. There are many worm casts, abundant roots and many rock fragments in this horizon. The reaction is 6.4. The lower boundary is clear and wavy.
S55 Calif-41-14-3		
B_2	15-28"	Light olive brown (2.5Y 5/4, olive brown and dark grayish brown 2.5Y 4/4-4/2 moist) gravelly silty clay loam. The gravel consists of angular rock fragments. Moderate fine subangular blocky. Hard, firm, plastic and slightly sticky. There are thin patchy clay skins of very dark grayish brown (2.5Y 3/2). Many rock fragments and some roots. The reaction is 6.2. The lower boundary is clear and wavy.
S55 Calif-41-14-4		
C_2	28-36"	Distinctly mottled light olive brown, olive yellow, and light brownish gray (2.5Y 5/4-6/6 and 6/2, very dark grayish brown 2.5Y 3/2 moist) light clay loam. Massive. Hard, firm, slightly plastic and very slightly sticky. There are occasional roots down the rock faces and the rock is a grayish brown (2.5Y 5/2) with fine yellowish brown (10YR 5/6-5/8) iron spots. The reaction is 6.0. The lower boundary is clear and wavy.
S55 Calif-41-14-5		
Dr (shattered)	36"+	Light olive brown, coarsely angular, slightly weathered fragments of silty Purisima sandstone or shale and some loosened soil material. Many feet thick.

1/ The Lobitos series is in a fine-loamy, mixed, mesic family of Typic Argixerolls. This pedon has a thick (greater than 20 inches) mollic epipedon that has a base saturation of less than 75 percent and an argillic horizon with more than 35 percent clay.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Supan cobbly gravelly loam (taxadjunct) **LOCATION** Amador County, California

SOIL FAMILY: Ultic Argixeroll, loamy-skeletal, mixed, mesic.

SOIL NOS. S 59Calif-3-1 **LAB. NOS.** 59265 - 59270

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0-3	A_{11}	1.2	4.2	4.2	10.5	8.0	48.6	23.3	31.0	32.0	16	1
3-11	A_{12}	0.8	3.5	3.8	10.6	8.1	49.1	24.1	42.6	21.4	10	1-sil
11-18	B_1	0.8	3.3	3.4	9.0	7.5	43.9	32.1	28.1	29.0	17	cl
18-37	B_{21}	0.8	4.1	4.2	9.1	7.2	38.5	36.1	26.1	25.2	20	cl
37-49	B_{22}	1.0	7.1	5.7	11.6	7.9	38.2	28.5	27.2	25.8	9	cl
49-68	R	not analysed										

pH			ORGANIC MATTER			6C1b	ELECTRICAL CONDUCTIVITY			MOISTURE TENSIONS		
8C1a H_2O	8C1c KCl		6A1a ORGANIC CARBON	6B1a NITROGEN	C/N	"Free" Fe_2O_3	EC x 10^3 MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent	GYPSUM mm./100g. SOIL	1/10 ATMOS.	1/3 ATMOS.	4B2 15 ATMOS.
1:1	1:1		%	%		%		%		%	%	%
6.6	5.7		4.26	0.269	15.8	4.4						15.6
6.0	4.9		1.66	0.139	11.9	4.9						13.3
5.9	4.8		0.63	0.060	10.5	5.4						15.5
5.8	4.9		0.43	0.048	9.0	5.4						17.2
6.0	4.8		0.22	0.034		5.1						17.4

5A2a	EXTRACTABLE CATIONS 5B1a					BASE SAT. %	SATURATION EXTRACT SOLUBLE		MOISTURE AT SATURATION
CATION EXCHANGE CAPACITY	6N2b	6O2c	6H2a	6P2a	6Q2a	5C3			
← Na →	Ca	Mg	H	Na	K		Na	K	
	milliequivalents per 100g. soil →						← milliequivalents per liter →		%
30.1	17.7	3.4	7.8	<0.1	2.2	75			
21.4	11.3	2.4	5.7	<0.1	2.1	74			
24.3	8.7	2.7	12.1	0.2	0.1	49			
21.3	8.1	3.7	9.7	<0.1	0.8	57			
21.7	7.4	5.3	8.2	<0.1	0.8	62			

1/ Percent of the whole soil

SUPAN COBBLY GRAVELLY LOAM (taxadjunct) 1/
S59 Calif-3-1

Collectors: Grant Kennedy, Reuben Nelson, Bob Sketchley, John Rogers.
Date of Sampling: June 15, 1959. Description by: Grant Kennedy.
Location: Amador County, California, near the County Airport, 200 feet E. of Highway 49, and 50 feet south of Access Road, in the SW1/4 of the NW1/4 of Section 17, T6N, R11E.
Elevation: 1,660 feet.
Relief: Nearly level ridgetop with steep sloping sides, slope 1 percent to SW.
Drainage: Well drained; slow runoff; moderately slowly permeable subsoils
Parent Material: Andesitic conglomerate of the Mehrten formation.
Biological Activity: Earthworms and burrowing rodents are active.
Climate: Mean annual rainfall 28 inches.
Vegetation: Annual grasses, forbs, a few oaks including filaree, clovers, wild radish, live oak.
Remarks: Medial developed Brunizem. The soil is relatively inextensive and was not sampled for the Bureau of Public Roads. Below about 11 inches about 50 percent of the mass consists of rounded cobbles and stones.
Classification: Ultic Argixeroll, loamy-skeletal, mixed, mesic.

HORIZON		DESCRIPTION
A_{11}	0-3"	Reddish brown (5YR 4/3) cobbly gravelly loam, dark reddish brown (5YR 2/2) when moist; moderate, medium and fine granular structure; soft when dry, friable when moist, nonsticky and slightly plastic when wet; abundant very fine and fine roots; many very fine and fine pores; few fine shot; neutral, pH 6.6; clear, smooth lower boundary.
A_{12}	3-11"	Reddish brown (5YR 4/3) heavy loam, dark reddish brown (5YR 2/3) when moist; massive; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; abundant very fine and fine roots; many very fine and fine pores; few fine shot; medium acid, pH 6.0; clear, wavy lower boundary.
B_1	11-18"	Reddish brown (5YR 4/4) gravelly clay loam, dark reddish brown (2.5YR 3/4) when moist; massive; hard when dry, friable when moist, slightly sticky and slightly plastic when wet; plentiful very fine and fine roots; many very fine, fine and few medium pores; few fine shot; common thin discontinuous clay films in pores; medium acid, pH 5.9; clear, wavy lower boundary.
B_{21}	18-37"	Reddish brown (5YR 4/4) gravelly clay loam, dark reddish brown (2.5YR 3/4) when moist; massive; hard when dry, firm to friable when moist, slightly sticky and plastic when wet; plentiful very fine and fine roots; common very fine and fine pores; thin continuous clay films in pores; medium acid, pH 5.8; gradual, wavy lower boundary.
B_{22}	37-49"	Reddish brown (5YR 4/4) slightly gritty clay loam, dark reddish brown (2.5YR 3/4) when moist; massive; hard when dry, friable to firm when moist, slightly sticky and plastic when wet; few very fine and fine roots; common very fine and fine pores; thin continuous clay films in pores; medium acid, pH 6.0; clear, wavy lower boundary.
R	49-68"	Pale brown (10YR 6/3) loamy sand (crushed), yellowish brown (10YR 5/4) when moist; massive; extremely hard when dry, brittle when moist; consolidated sandstone containing rounded andesitic cobbles; few fine pores; new clay films along fracture planes; medium acid, pH 6.0.

1/ The Supan series is a member of the fine-loamy, mixed, mesic family of Pachic Argixerolls. This pedon has slightly less than 75 percent base saturation in parts of the upper 30 inches, the mollic epipedon is less than 20 inches thick, and the argillic horizon has somewhat more than 35 percent rock fragments

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Supan cobbly loam (taxadjunct) **LOCATION** Amador County, California

SOIL FAMILY: Ultic Argixeroll, loamy-skeletal, mixed, thermic

SOIL NOS. S59Calif-3-2 **LAB. NOS.** 59271 - 59277

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 >2 1/	TEXTURAL CLASS
0-8	A_1	0.7	2.3	2.8	9.0	7.9	49.6	27.7	30.9	32.3	11	sil cl-l-
8-16	B_{11}	0.8	2.0	2.6	8.6	7.9	47.1	31.0	29.5	31.4	9	cl
16-22	B_{12}	0.6	2.1	2.8	8.7	8.0	45.1	32.7	29.2	29.7	17	cl
22-38	B_2	0.6	2.9	3.4	9.4	7.7	39.2	36.8	26.9	26.0	14	cl
38-58	B_{31}	1.7	11.7	9.2	15.3	8.8	28.8	24.5	28.2	18.1	13	l-scl
58-70	B_{32}	1.1	9.5	8.1	13.0	8.0	35.2	25.1	27.1	23.6	30	l
70-75	R	3.2	19.1	12.8	13.5	7.3	27.5	16.6	24.4	17.9	58	sl

DEPTH INCHES	8C1a pH H_2O 1:1	8C1c pH KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6C1b "Free" Fe_2O_3 %	ELECTRICAL CONDUCTIVITY EC x 10^3 MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
0-8	6.3	5.3	2.50	0.215	11.6	4.7						14.8
8-16	6.5	5.5	1.23	0.113	10.9	5.0						15.0
16-22	6.8	5.7	1.00	0.092	10.9	5.0						15.8
22-38	7.3	6.3	0.38	0.052	7.3	5.1						18.4
38-58	7.5	6.6	0.25	0.035	7.1	3.8						19.5
58-70	7.2	6.2	0.18			4.1						18.0
70-75	6.9	5.6	0.07			2.4						16.6

DEPTH INCHES	5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K	5B1a BASE SAT. % 5C3	Clay mineralogy (<0.002 mm.) Mont.	Verm.	Mixed layer Mica-Verm.	Mica	% Kaolin DTA 7A3	% Gibb. DTA 7A3
		milliequivalents per 100g. soil ⟶						⟵	X-ray 7A2		⟶		
0-8	26.0	16.3	2.0	7.9	<0.1	1.2	71						
8-16	24.3	15.8	1.5	6.2	<0.1	1.1	75						
16-22	23.4	15.6	1.5	5.0	<0.1	1.0	78						
22-38	23.4	15.4	1.6	3.5	0.1	1.6	84	x	-	-	x	35	-
38-58	25.9	15.3	3.5	2.8	<0.1	2.4	88						
58-70	25.5	11.1	7.0	3.4	<0.1	1.9	86	x	-	-	-	35	-
70-75	23.0	8.8	9.1	3.1	0.3	0.7	85						

1/ Percent of the whole soil

-	=	looked for but not found
tr	=	detected, very small amounts
x	=	detected, small amounts
xx	=	moderate amounts
xxx	=	large amounts
xxxx	=	predominant amounts

SUPAN COBBLY LOAM (taxadjunct) 1/
S59Calif-3-2

Collectors: Grant Kennedy, Reuben Nelson, Bob Sketchley, John Rogers.
Date of Sampling: June 15, 1959. Description by: Grant Kennedy.
Location: Amador County, California, on the Cazazzas property, along Highway 88, 100 feet north of the highway in the NE1/4 of the NW1/4 of Section 26, T6N, R10E.
Classification: Ultic Argixeroll, loamy-skeletal, mixed, thermic.
Elevation: 1,200 feet.
Relief: On a gently sloping, broad ridgetop having a 3 percent slope to the SW.
Drainage: Well drained, slow runoff; moderately slow permeability.
Parent Material: Andesitic conglomerate of the Mehrten formation.
Biological Activity: Burrowing rodents and earthworms have been active in these soils, particularly in the upper 2 feet where many krotovinas are present.
Climate: Mean annual rainfall about 25 inches.
Vegetation: Annual grasses, oak, and forbs including filaree, bur clover, soft chess and ripgut.
Remarks: This is a Reddish Brunizem near the Noncalcic Brown soil zone. This soil may have been cultivated at one time. It appears that some of the cobbles above the B_2 may have been removed. The profile contains about 20 to 30 percent cobbles.

HORIZON		DESCRIPTION
A_1	0-8"	Reddish brown (5YR 4/3) loam, dark reddish brown (5YR 3/2) when moist; moderate fine granular structure in top 2 inches, massive below; soft when dry, friable when moist, nonsticky and nonplastic when wet; abundant very fine roots in top 2 inches, plentiful below; many very fine pores; slightly acid, pH 6.3; clear, smooth lower boundary.
B_{11}	8-16"	Reddish brown (5YR 4/3) clay loam, dark reddish brown (5YR 3/2) when moist; massive between krotovinas, strong fine granular within them; soft when dry, friable when moist, nonsticky and slightly plastic when wet; plentiful fine and very fine roots; many very fine and fine, few medium pores; thin, discontinuous clay films in most pores; slightly acid, pH 6.5; gradual, wavy lower boundary.
B_{12}	16-22"	Reddish brown (5YR 4/3) cobbly gravelly clay loam, dark reddish brown (5YR 3/4) when moist; massive; slightly hard when dry, friable when moist, nonsticky and slightly plastic when wet; plentiful very fine and fine roots; many very fine and fine, few medium pores; clay films thin and nearly continuous in pores; neutral, pH 6.8; clear, wavy lower boundary.
B_2	22-38"	Reddish brown (5YR 4/4) cobbly clay loam, dark reddish brown (2.5YR 3/4) when moist; massive; hard when dry, firm when moist, slightly sticky and plastic when wet; plentiful very fine and fine roots; common very fine and fine, few medium pores; moderately thick, continuous clay films in pores and bridges; neutral, pH 7.3; gradual, wavy lower boundary.
B_{31}	38-58"	Reddish brown (5YR 4/4) cobbly sandy clay loam, dark reddish brown (2.5YR 3/4) when moist; massive; slightly hard when dry, friable when moist, slightly sticky and plastic when wet; few very fine and fine roots; common very fine and fine pores; thin discontinuous clay films in pores, colloid mainly in bridges; about 40 to 50 percent of the mass is cobbles over an inch in diameter; mildly alkaline, pH 7.5; gradual, wavy lower boundary.
B_{32}	58-70"	Reddish brown (5YR 5/4) cobbly gravelly loam with yellowish red (5YR 4/6) coatings, reddish brown (2.5YR 4/4) with dark reddish brown (2.5YR 3/4) coatings; massive; very hard when dry, firm when moist, nonsticky and slightly plastic when wet; neutral, pH 7.2; otherwise similar to the above horizon; gradual, wavy lower boundary.
R	70-75"	Weathered massive conglomerate, the andesitic cobbles becoming less weathered and darker with depth; neutral, pH 6.9.

1/ The Supan series is in a fine-loamy, mixed, mesic family of Pachic Argixerolls. This pedon has a mollic epipedon with a base saturation of less than 75 percent in the upper part that is less than 20 inches thick and has more than 35 percent rock fragments.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Kitchen Creek sandy loam **LOCATION** San Diego County, California

SOIL FAMILY: Ultic Argixeroll, coarse-loamy, mixed, mesic.

SOIL NOS. S60Calif-37-1 **LAB. NOS.** 60391 - 60397

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0- 3	A11	16.2	16.0	8.5	18.9	13.4	20.1	6.9	37.2	8.0	23	cosl
3-12	A12	15.7	18.1	9.2	18.0	12.1	19.4	7.5	33.5	8.8	22	cosl
12-19	B21t	15.3	18.6	9.5	19.1	11.1	17.1	9.3	31.9	7.4	24	cosl
19-34	B22t	9.7	16.3	8.0	20.4	13.8	20.6	11.2	38.8	8.0	20	cosl
34-48	B3	12.6	21.8	10.5	21.0	11.1	15.2	7.8	32.7	6.1	21	cosl-lcos
48-64	C1	25.6	35.8	11.4	12.1	2.8	4.7	7.6	11.0	2.1	14	lcos-cos
64-72+	C2	14.8	42.5	13.9	12.8	3.1	4.5	8.4	12.0	1.8	21	lcos

pH 8C1a H_2O 1:1	pH 8C1c KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC x 10^3 MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	Free Fe_2O_3 6C1b %	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
6.0	5.4	2.76	0.187	14.8				0.6			6.6
6.1	5.1	1.04	0.071	14.6				0.8			4.3
6.2	4.8	0.31	0.028					0.7			4.2
6.3	4.5	0.20	0.019					0.7			4.6
6.6	4.7	0.11						0.5			3.3
6.9	5.1	0.05						0.5			2.6
7.0	5.4	0.06						0.4			2.3

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	Mg 6O2c	H 6H2a	Na 6P2a	K 6Q2a milliequivalents per 100g. soil →	BASE SAT. % 5C3	Sum of Cations 5A3a me./100g. soil	K milliequivalents per liter →	MOISTURE AT SATURATION %
16.3	11.6	1.5	5.6	0.2	0.4	71	19.3		
11.2	6.5	0.6	3.9	0.2	0.2	66	11.4		
7.3	3.8	1.0	2.0	0.2	0.1	72	7.1		
8.1	5.1	1.6	1.8	0.2	0.1	80	8.8		
5.6	3.3	1.2	1.2	0.2	<0.1	80	5.9		
4.6	2.6	1.0	0.7	0.2	<0.1	84	4.5		
4.1	1.7	0.8	0.6	0.2	<0.1	82	3.3		

1/ Percent of whole soil

KITCHEN CREEK SANDY LOAM
S60Calif-37-1

Description: George Borst and Fred C. Eggers
Date of Sampling: November 8, 1960
Collectors: Reuben Nelson, Lothair Grant, George Borst, and Fred C. Eggers
Location: Approximately 0.15 mile east of southwest corner, sec. 18S, T. 11 S., R. 5 E., S.B.B.M., 75 feet north of Montezuma Valley Road, **San Diego County, Calif.**
Elevation: Approximately 4,100 feet Relief: Gently sloping, 4 percent.
Vegetation: Native chaparral Use: Range
Drainage: Well drained
Parent Material: Granitic alluvium
Climate: This soil occurs under about 17" annual rainfall. The mean annual temperature is about 57°, the mean January temperature about 44°, and the mean July temperature about 73°.
Remarks: The A horizon at this location is relatively thick and erosion is relatively slight, as compared with most soils in this series in San Diego County.
Reaction: pH is determined in the field with a Truog (Hellige) soil reaction kit.
Classification: **Ultic Argixeroll, coarse-loamy, mixed, mesic.**

HORIZON		DESCRIPTION
A11	0- 3"	Dark grayish brown (10YR 4/2) sandy loam, very dark grayish brown (10YR 3/2) when moist; moderate fine crumb structure; soft, very friable, nonsticky and nonplastic; abundant very fine random roots; neutral (pH 7.0); clear smooth boundary.
A12	3-12"	Dark grayish brown (10YR 4/2) sandy loam, very dark grayish brown (10YR 3/2) when moist; weak fine to medium crumb structure; slightly hard, friable, nonsticky and nonplastic; abundant fine random roots; few fine random tubular pores; medium acid (pH 6.0); clear wavy boundary.
B21t	12-19"	Brown (10YR 5/3) coarse sandy loam, dark brown (7.5YR 4/4) when moist; massive; slightly hard, friable, nonsticky and nonplastic; plentiful medium random roots; many fine random tubular pores; colloid in bridges between mineral grains; slightly acid (pH 6.2); gradual smooth boundary.
B22t	19-34"	Brown (10YR 5/3) coarse sandy loam, dark brown (7.5YR 4/4) when moist; massive; very hard, friable, nonsticky and nonplastic; plentiful medium random roots; many fine random tubular pores; colloid in bridges between mineral grains; slightly acid (pH 6.5); gradual smooth boundary.
B3	34-48"	Brown (10Y R 5/3) stratified fine gravelly sandy loam, dark brown (10YR 4/3) when moist; massive; hard, friable, nonsticky and nonplastic; plentiful medium random roots; many fine random tubular pores; colloid in bridges between mineral grains; neutral (pH 6.7); clear wavy boundary.
C1	48-64"	Brown (10YR 5/3) stratified fine gravelly loamy sand, dark brown (10YR 4/3) when moist; massive; slightly hard, very friable, nonsticky and nonplastic; few medium random roots; common fine random pores; colloid in bridges between mineral grains; neutral (pH 6.8); abrupt wavy boundary.
C2	64-72"+	Brown (10YR 5/3) stratified fine gravelly loamy coarse sand, dark brown (10YR 4/3) when moist; massive; soft, very friable, nonsticky and nonplastic; very few medium random roots; few fine random tubular pores; neutral.

SOIL SURVEY LABORATORY Riverside, California

OIL TYPE Kitchen Creek sandy loam **LOCATION** San Diego Co., California

SOIL FAMILY: Ultic Argixeroll, coarse-loamy, mixed, mesic.

SOIL NOS. S60Calif-37-2 **LAB. NOS.** 60398 - 60405

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)							3A1		2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0- 2	A11	10.7	20.8	8.9	20.7	11.7	20.8	6.4	35.4	9.4	15	cosl
2- 7	A12	11.8	18.6	7.6	16.7	10.1	21.4	13.8	32.4	9.1	13	cosl
7-13	B21t	12.7	18.0	6.8	13.6	8.4	22.2	18.3	27.2	11.4	14	cosl
13-32	B22t	12.0	17.7	7.3	16.1	9.7	24.6	12.6	30.4	13.5	16	cosl
32-43	B23t	12.4	18.4	7.1	16.6	10.0	23.4	12.1	30.4	13.1	20	cosl
43-55	B31	12.0	20.5	9.0	18.7	9.8	20.6	9.4	30.0	11.4	24	cosl
55-63	B32	12.8	24.0	9.1	18.7	9.7	18.9	6.8	29.5	9.8	27	cosl
63-73+	C1	18.8	23.6	8.6	16.9	9.4	18.2	4.5	28.1	9.2	25	lcos

pH		ORGANIC MATTER			EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM 25°C.	$CaCO_3$ equivalent	Free Fe_2O_3	MOISTURE TENSIONS		
8C1a H_2O 1:1	8C1c KCl 1:1	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N			%	6C1b %	1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
6.0	5.2	5.47	0.200	27.4				0.7			8.0
6.7	5.6	1.00	0.064	15.6				0.9			5.7
6.5	5.0	0.56	0.044	12.7				1.1			6.7
6.7	4.4	0.17	0.015	[illegible]				0.9			5.9
6.7	4.3	0.10						0.7			5.5
6.7	4.4	0.10						0.7			5.4
6.8	4.4	0.06						0.6			4.2
6.9	4.5	0.04						0.5			3.6

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B1a					BASE SAT. % 5C3	5A3a Sum of Cations					MOISTURE AT SATURATION
	6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K		me./100 g. soil	K				%
	milliequivalents per 100g. soil →							milliequivalents per liter →				
19.0	10.5	1.7	8.3	0.2	0.5	61	21.2					
12.2	6.7	1.6	3.5	0.1	0.5	72	12.4					
13.0	7.2	1.6	3.7	0.2	0.3	72	13.0					
11.1	6.8	1.9	2.4	0.2	0.1	79	11.4					
9.9	5.9	2.2	1.8	0.2	0.1	82	10.2					
8.1	4.9	2.3	1.3	0.2	0.1	85	8.8					
7.4	4.1	2.2	0.9	0.2	0.1	88	7.5					
6.8	3.2	2.2	0.6	0.4	0.1	91	6.5					

1/ Percent of whole soil

KITCHEN CREEK SANDY LOAM
S60Calif-37-2

Description: George Borst and Fred C. Eggers
Date of Sampling: November 8, 1960
Collectors: Reuben Nelson, Lothair Grant, George Borst, and Fred C. Eggers
Location: Approximately 400 feet south-southwest of the center of sec. 13, T. 11 S., R. 4 E., S.B.B.M., about 0.8 mile north of Montezuma Valley Road, San Diego County, California.
Elevation: Approximately 4,100 feet
Relief: Strongly sloping, 10 percent Use: Range Vegetation: Native chaparral
Parent Material: Granitic alluvium Drainage: Well drained
Climate: This soil occurs under about 17" annual rainfall. The mean annual temperature is about 57°; the mean January temperature about 44°, and the mean July temperature about 73°.
Remarks: The A horizon at this location is somewhat thinner and erosion relatively more active than at site S60Calif37-2; these are considered to be representative of the soil as it occurs in San Diego County.
Classification: **Ultic Argixeroll, coarse-loamy, mixed, mesic.**

HORIZON		DESCRIPTION
A11	0- 2"	Brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) when moist; weak fine crumb structure; soft, friable, nonsticky and nonplastic; abundant very fine random roots; slightly acid (pH 6.5); abrupt wavy boundary.
A12	2-7"	Brown (7.5YR 5/4) fine sandy loam, dark brown (7.5YR 3/3) when moist; massive to moderate coarse crumb structure; soft, firm, nonsticky and nonplastic; abundant fine random roots; few fine tubular pores, slightly acid (pH 6.2); clear wavy boundary.
B21t	7-13"	Brown (7.5YR 5/4) loam, dark brown (7.5YR 3/3) when moist; massive; very hard, firm, slightly sticky and slightly plastic; plentiful medium random roots; many fine to medium tubular random pores; colloid in bridges between mineral grains; slightly acid (pH 6.2); gradual smooth boundary.
B22t	13-32"	Brown (10YR 5/3) sandy loam, dark brown (7.5YR 4/4) when moist; massive; very hard, friable, slightly sticky and slightly plastic; few medium random roots; many medium random tubular pores; colloid in bridges between mineral grains; medium acid (pH 6.0); gradual smooth boundary.
B23t	32-43"	Pale brown (10YR 6/3) gravelly sandy loam, dark brown (10YR 4/3) when moist; massive; very hard, friable, slightly sticky and slightly plastic; very few medium random roots; many medium tubular pores; colloid in bridges between mineral grains; medium acid (pH 6.0); gradual smooth boundary.
B31	43-55"	Pale brown (10YR 6/3) gravelly sandy loam, dark brown (10YR 4/3) when moist; massive; hard, friable, slightly sticky and slightly plastic; very few medium random roots; many medium random tubular pores; colloid in bridges between mineral grains; medium acid (pH 6.0); gradual smooth boundary.
B32	55-63"	Pale brown (10YR 6/3) fine gravelly sandy loam, brown (10YR 4/3) when moist; massive; hard, friable, slightly sticky and slightly plastic; very few medium random roots; few fine random tubular pores; colloid in bridges between mineral grains; medium acid (pH 6.0); clear wavy boundary.
C1	63-73"+	Light brownish gray (10YR 6/2) gravelly sandy loam, dark grayish brown (10YR 4/2) when moist; massive; slightly hard, very friable, nonsticky and nonplastic; few medium and coarse random roots; many medium random tubular pores; colloid in bridges between mineral grains; medium acid (pH 6.0).

SOIL SURVEY LABORATORY Riverside, California

Kitchen Creek loamy

SOIL TYPE coarse sand **LOCATION** San Diego County, California

SOIL FAMILY: Ultic Argixeroll, coarse-loamy, mixed, mesic

SOIL NOS. S60Calif-37-4 **LAB. NOS.** 60411 - 60417

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0- 2	A11	18.1	27.7	11.8	16.1	6.4	14.1	5.8	22.3	6.3	33	lcos
2- 9	A12	17.1	23.3	12.1	20.5	8.2	12.7	6.1	26.2	5.9	18	lcos
9-13	A13	12.0	23.0	12.9	21.7	7.8	13.3	9.3	26.0	6.6	16	cosl-lcos
13-24	C1	11.3	24.8	12.0	20.7	7.5	12.1	11.6	24.6	5.9	32	cosl
24-34	C2	13.4	29.5	10.1	18.1	6.9	12.7	9.3	23.1	6.2	26	cosl-lcos
34-41	C3	18.0	35.0	10.6	17.6	5.2	7.9	5.7	19.1	3.1	28	lcos-cos
41-49	C4	12.8	34.8	11.3	20.2	7.0	9.4	4.5	24.2	3.4	33	" "

8C1a H_2O 1:1	8C1c KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	Free Fe_2O_3 6C1b %	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
6.8	6.0	2.95	0.156	18.9				0.5			5.4
7.2	6.2	1.40	0.090	15.6				0.7			4.0
7.2	5.9	0.70	0.051	13.7				0.6			4.4
6.9	5.2	0.26	0.025					0.8			6.0
6.9	4.1	0.28	0.018					0.8			6.1
6.7	4.2	0.18						0.7			4.2
6.5	3.8	0.11						0.6			7.4

5A2a CATION EXCHANGE CAPACITY (+ Na)	EXTRACTABLE CATIONS 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K (milliequivalents per 100g. soil)	5B1a BASE SAT. % 5C3	5A3a Sum of Cations me./100 g. soil	MOISTURE AT SATURATION %
14.5	11.1	1.2	2.9	0.1	0.5	72	15.8	
12.4	9.5	1.3	1.9	0.1	0.2	85	13.0	
12.0	7.6	1.1	1.9	0.1	0.3	83	11.0	
12.9	9.0	1.7	3.0	0.2	0.2	79	14.1	
18.0	13.2	2.6	2.3	0.2	0.1	87	18.4	
12.8	9.1	2.0	1.8	0.2	0.1	86	13.2	
11.4	8.0	2.1	1.5	0.2	<0.1	87	11.8	

1/ Percent of the whole soil

KITCHEN CREEK LOAMY COARSE SAND
S60Calif-37-4

Description: George Borst
Date of Sampling: November 10, 1960
Collectors: Reuben Nelson, Lothair Grant, Fred C. Eggers, John Wachtell, and George Borst
Location: Approximately 1,000 feet southeast of center of sec. 19, T. 11 S., R. 5 E., 800 feet east of private road along center of sec. 19, and 3,400 feet south of Montezuma Valley Road, **San Diego County, California.**
Elevation: 4,000 feet Relief: Strongly sloping, 12 percent
Vegetation: Native chaparral Use: Range
Drainage: Somewhat excessively drained
Parent Material: Deeply weathered granitic rock
Climate: This soil occurs under about 17" annual rainfall. The mean annual temperature is about 57°, the mean January temperature is about 44°, and the mean July temperature about 73°.
Remarks: A layer of angular quartz fragments, 2 to 6 mm. in size, occurs on the surface. This soil has a thicker A horizon and a more prominent B horizon than that sampled as S60Calif37-3. This site is probably more nearly modal for the series.
Classification: Ultic **Argixeroll, coarse-loamy, mixed, mesic.**

HORIZON		DESCRIPTION
A11	0- 2"	Dark gray (10YR 4/1) loamy coarse sand, containing light brownish gray (10YR 6/2) mineral particles, very dark gray (10YR 3/1) and light brownish gray (10YR 6/2) when moist; weak very fine crumb structure; soft, very friable, nonsticky and nonplastic; abundant very fine random roots; neutral (pH 7.0); micaceous; clear smooth boundary.
A12	2- 9"	Dark gray (10YR 4/1) loamy coarse sand, very dark gray (10YR 3/1) when moist; weak fine crumb structure; soft, very friable, nonsticky and nonplastic; abundant fine random roots; neutral (pH 7.0) micaceous; clear smooth boundary.
A13	9-13"	Dark grayish brown (10YR 4/2) loamy coarse sand, very dark grayish brown (10YR 3/2) when moist; massive; slightly hard, friable, nonsticky and nonplastic; plentiful fine random roots; neutral (pH 7.0 micaceous; clear wavy boundary.
C1	13-24"	Brown (10YR 5/3) loamy coarse sand containing dark grayish brown (10YR 4/2) mineral particles, dark brown (10YR 4/3) and very dark grayish brown (10YR 3/2) when moist; massive; hard, friable, nonsticky and nonplastic; few medium to coarse random roots; common fine random tubular pores; few thin clay films in pores and on mineral grains; neutral (pH 6.8); diffuse smooth boundary.
C2	24-34"	Brown (10YR 5/3) loamy coarse sand containing dark grayish brown (10YR 4/2) mineral particles, dark brown (10YR 4/3) and very dark grayish brown (10YR 3/2) when moist; massive; hard, friable, nonsticky and nonplastic; few medium to coarse random roots; common fine random tubular pores; few thin clay films in pores and on mineral grains; neutral (pH 6.8); gradual wavy boundary.
C3	34-41"	Pale brown (10YR 6/3) loamy coarse sand containing brown (10YR 5/3) and dark grayish brown (10YR 4/2) mineral particles, brown (10YR 5/3) dark brown (10YR 4/3), and black (10YR 2/1) when moist; massive; hard, friable, nonsticky and nonplastic; few medium to coarse random roots; few fine random tubular pores; few thin clay films on mineral grains; medium acid (pH 6.0); clear irregular boundary.
C4	41-49"+	Light gray (10YR 7/2), pale brown (10YR 6/3), and dark gray (10YR 4/1) disintegrated granite, light brownish gray (10YR 6/2), dark brown (10YR 4/3), and black (10YR 2/1) when moist; massive; hard, friable, nonsticky and nonplastic; few coarse random roots; medium acid (pH 6.0).

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Kitchen Creek loamy coarse sand **LOCATION** San Diego County, California

SOIL FAMILY: Ultic Argixeroll, coarse-loamy, mixed, mesic.

SOIL NOS. S61Calif-37-4 **LAB. NOS.** 6124 - 6131

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0- 4	A11	11.4	20.2	11.0	25.1	10.9	14.4	7.0	33.6	6.0	16	lcos
4-12	A12	12.3	19.8	10.2	24.8	10.9	14.7	7.3	33.6	6.5	12	lcos-cosl
12-21	A13	10.3	19.2	9.9	25.8	10.6	15.8	8.4	33.2	8.4	13	cosl
21-28	B1	10.0	19.4	8.8	24.5	10.1	18.1	9.1	32.2	10.7	11	cosl
28-42	B2	9.3	16.7	9.1	23.1	9.5	19.3	13.0	31.0	11.1	7	cosl
42-54	B3	11.5	21.1	10.1	22.0	8.5	16.6	10.2	28.2	9.8	9	cosl
54-67	C1	9.7	25.3	12.2	27.3	9.1	13.4	3.0	31.3	7.1	15	lcos
67-73+	C2	17.5	23.6	12.2	24.1	7.6	12.2	2.8	25.4	7.2	12	lcos-s

	pH		ORGANIC MATTER				ELECTRICAL CONDUCTIVITY		Free	MOISTURE TENSIONS		
8C1a H_2O 1:1	8C1c KCl 1:1		6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	EC×10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	Fe_2O_3 6C1b %	1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
6.4	5.5		2.29	0.152	15.1				0.5			4.8
6.3	5.4		1.34	0.091	14.7				0.5			4.0
6.3	5.2		0.55	0.042	13.1				0.6			3.9
6.8	5.1		0.27	0.024					0.5			4.1
6.6	4.6		0.13						0.6			5.8
6.5	4.2		0.11						0.5			5.5
6.5	4.0		0.05						0.5			3.2
6.2	3.8		0.05						0.5			3.0

5A2a	EXTRACTABLE CATIONS				5B1a	BASE SAT. %	Sum of					
CATION EXCHANGE CAPACITY (← Na)	6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K	5C3	Cations me./100g soil 5A3a	K				MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						milliequivalents per liter →					
14.9	9.5	0.6	4.7	0.2	0.3	69	15.3					
11.2	7.7	0.6	2.8	0.1	0.3	76	11.5					
8.9	5.4	0.4	1.9	0.2	0.4	77	8.3					
7.7	4.3	0.5	1.5	0.1	0.2	77	6.6					
8.7	5.6	1.0	2.0	0.2	0.1	77	8.9					
10.3	6.2	1.4	1.6	0.3	0.1	83	9.6					
7.0	3.9	1.1	1.0	0.3	<0.1	84	6.3					
6.1	2.7	1.7	1.0	0.3	0.1	83	5.8					

Sand includes considerable mica

1/ Percent of the whole soil

KITCHEN CREEK LOAMY COARSE SAND
S61Calif-37-4

Description: George Borst
Date of Sampling: January 20, 1961
Collectors: Reuben Nelson, Cliff Henry, and George Borst
Location: Approximately 800 feet southwest of east 1/4 corner, sec. 3, T. 17 S., R. 6 E., in Campo Indian Reservation, San Diego County, Calif.
Elevation: 4,560 feet Relief: Moderately sloping, 5 percent.
Vegetation: Native chaparral Use: Range
Drainage: Well drained
Parent Material: Very deeply weathered granitic rocks
Climate: This soil occurs under an average annual rainfall of about 15", a mean annual temperature of 58°, a mean January temperature of 49°, and a mean July temperature of 74°.
Remarks: This soil occurs on an old, moderately sloping upland plain, which appears to be a remnant of a pre-Pleistocene land surface. Erosion is very slight, the A horizon relatively thick, and the soil very consistent in profile features. This plain is bounded abruptly by steep, eroded slopes and deeply incised barrancas which penetrate almost to the stream divides.
Reaction: pH was determined in the field with a Truog (Hellige) soil reaction kit
Classification: Ultic Argixeroll, coarse-loamy, mixed, mesic.

HORIZON		DESCRIPTION
A11	0- 4"	Dark brown (10YR 3/3) loamy coarse sand, very dark brown (10YR 2/2) when moist; weak fine crumb structure; soft, very friable, non-sticky and nonplastic; abundant very fine vertical roots; many very fine interstitial pores; micaceous; slightly acid (pH 6.5); clear smooth boundary.
A12	4-12"	Dark brown (10YR 3/3) loamy coarse sand, very dark brown (10YR 2/2) when moist; massive; soft, very friable, nonsticky and nonplastic; plentiful fine random roots; slightly acid (pH 6.5); gradual smooth boundary.
A13	12-21"	Dark brown (10YR 4/3) loamy coarse sand, dark brown (10YR 3/3) when moist; massive; slightly hard, friable, nonsticky and non-plastic; few fine random roots; slightly acid (pH 6.5); clear smooth boundary.
B1	21-28"	Light brownish gray (10YR 6/2) sandy loam, brown (10YR 5/3) when moist; massive; hard, friable, nonsticky, slightly plastic; few fine random roots; common fine random pores; colloid in bridges between mineral grains; slightly acid (pH 6.5); clear wavy boundary.
B2	28-42"	Pale brown (10YR 6/3) sandy clay loam, yellowish brown (10YR 5/4) when moist; massive to weak coarse angular blocky structure; very hard, firm, sticky and plastic; few fine random roots; common fine random pores; colloid in bridges between mineral grains; medium acid (pH 6.0); gradual smooth boundary.
B3	42-54"	Very pale brown (10YR 7/3) sandy loam, pale brown (10YR 6/3) when moist; massive; hard, friable, nonsticky and slightly plastic; few fine random roots and fine tubular pores; colloid in bridges between mineral grains; medium acid (pH 6.0); gradual smooth boundary.
C1	54-67"	White (10YR 8/2) decomposed granitic rock, containing very dark-gray (10YR 3/1) mica crystals and very dark grayish brown (10YR 3/2) stains of decaying roots, very pale brown (10YR 7/4) and light yellowish brown (10YR 6/4) when moist; massive; hard, friable, non-sticky and nonplastic; few fine random roots; medium acid (pH 6.0); gradual smooth boundary.
C2	67-73"	White (10YR 8/2) decomposed granitic rock, containing very dark gray (10YR 3/1) mica crystals and very dark grayish brown (10YR 3/2) stains of decaying roots, pale brown (10YR 6/3) when moist; massive; hard, friable, nonsticky and nonplastic; few fine random roots; strongly acid (pH 5.5).

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Felton loam **LOCATION** San Diego County, California

SOIL FAMILY: Ultic Argixeroll, fine-loamy, mixed, mesic.

SOIL NOS. S61Calif-37-1 **LAB. NOS.** 613 - 619

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0- 7	A11	7.2	14.2	9.7	24.2	12.6	20.4	11.7	36.1	11.9	8	sl
7-12	A12	8.7	14.0	8.4	23.7	12.4	19.9	12.9	35.5	11.8	10	sl
12-17	A3	7.1	14.0	8.0	23.7	12.4	21.7	13.1	37.0	11.8	8	sl
17-25	B21	6.5	10.0	6.2	21.7	10.5	22.2	22.9	32.9	13.8	4	scl
25-35	B22	3.7	7.7	5.2	22.4	12.9	25.0	23.1	38.6	14.1	2	scl
35-47	B3	5.5	8.6	6.6	29.6	15.8	20.2	13.7	44.5	10.2	2	fsl
47-60+	C1	12.8	24.2	8.4	23.0	9.8	15.4	6.4	31.2	8.1	4	lcos

pH		ORGANIC MATTER			Atterberg limits			Free Fe_2O_3	MOISTURE TENSIONS		
8C1a H_2O 1:1	8C1c KCl 1:1	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	Plastic limit Pct.	Liquid limit of 0.4 mm.	Plastic index	6C1b %	1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
5.9	5.1	1.85	0.132	14.0	N. P.	-	N. P.	1.6			6.5
5.9	4.9	0.75	0.065	11.5				1.7			6.3
5.8	4.8	0.66	0.059	11.2				1.7			6.4
5.5	4.3	0.29	0.034		22	36	14	1.9			11.5
5.5	4.0	0.21						1.7			13.7
5.4	3.5	0.11			N. P.	-	N. P.	1.1			11.0
5.3	3.6	0.05						0.6			6.1

5A2a CATION EXCHANGE CAPACITY	EXTRACTABLE CATIONS 5B1a					BASE SAT. % 5C3	Sum of Cations me./100g. soil 5A3a					MOISTURE AT SATURATION
	6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K			K				
← Na →	milliequivalents per 100g. soil →							milliequivalents per liter →				%
13.1	6.7	1.2	5.4	0.1	0.5	61	13.9					
10.9	5.0	1.1	3.9	0.2	0.4	63	10.6					
10.5	4.6	1.1	3.5	0.2	0.4	64	9.8					
13.9	6.1	2.7	4.5	0.2	0.4	68	13.9					
20.8	10.5	4.5	5.2	0.2	0.2	75	20.6					
20.1	11.2	4.7	4.9	0.3	0.1	77	21.2					
11.0	4.9	2.1	2.2	0.3	<0.1	77	9.5					

1/ Percent of total soil

All sands have considerable mica.

FELTON LOAM
S61Calif-37-I

Description: George Borst
Date of Sampling: January 17, 1961
Collectors: Reuben Nelson, Cliff Henry, and George Borst
Location: About 1,350 feet southwest of northeast corner sec. 26, T. 13 S., R. 3 E., about 1,000 feet north-northwest of Pine Hills Guard Station, San Diego County, California.
Elevation: 3,700 feet
Relief: Strongly sloping, 16 percent
Use: Woodland range
Vegetation: Open forest, with scattered oak and manzanita
Drainage: Well drained, moderately slow subsoil permeability
Parent Material: Deeply weathered micaceous schist
Climate: This soil occurs under an average annual rainfall of about 38", a mean annual temperature of 53°, a mean January temperature of 39°, and a mean July temperature of 70°.
Remarks: The A horizon of this soil is relatively thick, and erosion relatively slight, as compared with most soils in this series in San Diego County.
Reaction: pH was determined in the field with a Truog (Hellige) soil reaction kit.
Classification: **Ultic Argixeroll, fine-loamy, mixed, mesic.**

HORIZON		DESCRIPTION
A11	0- 7"	Dark brown (10YR 4/3) loam, dark brown (7.5YR 3/2) when moist; weak fine granular structure; soft, friable, nonsticky and slightly plastic; abundant very fine random roots; many fine and very fine tubular pores; highly micaceous; slightly acid (pH 6.5); clear smooth boundary.
A12	7-12"	Dark yellowish brown (10YR 4/4) loam, dark brown (7.5YR 3/2) when moist; weak medium subangular blocky structure; slightly hard, friable nonsticky and slightly plastic; plentiful medium random roots; many medium random tubular pores; highly micaceous; medium acid (pH 6.0); clear smooth boundary.
A3	12-17"	Dark yellowish brown (10YR 4/4) loam, dark brown (7.5YR 3/2) when moist; weak coarse subangular blocky structure; slightly hard, friable nonsticky and slightly plastic; plentiful medium random roots; common medium random tubular pores; highly micaceous; medium acid (pH 6.0); abrupt smooth boundary.
B21	17-25"	Brown (7.5YR 5/4) clay loam, dark brown (7.5YR 4/4) when moist; strong coarse angular blocky structure; hard, firm, slightly sticky and plastic; few medium to coarse random roots; many fine to medium random tubular pores; common moderately thick clay films on ped faces, highly micaceous; medium acid (pH 6.0); clear smooth boundary.
B22	25-35"	Strong brown (7.5YR 5/6) clay loam, dark brown (7.5YR 4/4) when moist; strong coarse angular blocky structure; hard, firm, slightly sticky and plastic; few medium to coarse random roots; common fine to medium random tubular pores; many thick reddish brown (5YR 4/4) clay films on ped faces, dark reddish brown (5YR 3/4) when moist; highly micaceous; medium acid (pH 5.8); clear irregular boundary. This horizon contains numerous inclusions of the underlying material.
B3	35-47"	Strong brown (7.5YR 5/6) clay loam, dark brown (7.5YR 4/4) when moist; strong coarse angular blocky structure; hard, firm, slightly sticky and plastic; few medium random roots; few thick clay films on ped faces; highly micaceous; medium acid (pH 5.8); clear irregular boundary.
C1	47-60"+	Very pale brown (10YR 8/3) and gray (10YR 5/1), weathered, highly micaceous schist of loamy coarse sand texture, brownish yellow (10YR 6/6) and very dark gray (10YR 3/1) when moist: few fine random roots; medium acid (pH 6.0).

OIL SURVEY LABORATORY Riverside, California

SOIL TYPE Chino loam (taxadjunct) **LOCATION** Merced County, California

SOIL FAMILY: Aquic Calcixeroll, fine-loamy, mixed, thermic

SOIL NOS. S55Calif. 24-2 **LAB. NOS.** 55281-288

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0- 6	A_1	0.4	2.0	2.2	12.7	17.6	34.6	30.5	43.8	17.9	1	cl
6-16	B_1	0.5	2.2	1.8	10.8	16.0	31.3	37.4	38.7	16.6	0	cl
16-27	B_{21}	1.2	2.7	2.3	10.0	14.9	34.6	34.3	37.0	19.8	1	cl
27-35	B_{22}	2.8	3.0	2.0	9.3	15.7	34.5	32.7	39.2	17.8	1	cl
35-43	B_{31ca}	3.5	3.0	1.7	7.5	15.1	36.0	33.2	37.4	19.2	2	cl
43-52	B_{32ca}	3.6	3.3	2.0	6.7	9.7	38.8	35.9	30.1	23.1	3	cl
52-60	B_{33ca}	4.3	4.1	3.2	14.4	10.8	34.5	28.7	32.8	22.8	2	cl
60+	C	0.0	0.4	2.7	41.1	23.9	18.8	13.1	67.4	7.1	0	fsl

8C1b pH SATURATED PASTE 1:1	8C1a pH 1:5	8C1a pH 1:10	6A1a ORGANIC MATTER ORGANIC CARBON %	6B1a NITROGEN %	C/N	4A3a Bulk Density g./cc.	6F1a Elec. Conduc. EC x 10³ MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equiv. %	6F1a GYPSUM mm./100g. SOIL	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
7.7		8.5	1.84	0.155	11.9	1.45	2.1	2	0			12.3
8.2		8.9	0.81	0.070	11.6	1.31	21.3	7	2.2			15.5
8.7		9.2	0.42	0.043	9.7	1.60	33.8	11	2.2			15.9
8.4		9.4	0.23	0.028		1.62	15.2	9	<1			15.1
8.3		9.6	0.12	0.018		1.62	5.7	9	<1			15.4
8.3		9.6	0.07	0.015		1.59	3.3	14	0			15.7
8.5		9.7	0.05				2.8	21	<1			12.7
8.2		9.5	0.02			1.83	3.7		<1			7.1

5A2a CATION EXCHANGE CAPACITY (Na)	5B1a Ca 6N2b	5B1a Mg 6Q2c	6H2a H	5B1b Exch. Na 6P2a	5B1b Exch. K 6Q2a	5D1 EXCH. Na %	6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg	6I1a 6J1a HCO_3 + CO_3	6K1a	8A1 8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil						milliequivalents per liter					
27.6	27.0	7.7		1.7	1.0	6.2	12.7	0.3	10.5	0.9	5.1	43.6
26.3	26.1	12.9		10.3	0.6	39.2	225	0.9	62.5	2.9	137.7	52.7
23.4	24.4	12.5		20.5	0.4	87.6	195	1.0	63.3	2.0	184.8	53.2
25.1	21.0	9.0		8.6	0.6	34.3	160	0.5	29.0	1.9	32.9	61.6
22.3	20.3	8.9		10.6	0.5	47.5	46.5	0.1	6.3	3.3	4.3	43.2
27.3	21.7	9.3		8.8	0.5	32.2	29.7	0.1	2.5	3.8	3.0	84.2
21.1	20.5	6.9		7.4	0.3	35.1	25.0	0.1	1.6	4.1	3.3	68.0
14.8	5.9	6.3		3.8	0.1	25.7	31.7	0.2	5.1	3.4	6.2	39.7

1/ Percent of the whole soil

CHINO LOAM (taxadjunct) 1/
855Calif-24-2

Location: Merced County, California in San Luis SCD, 565 feet north of the intersection of State Highway No. 33-152 and Delta Road, 80 feet east of Delta Road, SW1/4 SW1/4 SW1/4, sec. 15, T. 10 S., R. 11 E.
Date of Sampling: April 20, 1955.
Description by: R. C. Huff. Collectors: Ralph E. Nelson, R. C. Huff, Rudolph Ulrich.
Classification: Aquic Calcixeroll, fine-loamy, mixed, thermic.
Vegetation: Virgin areas, partially barren with native vegetation of salt grass, iodine bush, soft chess and other salt tolerant annuals and bushes. Climate: Approximate 8½ inches annual rainfall, with dry summers and cool, moist winters. Parent Material: Mixed alluvium, mainly granitic, which is underlain by stratified sediments. Relief: Slightly undulating with mounds and depressions on a basin rim. The Chino soil is located on these slight mounds. The slope is 0-2 percent. Elevation: 96 feet. Drainage: Surface drainage is slow, internal drainage is slow.
Remarks: Roots down to 26 inches. Very few roots below this depth.

HORIZON		DESCRIPTION
A_1	0- 6"	Grayish brown to gray (10YR 5/2-5/1, very dark grayish brown to very dark brown 3/2-2/2 moist) loam. Very thin (¼") platy surface layer, which grades into moderate medium angular blocky. Very hard, friable, nonplastic and nonsticky. The soil effervesces slightly with HCl. The pH is 8+. This grades abruptly and smoothly into:
B_1	6-16"	Dark gray to very dark gray (10YR 4/1-3/1, very dark brown to almost black 2/2-2/1 moist) clay loam. Moderate medium and fine angular blocky. Very hard to extremely hard, firm, plastic and slightly sticky. The soil reacts strongly with HCl and there are thin streaks of light gray to white mycelial lime which follow root holes in the soil. The pH is above 8. Clear and wavy lower boundary.
B_{21}	16-27"	Very dark gray brown and gray brown (10YR 3/2 and 5/2, very dark gray brown and dark brown 3/2, 3/3 and 4/3 moist) light clay; when mixed, this horizon has a very dark gray brown color (2.5Y 3/2 moist). Weak fine subangular blocky. Extremely hard, firm, plastic and slightly sticky. The soil reacts strongly to HCl and has occasional weak iron mottles. The pH is above 8. This grades clearly and smoothly into:
B_{22}	27-35"	Mixed olive gray and white (5Y 5/2 and 10YR 8/1, olive gray and pink 5Y 4/2 and 7.5YR 7/4 moist) clay. Moderate medium subangular blocky. Extremely hard, firm, plastic and slightly sticky. The soil reacts violently to HCl and has masses of pinkish lime which react violently. The pH is above 8. This grades with a clear and wavy lower boundary into:
B_{31ca}	35-43"	Light olive gray and white (5Y 6/2 and 10YR 8/2, olive gray and olive and pinkish 5Y 4/2-4/3 moist) clay. Moderate medium subangular blocky. Extremely hard, firm, plastic and slightly sticky. The soil reacts slightly to HCl and has whitish nodular lime 2 to 5 mm. in size which react violently. There are also a few fine (less than 1 mm.) soft manganese concretions. The pH is above 8. This grades clearly, but with a wavy lower boundary into:
B_{32ca}	43-52"	Light olive gray and white (5Y 6/2 and 10YR 8/1, olive 5Y 4/3 moist, with pinkish seams) clay. Weak coarse subangular blocky; extremely hard, firm, plastic and slightly sticky. The soil reacts slightly to HCl, but has many lime concretions 5-10 mm. in size, which react violently; there are also a few fine (less than 1 mm.) soft manganese concretions. The reaction is above 8. This grades clearly and with a wavy lower boundary into:
B_{33ca}	52-60"	Pale yellow and white (10YR 7/3 and 8/1, olive and white 5Y 4/3 moist) clay. Weak medium subangular blocky. Extremely hard, firm, plastic and slightly sticky. The soil appears to be about one-half lime with numerous lime concretions 5 to 10 mm. in size which react violently to HCl. There are a few fine (less than 1 mm.) soft manganese concretions. Reaction is above 8. This grades abruptly and smoothly into:
C	60"+	Pale yellow, yellow, and brownish yellow (5Y 7/4, 10YR 7/6 and 6/8, olive, yellowish brown 5Y 4/4 and 10YR 5/6 and 5/8 moist) heavy fine sandy loam. Massive. Very hard, friable, slightly plastic and slightly sticky. Highly micaceous and has many streaks and blotches of soft manganese. The reaction is above 8, but the soil does not react to HCl.

1/ The Chino series is in a fine-loamy, mixed, thermic family of Aquic Haploxerolls. This pedon has a calcic horizon.

CONSECUTIVE PEDON NUMBER C 69 55 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES MERRILL SOIL NO. S69 CALI. 36-23 SAMPLE NO. 9 291-9 298 SAN BERNARDINO AREA

SOIL FAMILY AQUIC CALCIXEROLL FINE-SILTY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SAMPLE NO.	DEPTH CM.	HORZ.	SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION 2- .05	SILT .05-.002	CLAY LT .002	SANDS VCS 2-1	CS 1-.5	MS .5-.25	FS .25-.10	VFS .1-.05	CSI .05-.02	FSI .02-.002	SILTS-- CO. 2-.2U	CLAYS---- FINE LT .2U	CARBONATE 3A1A	1A2A INT. .2-.02	COARSE FRAGMENTS- PCT. OF WHOLE SOIL I 75-20	II 20-5 PCT. OF LT 75	III 5-2
			PERCENT OF LESS THAN 2MM																
9 291	0- 15	AP1	24.6	51.9	23.5	0.3	0.5	0.9	5.5	17.4	25.2	26.7			11	46.4	--A	--	--	--
9 292	15- 28	AP2	19.7	56.5	23.8	0.2	0.4	0.9	4.3	13.9	29.4	27.1			11	46.2	--A	--	--	--
9 293	28- 51	A13	24.6	51.9	23.5	0.1	0.6	1.2	5.3	17.4	27.0	24.9			11	48.1	--A	--	--	--
9 294	51- 63	A14	24.4	49.6	26.0	0.2	0.4	0.9	4.9	18.0	25.1	24.5			13	46.6	--A	--	--	--
9 295	63- 79	C 1CA	26.1	46.3	27.6	0.1	0.6	1.5	7.3	16.6	22.5	23.8			16	44.0	--G	--	--	--
9 296	79-110	C 2CA	28.7	46.0	25.3	0.9	3.3	3.3	9.2	12.0	20.9	25.1			19	38.2	--G	--	--	--
9 297	110-125	C 3	37.9	46.0	16.1	0.2	1.3	3.6	16.0	16.8	22.4	23.6			9	48.9	--A	--	--	--
9 298	125-150	C 4	43.6	44.8	11.6	0.1	1.0	4.1	21.0	17.4	21.5	23.3			4	52.0	--A	--	--	--

SAMPLE NO.	DEPTH CM.	ORG. CAR- BON 6A1A -PERCENT--	MATTER NITRO GEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	19-2 6E1B	EXT. IRON FE 6C2B PCT.	ATTERBERG L I M I T LL 4F2 PCT.	PL 4F1	BULK DENSITY EST 1/3 BAR 4A1F GRAMS	1/3 BAR 4A1F PER CC	DRY 4AH	CM 3B2	WATER CONTENT 1/10 BAR 4B1C -PERCENT---	1/3 BAR 4B1C	15 BAR 4B2	EXTENSBLTY LEF 4D1 -PERCENT-	LE 4D1	-----PH------ H2O 1/1 8C1A	H2O 1/10 8C1A	CACL2 8C1E
9 291	0- 15	3.46		26				NO.40		1.07	1.17	1.00		35.9	16.1	3.0	3.0	8.0		7.7
9 292	15- 28	3.11		25					1.12			1.00			16.5			8.1		7.7
9 293	28- 51	2.16		22						1.17	1.25	1.00		32.2	14.8	2.2	2.2	8.1		7.8
9 294	51- 63	1.88		25					1.20			1.00			15.1			8.2		7.8
9 295	63- 79	1.23		33					1.67			1.00			15.2			8.3		7.8
9 296	79-110	0.64		43						1.67	1.72	1.00		18.6	12.4	1.0	1.0	8.3		7.8
9 297	110-125	0.22		18					1.67			1.00			6.0			8.2		7.9
9 298	125-150	0.20		9					1.67			1.00			5.3			8.2		7.5

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES--- CA 5B4A 6N2E	MG 5B4A 6D2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	BASE SAT. PCT.	C E C-- NA- OAC 5A2A	NH4- OAC 5A6A	EC 8A1A	WATER EXTRACT FROM SATURATED PASTE CA	MG	NA	K	CO3	HCO3	CL	8A1 SO4	B	PH SAT. PASTE 8C1B
		MEQ/100G						MEQ/100G		MMHO	MEQ/1000 ML								PPM	
9 291	0- 15	30.5	10.4	0.2	1.0	42.1	100+		19.8	1.29										
9 292	15- 28	27.2	10.8	0.5	0.4	38.9	100+		19.9	1.06										
9 293	28- 51	25.2	13.5	0.5	0.3	39.5	100+		18.1	0.79										
9 294	51- 63	22.2	13.0	0.5	0.3	36.0	100+		17.4	0.84										
9 295	63- 79	21.0	12.0	0.3	0.2	33.5	100+		16.9	0.79										
9 296	79-110	19.5	7.7	0.2	0.1	27.5	100+		9.6	0.84										
9 297	110-125	18.9	3.1	0.3	0.1	22.4	100+		7.2	1.16										
9 298	125-150	20.3	3.6	0.2	0.1	24.2	100+		9.8	1.06										

SAMPLE NO.	DEPTH CM.	WATER AT SAT. 8A PCT.	EXCHANGBLE NA 5B4B MEQ.	NA 5D2 PCT.	SAR 5E	GYPSUM- AMT. REQ. 6F1B 6P3A PERCENT	CLAY MINERALOGY --LESS THAN 0.002 MM--- X RAY I 7A2E	II 7A2E	III 7A2E	DTA IV 7A2E	PCT. 7A3	-L.T. .0002 MM- X RAY I 7A2E	II 7A2E	III 7A2E
9 291	0- 15		0.2	1			MT 2	MI 2	KK 1					
9 292	15- 28		0.5	3										
9 293	28- 51		0.5	3										
9 294	51- 63		0.5	3			MT 2	MI 2	KK 1					
9 295	63- 79		0.3	2										
9 296	79-110		0.2	2										
9 297	110-125		0.3	4										
9 298	125-150		0.2	2			MT 2	MI 2	KK 2					

MINERAL CODE		RELATIVE AMOUNT	
MT	MONTMORT	1	TRACE
MI	MICA	2	SMALL
KK	KAOLINIT	3	MODERATE
		4	ABUNDANT
		5	DOMINANT
		6	INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
G=GROUND WHOLE. HORIZON INDURATED OR GRAVEL TOO SOFT TO BE SEPARATED. ALL DATA FOR WHOLE SOIL.

MERRILL SILT LOAM
S69Calif-36-23

Location: San Bernardino County, California; about 300 feet northwest of Eucalyptus and Central Avenue, SW¼ SE¼ SW¼ of sec. 14, T.2S., R.8W. Date of Sampling: June 10, 1969. Description by: A. A. Knecht, W. D. Nettleton, W. Z. Brock. Collectors: A. A. Knecht, W. D. Nettleton, W. Z. Brock.
Classification: Aquic Calcixeroll, fine-silty, mixed, thermic.
Vegetation: Bindweeds, forbs, annual and perennial grasses. Climate: Average annual precipitation about 16 inches. Mean temperature about 61°F. Parent Material: Mixed alluvium. Topography: Alluvial fan, nearly level, about 1 percent slope. Elevation: 600 feet. Drainage: Somewhat poorly drained; slow runoff; moderately slow to slow permeability. Area above flood plain. The water table has been lowered and wetness is not a problem. Soil Moisture: Profile was dry throughout when sampled.
Remarks: Field reaction was determined by the Truog method. All horizons were sampled and analyzed at the Riverside Soil Survey Laboratory. The A13 horizon (11-20") and C2ca horizon (31-43") were sampled for the California Division of Highways.

HORIZON	DESCRIPTION
	(0-15 cm.)
Ap1 RSL 69291	0 to 6 inches, gray (5Y 5/1) silt loam, dark olive gray (5Y 3/2) moist; weak coarse subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine roots; many very fine interstitial pores; strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary.
	(15-28 cm.)
Ap2 RSL 69292	6 to 11 inches, gray (10YR 5/1) silt loam, very dark gray (10YR 3/1) moist; weak coarse subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots; common very fine tubular pores; strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary.
	(28-51 cm.)
A13 RSL 69293	11 to 20 inches, gray (10YR 5/1) silt loam, very dark gray (10YR 3/1) moist; weak coarse angular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots; common very fine tubular pores; strongly effervescent; moderately alkaline (pH 8.0); gradual wavy boundary.
	(51-63 cm.)
A14 RSL 69294	20 to 25 inches, gray (10YR 6/1) silt loam, dark gray (10YR 4/1) moist; weak coarse angular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots; common very fine tubular pores; strongly effervescent; moderately alkaline (pH 8.0); gradual wavy boundary.
	(63-79 cm.)
C1ca RSL 69295	25 to 31 inches, light gray (2.5Y 7/2) loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, friable, sticky, slightly plastic; very few roots; few very fine tubular pores; 25 percent of the mass is large, irregularly shaped extremely hard lime concretions; violently effervescent; moderately alkaline (pH 8.0); gradual wavy boundary.
	(79-110 cm.)
C2ca RSL 69296	31 to 43 inches, light gray (2.5Y 7/2) loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, friable, sticky, plastic; few very fine tubular pores; 50 percent of the mass is large, irregularly shaped extremely hard lime concretions; strongly effervescent; moderately alkaline (pH 8.0); clear wavy boundary.
	(110-125 cm.)
C3 RSL 69297	43 to 50 inches, light brownish gray (2.5Y 6/2) loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; few very fine tubular pores; strongly effervescent; moderately alkaline (pH 8.0); gradual wavy boundary.
	(125-150 cm.)
C4 RSL 69298	50 to 60 inches, light brownish gray (2.5Y 6/2) loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; few very fine tubular pores; slightly effervescent; moderately alkaline (pH 8.0).

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Aridic Calcixeroll, fine-silty, mixed, mesic
SOIL Calita clay loam variant SOIL Nos. S54Calif-18-1 LOCATION Lassen County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 54290 - 54296

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	3A1 (2–0.1)			Coarse fragments: 2A2 > 2	Coarse fragments: 2 – 19	Coarse fragments: 19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76 mm	
0-6	Ap	14.5	61.2	24.3	0.0	0.3	0.6	4.3	9.3	21.8	39.4		5.2			0		
6-12	A3	14.3	61.0	24.7	0.0	0.3	0.8	5.2	8.0	13.7	47.3		6.3			0		
12-20	B2	14.8	55.2	30.0	0.0	0.4	1.1	6.1	7.2	20.2	35.0		7.6			0		
20-25	B3	14.0	55.1	30.9	0.0	0.3	0.7	5.3	7.7	10.4	44.7		6.3			0		
25-42	C1ca	15.7	45.7	38.6	0.0	0.1	0.4	5.3	9.9	9.3	36.4		5.8			0		
42-53	C2	23.5	36.6	39.9	0.0	0.2	1.3	13.3	8.7	0.4	36.1		14.8			0		
53-66	C3			Incomplete dispersion - gypsum												0		

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N		6E1b Carbonate as $CaCO_3$		Bulk density				Water content:	4B2 15 bar			pH: 8C1b Sat. Paste	pH: 8C1a 1:10
	Pct.	Pct.			Pct.		g/cc	g/cc	g/cc		Pct	Pct.	Pct.			
0-6	2.85	0.201	14.2		5								22.5		7.7	8.3
6-12	2.17	0.160	13.6		3								21.6		7.7	8.6
12-20	1.35	0.114	11.8		9								24.3		7.6	8.6
20-25	0.68	0.072	9.5		28								22.6		7.7	8.6
25-42	0.35				44								22.5		7.7	8.8
42-53	0.26				20								29.4		7.6	8.6
53-66	0.19				15								25.7		7.6	8.0

Depth (In.)	Extractable bases: Ca	Mg	5B1b Exch. Na 6P2a	5B1b Exch. K 6Q2a		5A2a CEC NaOAc			6N1a Ca+Mg 6O1a		Water extract from saturated paste: 6P1a Na	6Q1a K		CO_3	HCO_3	Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0-6			5.4	4.8		41.4			36.7		61.0	3.3						7.30
6-12			4.9	3.9		42.1			27.8		40.0	1.9						4.95
12-20			5.1	3.5		42.4			30.5		42.5	1.5						5.75
20-25			4.6	2.3		34.7			30.4		41.0	1.3						5.66
25-42			4.7	1.6		30.5			19.2		33.7	0.6						4.50
42-53			6.9	2.0		45.8			45.1		40.0	1.0						5.50
53-66			5.7	1.8		38.8			34.5		34.2	1.1						5.31

Depth (In.)	8A Water at Saturation	5D1 Exchangeable Na		6F1a Gypsum			
	Pct.	Pct.		Pct.			
0-6	63.2	13		1			
6-12	63.6	12		tr.			
12-20	67.2	12		1			
20-25	67.8	13		2			
25-42	66.8	15		tr.			
42-53	75.2	15		tr.			
53-66	73.9	15		12			

CALITA CLAY LOAM variant [1]
S54Calif-18-1

Location: Lassen County, California, in Honey Lake Valley SCD on Paul Milton ranch, 1/4 mile south of Clinton School or 100 feet east of quarter corner between Sections 16 and 17, T. 29 N., R. 13 E.
Collectors: S. B. Johnson, J. Langdon, R. E. Nelson, S. Porter, R. C. Roberts, and L. R. Wohletz.
Date of Sampling: October 18, 1954.
Vegetation: The area where the sample was taken was planted to tall wheat grass. Some big sage along fence line. Weeds were growing on the irrigation ridges where salt had accumulated.
Climate: At Susanville, about 7½ miles west, the January average temperature is 30.7° F, the July average is 69.5° F, and the growing season is 142 days. Average annual precipitation for a 30 year period is 17.8 inches divided as follows: January 3.64, February 2.66, March 2.64, April 1.05, May 0.84, June 0.51, July 0.22, August 0.19, September 0.50, October 1.01, November 1.77, and December 2.77. The average annual precipitation at sample site is probably about 16 inches and the average snowfall is about 65 inches. Parent Material: Stratified lake-laid sediments mostly fine-texture of "Lahontan" age. Relief: Nearly level to very gently sloping basin rim or old basin floor. Leveled for irrigation. Elevation: 4050 feet. Drainage: Moderately slow drainage, both external and internal. Water table at about 4 feet. Biological activity: Many angle worms at about 2 feet and evidence of worm activity from a depth of 4 inches to 30 inches.
Classification: Aridic Calcixeroll, fine-silty, mixed, mesic.

HORIZON	DESCRIPTION
Ap RSL No. 54290	0 to 6 inches, grayish brown (10YR 5/2, very dark brown 10YR 2/2 moist) moderately plastic clay loam which is hard when dry. This layer is moderately coarse granular with a tendency to be platy. Calcareous, and pH 8.5.
A3 RSL No. 54291	6 to 12 inches, grayish brown (10YR 5/2, very dark grayish brown 10YR 3/2 moist) silty clay loam which is weak medium prismatic that breaks into moderate medium subangular blocky aggregates. This horizon is plastic when wet and very hard when dry. It has many worm holes 1/16 inch in diameter. It is calcareous and has a pH of 8.4. Gradual change to layer below.
B2 RSL No. 54292	12 to 20 inches, grayish brown (10YR 5/2, dark brown 10YR 3/3 moist) heavy silty clay loam which is extremely hard when dry and plastic when wet. It is weakly prismatic and readily breaks into moderate medium subangular blocky peds. It also has many worm holes and has a pH of 8.8. Gradual change to layer below.
B3 RSL No. 54293	20 to 25 inches, very pale brown (10YR 7/3, brown 10YR 4/3 moist) plastic silty clay loam which is faintly mottled. This horizon is hard when dry and weak fine to medium angular blocky. It has a pH of 8.8.
C1ca RSL No. 54294	25 to 42 inches, light gray (10YR 7/2, brown 10YR 5/3 moist) very highly calcareous moderately plastic silty clay loam which is hard when dry. It has weak medium angular blocky aggregates with a pH of 8.6. Rather abrupt change to layer below.
C2 RSL No. 54295	42 to 53 inches, same color and consistence as layer above but coarser textured. This layer consists of brittle cemented lenses that do not slake in acid or water but readily become wet when put in a liquid. The pan is probably cemented by silica and lime and possibly sodium. pH 8.6.
C3 RSL No. 54296	53 to 66 inches, same color as layer above but much looser and only slightly plastic silt loam. This layer has many gypsum crystals and some lime. It consists mostly of brittle lenses and layers of loose friable material. pH 8.6.

[1] The Calita series is in a fine-loamy, mixed, mesic family of Aridic Calcixerolls. This pedon is in a fine-silty family of the same subgroup.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Pachic Calcixeroll, fine-silty, mixed, thermic

SOIL Linne silty clay loam (taxadjunct) SOIL Nos. S65Calif-27-4 LOCATION Monterey County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65468 - 65474

Depth (cm)	Horizon	1B1b Total Sand (2-0.05)	Total Silt (0.05-0.002)	Total Clay (<0.002)	Sand: Very coarse (2-1)	Sand: Coarse (1-0.5)	Sand: Medium (0.5-0.25)	Sand: Fine (0.25-0.1)	Sand: Very fine (0.1-0.05)	Silt (0.05-0.01)	Silt Int. III (0.02-0.002)	Silt Int. II (0.2-0.02)	Silt 2-0.1			1A2a Coarse fragments: b/ > 2 Pct. of whole soil	2-19 Pct. of <76mm	19-76 Pct. of <76mm
		Pct. of <2 mm																
0-10	A11	19.0	50.5	30.5	0.7	0.9	1.3	5.9	10.2	30.6	19.9	44.6	8.8			G		
10-41	A12	18.8	48.0	33.2	0.8	0.9	1.3	5.5	10.3	28.0	20.0	42.0	8.5			G		
41-81	A13	19.5	46.2	34.3	1.4	0.9	1.1	5.5	10.6	26.4	19.8	40.7	8.9			G		
81-91	A14ca	18.2	46.9	34.9	0.4	1.1	1.2	5.2	10.3	25.6	21.3	39.3	7.9			G		
91-115	C1ca	31.7	46.2	22.1	3.8	5.2	4.9	7.7	10.1	16.2	30.0	30.6	21.6			G		
115-150	C2	38.1	46.1	15.8	2.8	5.7	4.8	9.9	14.9	20.2	25.9	41.4	23.2			G		
115-150	a/ shale	34.0	46.8	19.2	0.7	3.1	3.2	11.8	15.2	21.0	25.8	44.3	18.8			G		

Depth (cm)	6A1a Organic carbon c/ Pct.	6B1a Nitrogen Pct.	C/N	Carbonate as $CaCO_3$: 6E1b <2 mm Pct.	Carbonate as $CaCO_3$: 3A1a <0.002 mm Pct.	Atterberg limits: Plastic limit Pct. of <0.4 mm	Atterberg limits: Liquid limit Pct. of <0.4 mm	Atterberg limits: Plastic index Pct. of <0.4 mm	Bulk density: 4A1f 1/3 bar g/cc	Bulk density: 4A1h Oven dry g/cc	3B2 Cm	Water content: 4B1c 1/3 bar Pct.	Water content: 4B2 15 bar Pct.	4D1 Extensibility COLEf cm/cm	4D1 Extensibility COLE cm/cm	pH: 8C1b Saturated paste	pH: 8C1a H_2O 1:1	pH: 8C1c IN KCl 1:1
0-10	3.90	0.330	12	1					1.42	1.67	1.00	27.6	14.5	0.056	0.056		6.9	
10-41	1.16	0.114	10	4		23	42	19	1.23	1.43	1.00	26.8	14.1	0.050	0.050		8.2	
41-81	0.79			6					1.22	1.40	1.00	27.5	15.0	0.046	0.046		8.0	
81-91	0.61			10					1.21	1.36	1.00	30.1	17.4	0.039	0.039		8.0	
91-115	0.27			31					1.07	1.08	1.00	45.2	13.7	0.004	0.004		8.5	
115-150	0.16			15		37	41	4	1.49	1.58	1.00	28.7	18.0	0.020	0.020		8.3	
a/115-150	0.18			8									21.6				8.0	

Depth (cm)	Extractable bases: 6N2a Ca meq/100g	6O2a Mg meq/100g	6P2a Na meq/100g	5B1a 6Q2a K meq/100g	6H2a Ext. acidity	5A1a CEC NH_4OAc	5D2 Exchangeable Sodium Pct.	5G1 Base saturation NH_4OAc Pct.	8A Water at saturation Pct.	Water extract from saturated paste 8A1: 6N1a Ca meq/liter	6O1a Mg meq/liter	6P1a Na meq/liter	6Q1a K meq/liter	6I1a CO_3 meq/liter	6J1a HCO_3 meq/liter	6K1a Cl meq/liter	6L1a SO_4 meq/liter	8A1a Electrical conductivity mmho/cm
0-10	39.6	4.8	0.2	0.9		35.5		100+										
10-41	40.4	4.0	0.2	0.4		32.4		100+										
41-81	39.1	4.6	0.5	0.4		31.5		100+										
81-91	35.4	6.2	2.0	0.3		29.6	5	100+	64.2	8.2	2.0	10.6	0.1	0.8	1.8	17.7	0.1	2.32
91-115	28.3	4.4	3.0	0.2		20.2	8	100+	55.7	13.2	6.7	24.3	0.1	1.3	1.4	38.3	0.7	4.51
115-150	25.1	6.6	4.4	0.2		20.3	10	100+	62.4	20.1	9.8	39.8	0.1	-	1.3	63.6	3.0	7.0

Depth (cm)	Ratios to clay 8D1: CEC NH_4OAc	Ext. iron	15 bar water	d/ Clay fraction mineralogy 3A1: 7A2 X-ray e/	7A3 DTA Pct.
0-10	1.15		0.47	MT5, KK2	
10-41	0.98		0.43		
41-81	0.98		0.47		
81-91	0.93		0.54		
91-115	1.19		0.80		
115-150	1.35		1.20		
a/115-150			1.14	MT5, MI2, KK2	

a/ Sample of C2 from which carbonate coatings were removed

b/ G = ground whole. Coarse shale fragments dispersed readily

c/ 14.8 kg of organic carbon per square meter to a depth of 1 meter

d/ Mineral code
MT = montmorillonite
MI = mica
KK = kaolinite

e/ Approximate weight fraction (X-ray)
5 = more than half
2 = one-twentieth to one-fifth

LINNE SILTY CLAY LOAM (taxadjunct) 1/
S65Calif-27-4

Location: Monterey County, California. About 6 miles N. of King City on Montgomery Ranch, 3800 feet NE from reservoir, 1 mile NE from main buildings, about 70 feet uphill from dirt road and 400 feet down from ridge top. Date of Sampling: May 18, 1965.
Description by: Lewis C. Leifer. Collectors: W. D. Nettleton, B. R. Brasher, C. J. Weisel, R. D. Waggoner, F. J. Pecarich. Site selection by T. D. Cook.
Classification: Pachic Calcixeroll, fine-silty, mixed, thermic. (Regosolic Chestnut).
Vegetation: Range, grass, ripgut brome, soft chess, burclover, fiddleneck; all dry. Climate: Precipitation 14 inches; mean annual temperature 60°F., mean January temperature 50°F., mean July temperature 67°F. Parent Material: Soft calcareous shale and sandstone, Plio-Pleistocene non-marine. Topography: Moderately steep rounded hills, slightly convex middle of NNE-facing slope of 26 percent. Elevation: 600 feet. Drainage: Well drained; permeability is moderately slow; runoff is medium. Soil Moisture: Slightly moist; wilting point throughout.
Remarks: pH determinations by Truog Kit. Paired sample is Linne silty clay loam, S65Calif-27-5-1 through 7. The color of the A1 horizons, A11, A12, and A13, tend a little toward 10YR 4/2 when dry; typical Linne colors have a chroma of 1. Asterisks indicate horizons sampled for California Division of Highways.

HORIZON	DESCRIPTION
A11 RSL No. 65468	0-4 inches (0-10 cm.), dark gray (10YR 4/1) light silty clay loam, very dark gray (10YR 3/1) moist; weak medium plates readily breaking to moderate medium angular blocks; very hard (dry), firm (moist), sticky and plastic (wet); abundant very fine roots; common very fine tubular pores; weakly effervescent with disseminated carbonate; platy structure at surface due to cattle trampling; gradual smooth boundary.
A12 * RSL No. 65469	4-16 inches (10-41 cm.), dark gray (10YR 4/1) light silty clay loam, very dark gray (10YR 3/1) moist; strong moderate and coarse subangular blocky structure; hard (dry), friable (moist), sticky and plastic (wet); plentiful very fine roots; many very fine interstitial and many very fine and few fine tubular pores; strongly effervescent with disseminated carbonate; clear irregular boundary.
A13 RSL No. 65470	16-32 inches (41-81 cm.), dark gray (10YR 4/1) light silty clay loam, very dark gray (10YR 3/1) moist; moderate coarse subangular blocky structure; hard (dry), friable (moist), sticky and plastic (wet); plentiful very fine roots; many very fine interstitial, common very fine and few fine tubular pores; strongly effervescent with disseminated carbonate and many fine filaments of carbonate toward bottom of horizon; gradual irregular boundary.
A14ca RSL No. 65471	32-36 inches (81-91 cm.), dark grayish brown (10YR 4/2) light silty clay loam, very dark grayish brown (10YR 3/2) moist; weak medium angular blocky structure; hard (dry), friable (moist), sticky and plastic (wet); few very fine roots; common very fine interstitial and few very fine tubular pores; violently effervescent with disseminated carbonate, fine carbonate filaments cover 65 percent of ped faces; abrupt wavy boundary.
C1ca RSL No. 65472	36-45 inches (91-115 cm.), very pale brown (10YR 7/3) calcareous shale and sandstone with many white, thick to thin coats of carbonate on rock joints; soft (dry); carbonate appears to have accumulated from above; gradual wavy boundary.
C2 RSL No. 65473 & 65474	45-60 inches (115-150 cm.), similar to above but with few thin carbonate coats on rock joints.

1/ The Linne series is in a fine-loamy, mixed, thermic family of Calcic Pachic Haploxerolls. This pedon is in the fine-silty family and has a calcic horizon, and is calcareous in all parts of all horizons above the calcic horizon.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Pososilt loam **LOCATION** Madera County, California

SOIL FAMILY: Orthidic Durixeroll, fine-loamy, mixed, thermic

SOIL NOS. S58Calif-20-1 **LAB. NOS.** 58251 - 58258

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2	
0-4	A11	0.3	1.7	2.1	7.2	8.3	51.8	28.6	35.6	29.2	0	sicl
4-12	A12	0.4	3.4	4.7	14.4	15.5	47.1	14.5	53.0	19.1	0	l
12-19	C1sica	1.5	4.3	3.4	9.1	11.6	45.3	24.8	37.6	25.2	0	l
19-22	C2sica	4.2	5.4	3.4	9.5	13.6	49.9	14.0	43.1	26.8	0	l
22-30	C3sicam	13.9	18.0	6.7	10.0	7.0	31.6	12.8	22.8	21.5	0	cosl
30-37	C4ca	6.0	8.5	4.9	13.0	15.4	42.3	9.9	42.0	24.9	0	l
37-47	C5	4.4	23.5	4.4	11.6	3.9	44.7	7.5	29.7	24.7	0	l
47-62	C6	0.1	2.4	4.2	31.3	28.5	31.6	1.9	73.6	10.1	0	fsl

	pH		ORGANIC MATTER			6I1a	8A1a	6E1b	6J1a	MOISTURE TENSIONS		4B2
8C1b SATURATED PASTE 1:1	1:5	8C1a 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	CO_3 meq/l	Elec. Conduc. mmhos/cm. at 25° C.	$CaCO_3$ equivalent %	HCO_3 meq/l	1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
7.3		7.1	4.58	0.402	11.4	2.0	1.1	--	6.4			15.3
7.4		7.5	1.54	0.112	13.8	0.0	0.6	--	5.8			7.5
8.0		8.6	0.55	0.077	7.1	0.0	0.6	15	5.6			13.4
8.2		8.9	0.54	0.067	8.1	2.4	0.8	18	3.0			10.8
8.7		9.3	0.12	0.021		1.2	0.5	12	4.4			11.8
8.6		9.3	0.09	0.007		0.0	0.6	12	4.8			7.9
8.5		9.3	0.11	0.005		0.0	0.4	2	3.8			8.0
8.5		9.1	0.06	0.003		0.0	0.4	Tr	2.6			3.7

5A2a	EXTRACTABLE CATIONS					5D1	SATURATION EXTRACT SOLUBLE					8A
CATION EXCHANGE CAPACITY (+ Na)	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	EXCH. Na %	6P1a Na	6Q1a K	6N1a Ca	6O1a Mg	6K1a Cl	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
31.8	22.3	2.2	--	0.6	0.8	2	1.8	0.2	8.0	3.1	2.5	72.2
20.5	13.1	4.7	--	0.2	0.4	1	0.9	0.1	3.3	2.0	1.0	40.4
22.5	26.4	9.0	--	1.1	0.4	5	1.8	0.0	2.9	2.5	1.0	40.2
24.0	23.8	7.4	--	2.2	0.3	9	4.1	0.0	2.4	2.5	0.2	42.3
15.2	24.0	7.4	--	4.9	0.3	32	6.0	0.0	0.3	0.4	0.3	41.5
15.9	20.6	4.1	--	2.3	0.2	15	5.5	0.0	0.3	0.4	0.3	44.0
10.4	19.3	10.1	--	2.1	0.2	20	4.4	0.0	0.3	0.4	0.6	33.4
10.5	5.9	6.6	--	1.3	0.1	12	3.5	0.0	0.4	0.2	0.2	34.6

POZO SILT LOAM
S58Calif-20-1

Location: Madera County, California. 0.3 mile southeast of intersection of power line and dike and 200 feet east of dike in NW1/4, Sec. 8, T. 11 S., R. 14 E. Date of Sampling: October 29, 1958. Description by: R. Ulrich. Collectors: R. E. Nelson, Jess Glouser, Gene Novak, and R. Ulrich. Classification: Orthidic Durixeroll, fine-loamy, mixed, thermic. Vegetation: Dominantly lippia and saltgrass with spikeweed, alkali weed, vinegar weed (turpentine weed), wild rye, and some cocklebur. In range pasture use. Climate: About 9 inches rainfall. Mean annual temperature about 63° F. Parent Material: Largely water transported, sorted, and deposited sediments from granitic sources in Sierra Nevada to the eastward. Position is basin or basin rim by University of California physiographic terminology. Associated soils largely Fresno, El Peco, and Rossi. Topography: Essentially a level plain, less than 1 percent slope, with very gently undulating or hummocky (gilgai) microrelief. Elevation: 130 feet as given by Pozo Farm USGS Topographic Quadrangle sheet. Drainage: Imperfect at present time, possibly poorly drained sometime in the past before wide-spread pump irrigation and surface diversion from canals and reservoirs higher on the alluvial fans. No water table above 8 feet by auger sampling, but soil was moist below the hardpan and dry above. Internal drainage very slow to slow due to hardpan. Surface runoff very slow.

DESCRIPTION

A11 RSL No. 58251 — 0-4 inches, gray (10YR 5/1) silt loam, very dark gray (10YR 3/1) moist; weak medium and fine granular; hard, friable, slightly plastic, nonsticky; abundant coarse saltgrass stolons and abundant secondary fine root distribution pattern throughout horizon; many extremely fine and very fine interstitial pores; few worm casts; noncalcareous to dilute acid; reaction not determined in field, see lab data; clear wavy lower boundary.

A12 RSL No. 58252 — 4-12 inches, similar colored silt loam; very weak very fine granular moist drying essentially massive; hard, friable, slightly plastic, nonsticky; few coarse saltgrass stolons and plentiful fine roots; many extremely fine and very fine tubular pores, many extremely fine and very fine interstitial pores; few worm casts; noncalcareous to dilute acid; abrupt, slight wavy lower boundary.

C1sica RSL No. 58253 — 12-19 inches, white (10YR 8/1) heavy loam, light brownish gray (2.5Y 6/2) moist; massive; hard, friable, very slightly plastic, nonsticky; plentiful fine roots; common very fine and few fine tubular pores; moderately calcareous; clear smooth lower boundary.

C2sica RSL No. 58254 — 19-22 inches, similar colored loam; massive to weak medium platy or laminated presumably due to stratification; hard, friable, very slightly plastic, nonsticky; few fine roots with some platelets or laminae having root mat concentrations; few extremely fine and very fine tubular pores; moderately calcareous; abrupt smooth lower boundary.

C3sicam RSL No. 58255 — 22-30 inches, light gray (5Y 7/2) strongly cemented lime-silica hardpan, olive gray (5Y 5/2) moist, with a very thin white (5Y 8/1) capping (light gray (5Y 7/1) moist, on the upper surface and alternating in very thin seams throughout the horizon; upper surface of hardpan continuously covered with a root mat and secondary root mats of a less continuous nature occur along cracks and fissures at other places within the hardpan, roots are flattened and compressed; upper surface of hardpan essentially nonporous but an occasional very fine tubular pore is present in places, pores within hardpan are mainly very fine and few in abundance but softer lenses and seams have common very fine and a few fine tubular pores; moderately calcareous, the lime appearing mainly accessory although dilute acid has a noticeable softening effect on portions of the hardpan; clear smooth lower boundary.

C4ca RSL No. 58256 — 30-37 inches, light gray (5Y 7/2) loam, olive gray (5Y 5/2) moist; massive to weak thin and medium platy or laminated apparently due to stratification; hard to very hard, firm to very firm, very slightly plastic, nonsticky; no roots evident; few extremely fine and very fine tubular pores; moderately calcareous, clear smooth lower boundary.

C5 RSL No. 58257 — 37-47 inches, indistinctly finely mottled light gray and light olive gray (5Y 7/2 and 6/2) light loam, light olive gray (5Y 6/2) and olive gray (5Y 5/2) moist; massive to weak fine platy or laminated apparently due to stratification; hard, firm, nonplastic, nonsticky; no roots evident, few extremely fine and very fine tubular pores; moderately calcareous with most of the effervescence in the lighter colored softly segregated materials of somewhat higher lime content; clear smooth lower boundary.

C6 RSL No. 58258 — 47-62 inches, light olive gray (5Y 6/2) fine sandy loam, olive gray (5Y 5/2) moist, with common fine distinct mottles of 10YR 5/6 and 5/8, and 7.5YR 5/6 and 5/8 moist; some of the most distinct mottles follow the tubular pores, channels; massive; hard, very friable, nonplastic, nonsticky; no roots evident; few extremely fine and very fine tubular pores; common fine flakes of mica; very slightly calcareous, the lime being in soft lighter colored lime segregations with the matrix essentially noncalcareous.

OIL SURVEY LABORATORY Riverside, California

OIL TYPE Crouch loamy coarse sand (taxadjunct) **LOCATION** San Diego County, California

SOIL FAMILY: Typic Haploxeroll, coarse-loamy, mixed, mesic

SOIL NOS. S61Calif-37-5 **LAB. NOS.** 6132 - 6140

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0- 3	A11	13.8	21.5	12.4	25.3	9.8	11.6	5.6	30.6	5.5	15	1cos
3-11	A12	13.8	20.8	10.8	25.2	10.1	12.4	6.9	31.5	6.1	14	1cos
11-18	A13	13.3	18.3	9.4	23.6	10.8	16.3	8.3	32.8	8.5	16	cos1
18-22	B1	14.7	19.6	9.2	21.8	9.2	17.6	7.9	30.1	9.5	18	cos1
22-30	B21t	11.5	18.8	8.8	22.3	10.6	19.3	8.7	33.2	10.3	15	cos1
30-38	B22t	13.8	19.0	9.6	21.4	9.1	18.9	8.2	30.1	10.5	16	cos1
38-46	B3	13.1	19.7	9.6	22.0	9.0	19.4	7.2	30.7	10.8	17	cos1
46-62	C1	12.2	30.7	10.2	20.5	8.1	13.2	5.1	26.3	6.3	29	1cos
62-68	C2	7.5	24.4	10.6	23.6	9.7	17.6	6.6	31.7	9.1	26	cos1-1cos

pH			ORGANIC MATTER			EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent	Free Fe_2O_3	MOISTURE TENSIONS		
8C1a H_2O 1:1	8C1c KCl 1:1	1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N			%	6C1b %	1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
6.6	5.8		2.06	0.131	15.7				0.5			4.4
6.9	5.8		1.40	0.090	15.6				0.6			4.1
6.7	5.4		0.55	0.044	12.5				0.6			4.3
6.7	5.3		0.35	0.027					0.6			4.1
6.6	4.9		0.26						0.6			4.5
6.3	4.3		0.21						0.6			4.6
5.9	3.6		0.13						0.7			4.3
5.9	3.8		0.07						0.5			4.6
5.7	3.5		0.10						0.5			5.1

5A2a	EXTRACTABLE CATIONS 5B1a					BASE SAT. %	Sum of Cations					
CATION EXCHANGE CAPACITY (Na)	6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K	5C3	me./100 g. soil 5A3a	K				MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →							milliequivalents per liter →				
13.4	9.6	1.0	2.5	0.2	0.4	82	13.7					
12.1	9.2	1.1	2.4	0.2	0.2	82	13.1					
10.5	6.6	1.0	1.7	0.2	0.1	82	9.6					
8.5	5.8	1.6	1.4	0.2	0.1	85	9.1					
8.5	5.3	1.1	1.5	0.2	0.1	82	8.2					
9.2	6.1	1.3	1.8	0.3	<0.1	80	9.5					
9.8	5.5	1.8	1.4	0.5	0.1	85	9.3					
7.0	3.5	1.5	1.3	0.4	<0.1	81	6.7					
8.5	4.4	2.4	1.3	0.4	<0.1	85	8.5					

Sand includes considerable mica

1/ Percent of the whole soil

CROUCH LOAMY COARSE SAND (taxadjunct) 1/

S61Calif-37-5

Description: George Borst
Date of Sampling: January 23, 1961
Collectors: Reuben Nelson, Lothair Grant, and George Borst
Location: Approximately 1,500 feet west-northwest of southeast corner, sec. 27, T. 16 S., R. 6 E., in Manzanita Indian Reservation, San Diego County, Calif.
Elevation: 4,480 feet Relief: Moderately sloping, 6 percent.
Vegetation: Native chaparral Use: Range
Drainage: Well drained, moderately rapid subsoil permeability
Parent Material: Very deeply weathered granitic rock
Climate: This soil occurs under an average annual rainfall of about 15", a mean annual temperature of 58°, a mean January temperature of 49°, and a mean July temperature of 74°.
Remarks: This soil occurs on an old, moderately sloping upland plain, which appears to be a remnant of a pre-Pleistocene land surface. Erosion is very slight, the A horizon relatively thick, and the soil very consistent in profile features. This plain is bounded abruptly by steep, eroded slopes and deeply incised barrancas which penetrate almost to the stream divides.
Classification: **Typic Haploxeroll, coarse-loamy, mixed, mesic.**

HORIZON		DESCRIPTION
A11	0- 3"	Very dark grayish brown (10YR 3/2) loamy coarse sand, very dark brown (10YR 2/2) when moist; quartz crystals, 2 to 4 mm. in diameter, concentrated at the surface; weak fine crumb structure; soft, very friable, nonsticky and nonplastic; abundant very fine vertical roots; many very fine interstitial pores, slightly acid (pH 6.5); clear smooth boundary.
A12	3-11"	Dark brown (10YR 3/3) loamy coarse sand, very dark brown (10YR 2/2) when moist; massive; soft, very friable, nonsticky and nonplastic; plentiful fine random roots; slightly acid (pH 6.5); gradual smooth boundary.
A13	11-18"	Brown (10YR 4/3) loamy coarse sand, dark brown (10YR 3/3) when moist; massive; slightly hard, friable, nonsticky and nonplastic; few fine random roots; slightly acid (pH 6.5); clear smooth boundary.
B1	18-22"	Brown (10YR 5/3) coarse sandy loam, brown (10YR 4/3) when moist; massive; hard, friable, slightly plastic and slightly sticky; few fine random roots; common fine random tubular pores; colloid in bridges between mineral grains; slightly acid (pH 6.5); clear wavy boundary.
B21t	22-30"	Light brownish gray (10YR 6/2) coarse sandy loam, brown (10YR 4/3) when moist; massive; hard, friable, slightly sticky and slightly plastic; few fine random roots; common fine random tubular pores; colloid in bridges between mineral grains; slightly acid(pH 6.3); gradual smooth boundary.
B22t	30-38"	Light brownish gray (10YR 6/2) coarse sandy loam, brown (10YR 5/3) when moist; massive to weak coarse angular blocky structure; very hard, friable, slightly sticky and slightly plastic; few fine random roots; common fine random tubular pores; colloid in bridges between mineral grains; medium acid (pH 6.0); gradual smooth boundary.
B3	38-46"	Light gray (10YR 7/2) coarse sandy loam, pale brown (10YR 6/3) when moist; massive; hard, friable, slightly sticky and slightly plastic; few fine random roots; common fine random tubular pores; colloid in bridges between mineral grains; strongly acid (pH 5.5); clear smooth boundary.
C1	46-62"	White (10YR 8/2) decomposed granitic rock, containing very dark-gray (10YR 3/1) mica crystals and very dark grayish brown (10YR 3/2) stains of decaying roots, very pale brown (10YR 7/4) and light yellowish brown (10YR 6/4) when moist; massive; hard, friable, nonsticky and nonplastic; few fine random roots; strongly acid (pH 5.3); gradual smooth boundary.
C2	62-68"	White (10YR 8/2) decomposed granitic rock, containing very dark gray (10YR 3/1) mica crystals and very dark grayish brown (10YR 3/2) stains of decaying roots, pale brown (10YR 6/3) when moist; massive; hard, friable, nonsticky and nonplastic; strongly acid (pH 5.3).

1/ **The Crouch series is in a coarse-loamy, mixed, mesic family of Ultic Haploxerolls. This pedon has a base saturation of greater than 75 percent in the mollic epipedon.**

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Haploxeroll, coarse-loamy, mixed, thermic
SOIL San Andreas sandy loam SOIL Nos. S65Calif-27-6 LOCATION Monterey County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65598

Depth (In.)	Horizon	1B1b Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05)	Total: Silt (0.05–0.002)	Total: Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: (0.05–0.02)	Silt: Int III (0.02–0.002)	Int II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	* Coarse fragments 1A2a: > 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76mm	
0-3	A1***															28	26	2

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$		Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven dry		3B2	Water content	4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility LEf	4D1 Extensibility LE	pH: 8C1a H_2O 1:1		
	Pct.	Pct.		Pct.	Pct.		g/cc	g/cc	g/cc	Cm	Pct.	Pct.	Pct.	Pct.	Pct.			
0-3	1.76	0.100	18															

Depth (In.)	Extractable bases 5B4a: 6N2a Ca	6O2d Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A6a NH_4OAc	5A3a Sum		6G1e KCl Ext. Al^{+++}						Base saturation	
	meq/100 g															Pct.	Pct.

Depth (In.)	Clay mineralogy (<0.002 mm.) 3A1: Mont.	Verm.	Mica 7A2 X-ray	Kaolin.

* From characterization sample (5Kg) (except as noted).
** 2-19 mm. from characterization sample, 19-76 mm. from field volume estimate.
*** Composite A horizon sample.

SAN ANDREAS SANDY LOAM
S65Calif-27-6

Location: Monterey County, California, about 10 miles NE of King City on Montgomery Ranch, 300 feet due west from Pinalito VABM, about 75 feet down from ridge top. (Site #1 North Slope). Date of Sampling: May 18, 1965.

Description by: Lewis C. Leifer. Collectors: W. D. Nettleton, B. R. Brasher, and T. D. Cook.

Classification: Typic Haploxeroll, coarse-loamy, mixed, thermic. (minimal) Noncalcic Brown.

Vegetation: Blue oak, chamise, pine blue grass, wild buckwheat, red brome, annual fescue, wild oats, melic, digger pine. Climate: Precipitation is 14 inches; mean annual temperature 60°F., January mean 58°F., July mean 67°F. Parent Material: Granodiorite. Topography: Steep and very steep slopes, locally slightly concave, 50 percent North facing slope, smooth, 75 feet below ridge crest. Elevation: 1500 feet. Drainage: Somewhat excessive, moderately rapid permeability, medium runoff. Soil Moisture: Very slightly moist, wilting or below.

Remarks: Composite sample of A1 by orchard type auger to depth of 8 inches. Composite sample included individual samples (borings) from a plot with 4 rows 12 feet apart. Each row was sampled 6 times at 6-foot intervals. The paired site for this location on south slope S65Calif-27-7-1. Other samples in this study are south aspect S65Calif-27-29-1 and north site S65Calif-27-30-1. Twenty-four samples were taken for the composite.

HORIZON	DESCRIPTION
A11 RSL 65598*	0 to 3 inches, dark grayish brown (10YR 4/2) fine gravelly sandy loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; abundant very fine roots; many very fine interstitial pores; slightly acid (pH 6.5); 28 percent fine gravel by volume; top 1/2 inch is dark gray and black with many fine partially decayed fragments of twigs and leaves; clear smooth boundary.
A12	3 to 12 inches, dark grayish brown (10YR 4/2) fine gravelly sandy loam; dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; abundant very fine roots; many very fine interstitial and few fine and very fine tubular pores; slightly acid (pH 6.5); 28 percent fine gravel.

* One sample only, both horizons.

CONSECUTIVE PEDON NUMBER C 69 27 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES SAN ANDREAS TAXADJUNCT SOIL NO. S69 CALI. 31-22 SAMPLE NO. 9 131-9 136 PLACER COUNTY AREA

SOIL FAMILY TYPIC HAPLOXEROLL COARSE-LOAMY,MIXED,THERMIC RIVERSIDE SOIL SURVEY LABORATORY

SAMPLE NO.	DEPTH CM.	HORZ.	SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2-.05	SILT .05-.002	CLAY LT .002	SANDS VCS 2-1	CS 1-.5	MS .5-.25	FS .25-.10	SILTS VFS .1-.05	CSI .05-.02	FSI .02-.002	CLAYS CO. 2-.2U	FINE LT .2U	CARBONATE 3A1A.02	1A2A INT. II	COARSE FRAGMENTS PCT. I OF WHOLE 20 SOIL	II 75-20-5 PCT. OF	III 5-2 LT 75
			PERCENT OF LESS THAN 2MM																
9 131	0- 13	A11	74.3	18.6	7.1	13.3	21.3	13.8	18.6	7.3	7.9	10.7				24.2	5W	--	--	5
9 132	13- 38	A12	73.7	18.6	7.7	12.0	20.0	14.1	19.4	8.2	7.5	11.1				25.5	6W	--	--	6
9 133	38- 61	B2	72.7	19.2	8.1	13.2	19.3	12.6	18.6	9.0	7.5	11.7				26.2	10W	--	--	10
9 134	61- 74	B3	72.3	18.1	9.6	13.6	20.1	13.0	18.1	7.5	7.1	11.0				23.8	10W	--	--	10
9 135	74- 94	C 1	72.0	14.6	13.4	17.3	22.1	11.2	15.7	5.7	5.5	9.1				19.0	10W	--	--	10
9 136	94-120	C 2	83.2	8.1	8.7	24.9	27.3	12.1	14.6	4.3	3.2	4.9				14.4	19W	--	--	19

SAMPLE NO.	DEPTH CM.	ORG. CARBON 6A1A -PERCENT--	MATTER NITROGEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	19-2 6E1B	EXT. IRON FE 6C2B PCT.	ATTERBERG L I M I T LL 4F2 PCT.	PL 4F1 NO.40	BULK EST 1/3 BAR 4A1F	DENSITY 1/3 BAR 4A1F	DRY 4AH GRAMS PER CC	CM 3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C -PERCENT---	15 BAR 4B2	EXTENSBLTY LEF 4D1 -PERCENT-	LE 4D1	PH H2O 1/1 8C1A	H2O 1/10 8C1A	CACL2 8C1E
9 131	0- 13	1.90	0.118							1.34	1.35	0.97		4.4	4.1	0.2	0.2	6.2		5.5
9 132	13- 38	0.61	0.043							1.63	1.63	0.96		7.5	3.3			5.9		5.2
9 133	38- 61	0.19								1.67	1.67	0.94		8.0	3.0			5.9		5.2
9 134	61- 74								1.73			0.94			3.7			5.7		5.0
9 135	74- 94									1.79	1.82	0.93		10.2	5.5	0.6	0.5	5.4		4.9
9 136	94-120									1.97	2.02	0.85		9.2	4.4	0.8	0.7	5.3		4.7

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6O2D	NA 5B4A 6P2A	K 6Q2A	SUM	BASE SAT.	C E C NA- OAC 5A2A	NH4- OAC 5A6A	WATER EXTRACT FROM SATURATED PASTE EC 8A1A	CA 6N1B	MG 6O1B	NA 6P1A	K 6Q1A	CO3 6I1A	HCO3 6J1A	CL 6K1A	SO4 6L1B	B 6T1A	PH SAT. PASTE 8C1B
		MEQ/100G					PCT.	-MEQ/100G		MMHO	MEQ/1000 ML								PPM	
9 131	0- 13	6.6	0.6	0.1	0.3	7.6	79		9.6											
9 132	13- 38	4.4	0.7	0.1	0.2	5.4	78		6.9											
9 133	38- 61	2.3	0.7	0.1	0.2	3.3	75		4.4											
9 134	61- 74	2.4	0.8	0.1	0.2	3.5	83		4.2											
9 135	74- 94	3.9	0.7	0.1	0.2	4.9	82		6.0											
9 136	94-120	5.5	0.8	0.1	0.1	6.5	90		7.2											

SAMPLE NO.	DEPTH CM.	WATER AT SAT. 8A PCT.	EXCHANGBLE NA 5B4B MEQ.	NA 5D2 PCT.	5E	SAR	GYPSUM AMT. REQ. 6F1B 6P3A PERCENT	CLAY MINERALOGY --LESS THAN 0.002 MM-- X RAY DTA 7A2E I	7A2E II	7A2E III	7A2E IV	7A3 PCT.	-L.T. .0002 MM- X RAY 7A2E I	7A2E II	7A2E III	MINERAL CODE	RELATIVE AMOUNT
9 131	0- 13		0.1	1				MI 3	KK 3							MI MICA	1 TRACE
9 132	13- 38		0.1	1												KK KAOLINIT	2 SMALL
9 133	38- 61		0.1	2				MI 3	KK 3								3 MODERATE
9 134	61- 74		0.1	2													4 ABUNDANT
9 135	74- 94		0.1	2													5 DOMINANT
9 136	94-120		0.1	1													6 INDETER.

SAMPLE PREPARATION CODES
W=DATA DETERMINED ON WHOLE SOIL AND RECALCULATED TO 2 MM BASIS. GRAVEL FROM SLAKED SUBSAMPLE.

SAN ANDREAS COARSE SANDY LOAM (TAXADJUNCT) 1/
S69Calif-31-22

Location: Placer County, California. From Sierra College Blvd., 1.5 miles east of Douglas Blvd. Pit location approximately 80 feet north and directly across from Ken L. Services, 2,700 feet west and 80 feet north of the SE corner of sec. 3, T.10N., R.7E. Date of Sampling: May 9, 1969.
Description by: L. A. Brittan, T. M. Ryan and G. M. Kennedy. Collectors: K. W. Flach, W. D. Nettleton, G. M. Kennedy, T. M. Ryan, L. A. Brittan.
Classification: Typic Haploxeroll, coarse-loamy, mixed, thermic.
Vegetation: Blue oak, soft chess, ripgut, and wild oats. Climate: Annual average precipitation 22 inches; mean annual air temperature 62°F. Parent Material: Weathered granodiorite. Topography: Low foothill, gently rolling, 8 percent with west aspect. Elevation: 310 feet. Drainage: Well drained, slow to medium runoff and moderately rapid permeability. Soil Moisture: Dry to 24 inches, slightly moist below.
Remarks: A stone line 2 to 3 inches thick was overlying the C1 horizon and composed mainly of quartz fragments. Roots were matted between C1 and C2 horizons. The C1 horizon was noticeably easier to dig than the C2 horizon. Perhaps clay films make this material harder to dig compared to the decomposed granodiorite in Vista soils.

HORIZON	DESCRIPTION
	(0-13 cm.)
A11 RSL 69131	0 to 5 inches, grayish brown (10YR 5/2) coarse sandy loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; soft, very friable, nonsticky, nonplastic; many very fine and fine vertical roots; many very fine tubular and interstitial pores; slightly acid (pH 6.5); clear smooth boundary.
	(13-38 cm.)
A12 RSL 69132	5 to 15 inches, grayish brown (2.5Y 5/2) coarse sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, nonsticky, nonplastic; many very fine and common fine and medium vertical roots; common very fine tubular and interstitial and few fine tubular pores; medium acid (pH 6.0); clear smooth boundary.
	(38-61 cm.)
B2 RSL 69133	15 to 24 inches, pale brown (10YR 6/3) coarse sandy loam, brown and dark brown (10YR 4/3) moist; massive; hard, very friable, nonsticky, nonplastic; common very fine, medium and coarse random roots; common very fine tubular and interstitial, and few fine tubular pores; neutral (pH 7.0); clear smooth boundary.
	(61-74 cm.)
B3 RSL 69134	24 to 29 inches, very pale brown (10YR 7/3) coarse sandy loam, brown (10YR 5/3) moist; massive; hard, very friable, nonsticky, nonplastic; few fine and medium horizontal roots; common very fine tubular and interstitial, and few fine tubular pores; few thin clay films line pores and bridge mineral grains; slightly acid (pH 6.5); abrupt wavy boundary.
	(74-94 cm.)
C1 RSL 69135	29 to 37 inches, very pale brown matrix (10YR 7/4) with variegated mineral grains of weathered granodiorite, reddish yellow matrix (7.5YR 6/6) moist; rock fabric structure; hard, friable, nonsticky, nonplastic; few fine and medium horizontal roots; common very fine tubular and interstitial pores; many moderately thick clay films line pores and bridge mineral grains; slightly acid (pH 6.5); gradual wavy boundary.
	(94-120 cm.)
C2 RSL 69136	37 to 47 inches, variegated weathered granodiorite; rock fabric structure; hard, friable, nonsticky, nonplastic; very few fine and coarse random roots; few very fine tubular and interstitial pores; many moderately thick clay films line pores and bridge mineral grains; slightly acid (pH 6.5); gradual wavy boundary.

1/ The San Andreas series is in a coarse-loamy, mixed, thermic family of Typic Haploxerolls. This pedon is in the same family and subgroup but has more coarse sand than is typical of the series.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Haploxeroll, coarse-loamy, mixed, thermic
SOIL Sheridan loam (taxadjunct) SOIL Nos. S65Calif-27-20 LOCATION Monterey County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65559 - 65564

Depth (in.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt (0.05–0.02)	Silt: Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	* Coarse fragments 1A2a > 2 Pct	2 – 19 Pct. of < 76 mm	19 – 76 Pct. of < 76 mm	
		Pct. of < 2 mm																	
0-3	A11	75.1	15.4	9.5	16.7	21.8	11.4	18.4	6.8	6.1	9.3	21.6	68.3	0	10	17	17	0	**
3-12	A12	75.6	14.6	9.8	14.0	22.5	12.1	20.2	6.8	6.4	8.2	22.5	68.8	0	10	18	18	0	**
12-25	A13	77.9	12.5	9.6	14.7	22.3	12.6	21.3	7.0	5.6	6.9	22.9	70.9	0	10	22	19	3	
25-35	A14	80.5	11.0	8.5	10.4	22.1	14.4	25.1	8.5	4.7	6.3	25.7	72.0	0	9	27	22	5	
35-44	C1	87.2	8.3	4.5	13.4	24.8	15.2	25.7	8.1	4.7	3.6	25.3	79.1	0	5	9	9	0	**
44-59+	C2	84.3	9.5	6.2	16.2	24.9	14.2	21.8	7.2	4.7	4.8	22.6	77.1	0	6	13	13	0	**

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. Iron as Fe Pct.	6E1b Carbonate as $CaCO_3$ Pct	Bulk density 4A1f 1/3 bar g/cc	Bulk density 4A1h Oven dry g/cc	3B2 Cm	Water content Pct.	Water content 4B1c 1/3 bar Pct.	Water content 4B2 15 bar Pct.	4D1 Extensibility COLEF in./in.	4D1 Extensibility COLE in./in.	pH 8C1b Saturated Paste	pH 8C1a H_2O 1:1	pH 8C1a H_2O 1:10
0-3	4.70	0.286	16			1.05	1.12	0.93		22.1	11.6	0.023	0.021		6.7	
3-12	0.97	0.081	12			1.42	1.46	0.90		11.4	7.6	0.009	0.008		6.8	
12-25	0.42	0.040				1.47	1.51	0.86		11.2	6.8	0.007	0.006		6.7	
25-35	0.29					1.39	1.43	0.84		12.5	7.2	0.010	0.008		6.6	
35-44	0.12					1.96	2.03	0.93		8.3	5.7	0.012	0.012		6.9	
44-59+	0.17					1.94	2.01	0.90		9.7	5.3	0.011	0.010		6.6	

Depth (in.)	Extractable bases 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	5B1a Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 8A1 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K	6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter								mmho/cm
0-3	19.6	3.7	0.2	1.0	24.5			23.6									
3-12	16.7	5.6	0.3	0.1	22.7			23.4									
12-25	16.2	7.3	0.3	0.1	23.9			24.9									
25-35	15.3	8.0	0.3	0.1	23.7			24.8									
35-44	14.6	8.7	0.4	0.1	26.4			25.3	1.0	0.5	1.7	0.1		-	1.0	0.5	0.27
44-59+	14.7	11.3	0.4	0.1	26.5			28.2									

Depth (in.)	8A Water at Saturation Pct.	5D2 Exchangeable Na Pct.	5B1b Exch. Na meq./100g.	Gypsum Pct.	5C1 Base Sat. NH_4OAc Pct.	Clay mineralogy (<0.002 mm.) 7A Mont.	Verm.	Mica	Kaolin.	
						< X-ray >				
0-3					100+	xx		xxx	x	
3-12					97					
12-25					96	xxx	xx		x	
25-35					96					
35-44	33.7		0.3		100+					
44-59+					94	xx	xxx		x	

* From characterization sample (5Kg)(except as noted).
** 2-19 mm. from characterization sample, 19-76 mm. from field volume estimate.

-· = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

SHERIDAN LOAM (taxadjunct) 1/
S65Calif-27-20

Location: Monterey County, California, NE corner, NW¼, NW¼, Sec. 21, T18S, R1E, about 3.5 miles on old Coast Road from Bixby Bridge on Hwy. 1, 1 mile up Rancho Calera Road from Old Coast Road, on Rancho Calera. (shallow brush site). Date of Sampling: May 25, 1965.
Description by: Lewis C. Leifer. Collectors: W. D. Nettleton, B. R. Brasher, C. J. Weisel, R. D. Waggoner, F. J. Pecarich; site selection by T. D. Cook.
Classification: Typic Haploxeroll, coarse-loamy, mixed, thermic.
Vegetation: Brush, chamise, poison oak, black sage, sticky monkey flower. Climate: Precipitation is 35 to 45 inches; mean annual soil temperature at 20 inches is assumed to be greater than 59° F. Parent Material: Weathered diorite (gruss). Topography: Very slightly convex very steep S slope of 52 percent; about 100 feet below ridge crest and 30 feet below grass-brush boundary. Elevation: 1400 feet. Drainage: Well drained, moderately rapid permeability, medium runoff. Soil Moisture: Dry to 8 inches, moist below.
Remarks: Field pH determinations by Truog Kit. This Sheridan site related to S65Calif-27-21 and S65Calif-27-22 in the high rainfall zone but has vegetation and exposure differences; also related to Sheridan sites S65Calif-27-23, S65Calif-27-24, S65Calif-27-25, and S65Calif-27-26 in inland lower rainfall areas. Few gravel size rock fragments throughout profile.

HORIZON	DESCRIPTION
A11 RSL 65559	0 to 3 inches, dark grayish brown (10YR 4/2) light loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; abundant very fine and few fine roots; many very fine interstitial pores; neutral (pH 6.8); clear smooth boundary.
A12 RSL 65560	3 to 12 inches, dark grayish brown (10YR 4/2) light loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; plentiful fine and medium roots; many very fine interstitial and common fine and medium tubular pores; neutral (pH 6.6); gradual wavy boundary.
A13 RSL 65561	12 to 25 inches, dark grayish brown (10YR 4/2) light loam, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine, fine and medium roots; many very fine interstitial and few fine and medium tubular pores; slightly acid (pH 6.5); gradual smooth boundary.
A14 RSL 65562	25 to 35 inches, dark grayish brown (10YR 4/2) light loam, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine, fine and medium roots; many very fine interstitial, few very fine, fine and medium tubular pores; slightly acid (pH 6.3); considerable rock fragments; clear wavy boundary.
C1 RSL 65563	35 to 44 inches, brown (7.5YR 5/4) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; weathered diorite easily cut with hand tools; hard, friable, nonsticky and nonplastic; few very fine and fine roots; many very fine interstitial pores; very few thin clay films in pores; slightly acid (pH 6.3); gradual smooth boundary.
C2 RSL 65564	44 to 59 inches, brown (7.5YR 5/4) coarse loamy sand, dark yellowish brown (10YR 4/4) moist; massive; weathered diorite has rock structure and is cut by hand tools with considerable difficulty; hard, firm, nonsticky and nonplastic; very few very fine roots; few very fine interstitial pores; very few thin clay films in pores; slightly acid (pH 6.3); a few rodent holes filled with A1 material.

1/ The Sheridan series is in a coarse-loamy, mixed, thermic family of Pachic Haploxerolls. This pedon has an epipedon less than 20 inches thick.

U S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Haploxeroll, coarse-loamy, mixed, thermic

SOIL Sheridan loam (taxadjunct) SOIL Nos. S65Calif-27-23 LOCATION Monterey County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65575 - 65579

Depth (In)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	* Coarse fragments 1A2a ≥ 2	2 – 19	19 – 76	
		Pct. of < 2 mm														Pct.	Pct. of < 76mm		
0-7	A11	73.0	16.3	10.7	18.7	22.0	9.5	15.1	7.7	6.7	9.6	22.0	65.3	0	11	11	11	0	**
7-18	A12	71.7	17.1	11.2	15.1	21.0	10.6	16.8	8.2	7.1	10.0	23.9	63.5	0	11	15	15	0	**
18-35	A13	71.1	17.2	11.7	14.3	20.6	9.6	17.6	9.0	7.1	10.1	25.0	62.1	0	12	16	16	0	**
35-42	C1	71.3	15.6	13.1	14.2	23.2	9.6	16.7	7.6	7.4	8.2	23.5	63.7	0	13	16	16	0	**
42-60+	C2	78.4	12.9	8.7	15.4	26.2	10.6	18.3	7.9	7.4	5.5	24.8	70.5	0	9	13	13	0	**

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven dry	Bulk density	3B2	Water content	4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility COLEP	4D1 Extensibility COLE	pH: 8C1a H_2O 1:1	pH	
	Pct.	Pct		Pct.	Pct.	g/cc	g/cc	g/cc	Cm	Pct.	Pct.	Pct	in./in.	in./in.			
0-7	0.97	0.077	13			1.63	1.64		0.93		10.3	4.3	0.002	0.002	6.3		
7-18	0.52	0.043	12			1.49	1.54		0.91		12.6	5.0	0.013	0.011	6.5		
18-35	0.39					1.55	1.58		0.90		11.6	5.5	0.006	0.005	6.6		
35-42	0.22					1.70	1.78		0.89		14.4	7.7	0.015	0.013	6.5		
42-60+	0.17					1.77	1.83		0.91		12.5	5.2	0.012	0.011	6.7		

Depth (In)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	5A2a NaOAc		6G1d KCl Ext. Al^{+++}		Atterberg limits: Plastic limit	Liquid limit	Plastic index		Base saturation 5C1 NH_4OAc	
	meq/100 g											Pct. of <0.4 mm				Pct	Pct.
0-7	8.8	2.0	0.3	0.1	11.2		11.7									96	
7-18	9.8	2.7	0.4	0.1	13.0			16.5					-	N.P.		95	
18-35	10.4	3.4	0.4	0.1	14.3		14.4									99	
35-42	14.2	5.8	0.5	0.1	18.1		19.2					20	30	10		94	
42-60+	8.6	3.4	0.4	0.1	12.5		11.6									100+	

Depth (In.)	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Mica	KaoHn	X-ray

* From characterization sample (5Kg)(except as noted).

** 2-19 mm. from characterization sample, 19-76 mm. from field volume estimate.

SHERIDAN FINE GRAVELLY LOAM (taxadjunct) 1/
S65Calif-27-23

Location: Monterey County, California, center NE¼ SE¼ SE¼ Sec. 30, T15S, R6E. About 3.5 miles up Johnson Canyon Road from Armstrong Ranch main gate. (16" rainfall, inland, grass, south slope). Date of Sampling: May 26, 1965.

Description by: Lewis C. Leifer. Collectors: W. D. Nettleton, B. R. Brasher, C. J. Weisel, R. D. Waggoner, F. J. Pecarich; site selection by T. D. Cook.

Classification: Typic Haploxeroll, coarse-loamy, mixed, thermic. Regosol (Brunizemic).

Vegetation: Range grass, soft chess, annual fescue, ripgut brome, popcorn flower, lupine. Climate: Precipitation is 14 to 20 inches. Mean annual temperature is 60°F., mean January 50°F., mean July 66°F. Parent Material: Weathered diorite (gruss). Topography: Slightly convex moderately steep slope on south exposure, about 20 percent and about 100 feet below ridgecrest. Elevation: 2850 feet. Drainage: Well drained, moderately permeable, medium runoff. Soil Moisture: Dry (All), moist below.

Remarks: The closely related soil about 300 feet away on the North slope is S65Calif-27-24-1 through 6; the related south slope is S65Calif-27-25-1 through 6, about 1 mile away. Other related soils are S65Calif-27-26, North inland and S65Calif-27-20, S65Calif-27-21, and S65Calif-27-22 near the coast. Asterisks indicate horizons sampled for California Division of Highways.

HORIZON	DESCRIPTION
A11 RSL 65575	0 to 7 inches, dark grayish brown (10YR 4/2) fine gravelly loam, very dark grayish brown (10YR 3/2) moist; weak coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; plentiful very fine roots; many very fine interstitial and few fine tubular pores; slightly acid (pH 6.2); surface 1/2 inch soft and much darkened by organic matter, horizon somewhat compacted by trampling, 17 percent fine gravel by volume and 40 percent coarse sand; gradual smooth boundary.
A12 RSL 65576	7 to 18 inches, dark grayish brown (10YR 4/2) fine gravelly light loam, very dark brown (10YR 2/2) moist; moderate medium angular and moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine interstitial and common very fine and medium tubular pores; medium acid (pH 6.0); diffuse smooth boundary.
*A13 RSL 65577	18 to 35 inches, dark grayish brown (10YR 4/2) fine gravelly light loam, very dark brown (10YR 2/2) moist; moderate medium and coarse granular structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine interstitial and common very fine, fine and medium tubular pores; medium acid (pH 6.0); clear wavy boundary.
*C1 RSL 65578	35 to 42 inches, brown (7.5YR 4/4) overall color made up of brown and very dark gray grains (7.5YR 5/4 dry, 4/4 moist and 10YR 3/1 moist and dry) loamy coarse sand; massive; shows rock structure and is cut by hand tools with difficulty; hard, firm, nonsticky and nonplastic; very few very fine roots; common very fine interstitial pores; common stains on grains and few thin clay films in pores; medium acid (pH 6.0); diffuse smooth boundary.
C2 RSL 65579	42 to 60 inches, similar to the above horizon in most characteristics; there are no roots, no clay films, but there are a few colloidal stains on grains; 20 percent of the soil horizon is made up of A1 soil material that has filled rodent tunnels.

1/ The Sheridan series is in a coarse-loamy, mixed, thermic family of Pachic Haploxerolls. This pedon has a mollic epipedon less than 20 inches thick.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Haploxeroll, coarse-loamy, mixed, thermic
SOIL Sheridan loam (taxadjunct) SOIL Nos. S65Calif-27-25 LOCATION Monterey County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65586 - 65591

Depth (In.)	Horizon	1B1b Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05)	Total: Silt (0.05–0.002)	Total: Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Noncarbonate clay	* Coarse fragments 1A2a: > 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76mm	
0-5	A11															15	15	0 **
5-15	A12															19	19	0 **
15-26	A13	70.0	19.3	10.7	15.6	19.6	9.3	17.2	8.3	9.0	10.3	26.2	61.7	0	11	21	21	0 **
26-41	C1															19	19	0 **
41-53	C2															26	26	0 **
53-72+	C3															26	26	0 **

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. Iron as Fe Pct.	6E1b Carbonate as $CaCO_3$ Pct.	Bulk density: 4A1f 1/3 bar g/cc	4A1h Oven dry g/cc	g/cc	Water content: Pct.	4B1c 1/3 bar Pct.	4B2 15 bar Pct.	4D1 Extensibility COLEF in./in.	4D1 Extensibility COLE in./in.	pH: 8C1a H_2O 1:1		
0-5	1.10	0.094	12											6.4		
5-15	0.53	0.040	13											6.4		
15-26	0.38										6.3			6.5		
26-41	0.16													6.4		
41-53	0.10													6.7		
53-72+	0.06													6.5		

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	5A3a Sum	6G1d KCl Ext. Al^{+++}	Base saturation: 5C1 NH_4OAc Pct.	Pct.
	meq/100 g										
0-5	8.3	1.4	0.3	0.2	10.2					96	
5-15	8.8	1.7	0.3	0.2	11.0		11.7			94	
15-26	10.6	2.4	0.4	0.1	13.5		14.2			95	
26-41	18.1	5.6	0.4	0.2	24.3		25.5			95	
41-53	19.4	6.4	0.4	0.1	26.3		28.0			94	
53-72+	18.1	6.7	0.5	0.1	25.4		26.3			97	

Depth (In.)	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Mica	Kaolin.
	X-ray			

* From characterization sample (5Kg)(except as noted).
** 2-19 mm. from characterization sample, 19-76 mm. from field volume estimate.

SHERIDAN FINE GRAVELLY SANDY LOAM (taxadjunct) 1/
S65Calif-27-25

Location: Monterey County, California, SW¼ NE¼ NE¼ Sec. 29, T15S, R6E, 4.5 miles up Johnson Canyon Road from Armstrong Ranch main gate, 600 feet N. at dirt road, about 150 feet below ridge top. (Inland, grass, south slope). Date of Sampling: May 26,1965. Description by: Lewis C. Leifer. Collectors: W. D. Nettleton, B. R. Brasher, C. J. Weisel, R. D. Waggoner, F. J. Pecarich; site selection by T. D. Cook. Classification: Typic Haploxeroll, coarse-loamy, mixed, thermic. Regosol (brunizemic).

Vegetation: Range, grass, soft chess, lupine, ripgut brome, popcorn flower. Climate: Precipitation is 14 to 20 inches; mean annual temperature 60°F., mean January 50°F., mean July 66°F. Parent Material: Weathered diorite (grus). Topography: Slightly convex, moderately steep slope on south exposure, about 27 percent and about 150 feet below ridge top. Elevation: 3100 feet. Drainage: Well drained, moderately rapid permeability, medium runoff. Soil Moisture: All and A12 are dry. Moist below.

Remarks: All Sheridan soils sampled in this study are rather similar in texture, though individual pits may vary from light loam to coarse sandy loam. Mean soil temperature is assumed to be more than 59°F., though coastal sites may be slightly cooler. The matched profile to this site is S65Calif-27-23 and is about a mile away on a south slope. Profile S65Calif-27-26, a few hundred feet away on a north slope; S65Calif-27-24 is also on a north slope. Other Sheridan profiles under grass and brush under 35-45 inches of rainfall near the coast are numbers 20, 21 and 22.

HORIZON	DESCRIPTION
A11 RSL 65586	0 to 5 inches, dark grayish brown (10YR 4/2) fine gravelly heavy sandy loam, very dark brown (10YR 2/2) moist; weak coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; plentiful very fine roots; common very fine interstitial and few fine tubular pores; slightly acid (pH 6.5); loose layer at top of strong fine granular structure with upper 1/2 inch mixed organic and mineral soil; gradual smooth boundary.
A12 RSL 65587	5 to 15 inches, dark grayish brown (10YR 4/2) fine gravelly heavy sandy loam, very dark brown (10YR 2/2) moist; moderate medium granular and some medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; plentiful very fine roots; common very fine interstitial and few very fine, common fine and medium tubular pores; medium acid (pH 6.0); diffuse smooth boundary.
A13 RSL 65588	15 to 26 inches, dark grayish brown (10YR 4/2 toward 4/1) fine gravelly heavy sandy loam, very dark brown (10YR 2/2) moist; strong medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; plentiful very fine roots; many very fine interstitial pores; slightly acid (pH 6.5); considerable rodent activity just above C1; clear irregular boundary.
C1 RSL 65589	26 to 41 inches, brown (7.5YR 5/4) fine gravelly heavy sandy loam, brown and dark reddish brown (7.5YR 4/4, 5YR 3/4) moist; massive; shows definite rock structure; difficult to cut and break with hand tools; hard, friable, sticky and slightly plastic; few very fine roots; common very fine interstitial and common very fine tubular pores; common thin clay films in pores and continuous colloidal stains; medium acid (pH 6.0); clear smooth boundary.
C2 RSL 65590	41 to 53 inches, reddish brown (5YR 4/4 moist or dry) with 20 percent darker mineral grains; massive; rock structure, difficult to cut or break with hand tools; very hard, firm, slightly sticky and nonplastic; very few very fine roots; few very fine interstitial pores; common colloidal stains; slightly acid (pH 6.5); few large rock joints have thin clay films; gradual wavy boundary.
C3 RSL 65591	53 to 72 inches, brown (7.5YR 5/4) fine gravelly sandy loam, brown and reddish brown (7.5YR 4/4, 5YR 4/4) moist; massive; difficult to break with hand tools; very hard, firm; no roots; slightly acid (pH 6.5).

1/ The Sheridan series is in a coarse-loamy, mixed, thermic family of Pachic Haploxerolls. This pedon has a mollic epipedon less than 20 inches thick.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Haploxeroll, coarse-loamy, mixed, thermic
SOIL Sheridan loam (taxadjunct) SOIL Nos. S65Calif-27-26 LOCATION Monterey County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65592 - 65597

Depth (In.)	Horizon	1B1b Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	* Coarse fragments 1A2a: > 2 Pct.	2 – 19 Pct. of < 76 mm	19 – 76 Pct. of < 76 mm	
		Pct. of < 2 mm																	
0-6	A11															12	12	0	**
6-20	A12															14	14	0	**
20-34	A13	76.0	16.4	7.6	15.0	22.1	11.1	19.5	8.3	7.3	9.1	25.5	67.7	0	8	16	16	0	**
34-47	A14															22	22	0	**
47-54	C1															19	19	0	**
54-68+	C2															19	19	0	**

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. Iron as Fe Pct.	6E1b Carbonate as $CaCO_3$ Pct	Bulk density: 4A1f 1/3 bar g/cc	4A1h Oven dry g/cc	g/cc	Water content: Pct.	4B1c 1/3 bar Pct.	4B2 15 bar Pct.	4D1 Extensibility COLE f in./in.	4D1 Extensibility COLE in./in.	pH: 8C1b Saturated Paste	8C1a H_2O 1:1	8C1a H_2O 1:10
0-6	1.01	0.077	13												6.3	
6-20	0.54	0.042	13												6.2	
20-34	0.45										5.0				6.4	
34-47	0.42														6.4	
47-54	0.37														6.3	
54-68+	0.27														6.2	

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 8A1: 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K		6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0-6	6.1	1.2	0.2	0.2	7.7			8.6										
6-20	8.8	1.3	0.3	0.1	10.5			11.3										
20-34	9.7	1.9	0.3	0.1	12.0			12.4										
34-47	13.8	3.4	0.4	0.1	17.7			15.8	0.7	0.2	1.2	0.1		-	0.9	0.4		0.23
47-54	6.3	1.6	0.4	0.1	8.4				0.5	0.4	1.2	0.1		-	0.9	0.4		0.19
54-68+	5.8	1.5	0.4	0.3	8.0			6.5	0.6	0.2	0.8	tr.		-	1.1	0.5		0.22

Depth (In.)	8A Water at Saturation Pct.	5D2 Exchangeable Na Pct	5B1b Exch. Na meq./100g.	Gypsum Pct.	5C1 Base Sat. NH_4OAc Pct.	Clay mineralogy (<0.002 mm.) 7A: Mont.	Verm.	Mica	Kaolin	
						< X-ray >				
0-6					90					
6-20					93					
20-34					97					
34-47	31.9		0.4		100+					
47-54	30.8		0.3		100+					
54-68+	29.7	6	0.4		100+					

* From characterization sample (5Kg)(except as noted).
** 2-19 mm. from characterization sample, 19-76 mm. from field volume estimate.

SHERIDAN SANDY LOAM (taxadjunct) 1/
S65Calif-27-26

Location: Monterey County, California. SW corner NE¼ NE¼ Sec. 29, T15S, R6E, 4.5 miles up Johnson Canyon Road from Armstrong Ranch main gate, 600 feet north of dirt road. (16" rainfall, inland, grass, north slope). Date of Sampling: May 26, 1965.
Description by: Lewis C. Leifer. Collectors: W. D. Nettleton, B. R. Brasher, C. J. Weisel, R. D. Waggoner, F. J. Pecarich: site selection by T. D. Cook.
Classification: Typic Haploxeroll, coarse-loamy, mixed, thermic. Regosol (brunizemic). (See temperature data).
Vegetation: Range, grass, soft chess, ripgut brome, fiddleneck and scattered weeds.
Climate: Precipitation is 14 to 20 inches. Mean annual temperature is 60°F., mean January 50°F., mean July 66°F. Parent Material: Weathered diorite (gruss).
Topography: Steep, smooth, north-facing slope of 34 percent, about 50 feet below top of rounded ridge crest. Elevation: 3100 feet. Drainage: Well drained, moderately rapid permeability, medium runoff. Soil Moisture: All is dry; moist below.

Remarks: The closely related paired profile for this sample is about a mile away, S65Calif-27-24; a south exposure a few hundred feet away is S65Calif-27-25 and the one a mile away is S65Calif-27-23. Other Sheridan samples are from near the coast under 35 to 45 inches of rainfall and are numbers 20, 21 and 22.

HORIZON	DESCRIPTION
A11 RSL 65592	0 to 6 inches, dark grayish brown (10YR 4/2) heavy sandy loam, very dark brown (10YR 2/2) moist; moderate fine and medium subangular blocky structure; only very slightly compacted by cattle; slightly hard, very friable, slightly sticky and slightly plastic; abundant very fine roots; many very fine interstitial and few fine tubular pores; medium acid (pH 6.0); gradual smooth boundary.
A12 RSL 65593	6 to 20 inches, dark grayish brown (10YR 4/2) sandy loam, very dark brown (10YR 2/2) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; plentiful very fine roots; many very fine interstitial and common fine tubular pores; medium acid (pH 6.0); diffuse smooth boundary.
A13 RSL 65594	20 to 34 inches, dark grayish brown (10YR 4/2) sandy loam, very dark brown (10YR 2/2 toward 3/2) moist; strong medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; plentiful very fine roots; many very fine interstitial and few fine tubular pores; slightly acid (pH 6.3); clear irregular boundary.
A14 RSL 65595	34 to 47 inches, brown (10YR 5/3) light sandy loam, darker brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; very few very fine roots; many very fine interstitial pores; considerable rodent activity and mixing, 20 to 30 percent, upper A soil material; clear wavy boundary.
C1 RSL 65596	47 to 54 inches, brown (7.5YR 5/4) coarse sand, strong brown and brown (7.5YR 5/6 and 4/4) moist; massive; has rock structure and is easily cut with hand tools; hard, friable, nonsticky and nonplastic; no roots; common very fine interstitial pores; few colloidal stains and few thin clay films in pores; slightly acid (pH 6.5); gradual irregular boundary.
C2 RSL 65597	54 to 68 inches, black and white clean decomposed diorite, easily cut with hand tools.

1/ The Sheridan series is in a coarse-loamy, mixed, thermic family of Pachic Haploxerolls. This pedon has a mollic epipedon less than 20 inches thick.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Sweeney silty clay loam (taxadjunct) **LOCATION** San Mateo County, California

SOIL FAMILY: Typic Haploxeroll, fine-loamy, mixed, mesic

SOIL NOS. S55-Calif.-41-10 **LAB. NOS.** 55373-55379

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2 2/	TEXTURAL CLASS
0- 7	A1	0.9	4.5	6.4	23.8	14.4	25.1	24.9	41.9	13.2	1	scl
7-16	B2	0.6	3.6	5.3	22.6	13.7	25.3	28.9	40.2	13.7	1	scl
16-22	B3	0.8	7.1	7.8	26.1	15.3	23.9	19.0	42.9	13.2	0	fsl
22-33	C1	1.4	9.9	9.5	27.8	14.2	24.5	12.7	42.4	13.5	0	fsl
33-45	C21	3.1	15.7	11.8	27.6	13.9	19.5	8.4	40.4	9.6	2	fsl
45-57	C22	3.0	18.1	13.5	28.9	13.0	17.8	5.7	39.7	8.0	0	sl
57-65	C23	1.9	16.3	14.6	30.3	13.6	18.2	5.1	41.0	8.1	0	sl

8C1b SATURATED PASTE 1:1	pH 8C1a 1:5	8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	8A1a Elec. Conduc. EC×10³ MILLIMHOS PER CM @25°C.	Free Fe_2O_3 6C1b %	GYPSUM me./100g. SOIL	4A3a Bulk Density g/cc		4B2 Soil wat r 15 atmos. Pct.
6.4		6.9	1.48	0.112	13.2		0.4	1.1		1.33		12.8
6.3		6.9	1.12	0.096	11.7		0.5	1.2		1.48		14.0
6.7		7.2	0.40	0.042	9.5		0.4	1.0				14.0
6.7		7.3	0.19				0.4	1.1				14.0
6.9		7.4	0.08				0.3	0.7		1.65		11.6
7.0		7.2	0.05				0.3	0.7				11.0
7.2		7.3	0.09				0.3	0.7				10.2

5A2a CATION EXCHANGE CAPACITY (+ Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a N	5B1b Exch. Na 6P2a	5B1b Exch. K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg	6J1a 1/ HCO_3	6K1a Cl	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
47.7	21.0	19.8	6.6	1.1	0.2	86	0.8	Tr.	2.8	2.4	0.4	46.0
52.8	23.1	20.0	6.3	0.9	0.2	88	0.8	0.1	3.3	2.2	0.3	45.6
56.2	25.8	23.1	6.5	0.9	0.2	89	0.7	Tr.	2.5	1.5	0	41.4
56.4	28.0	24.4	5.5	0.9	0.1	91	0.6	Tr.	2.4	1.2	0	40.1
53.5	26.8	22.6	6.6	1.1	0.1	89	0.6	Tr.	1.4	0.9	0	39.5
52.5	26.7	22.2	6.1	1.2	0.1	89	0.6	Tr.	4.2	0.9	0	39.1
47.7	24.3	21.1	4.9	1.2	0.1	91	0.7	Tr.	2.0	0.7	0	37.5

1/ No $CO_3^=$ found

2/ Percent of the whole soil

SWEENEY SILTY CLAY LOAM (taxadjunct) 1/
S55Calif-41-10

Location: San Mateo County, California. In the San Mateo County SCD, west side of Highway No. 5 (Skyline Highway), 4.5 miles south of Sky Londa. See Sheet 24, Soil Survey of San Mateo Area, California, May 1961. Date of Sampling: May 17, 1955
Description by: Ralph E. Nelson. Collectors: Reuben E. Nelson, Ralph E. Nelson, and Rudolph Ulrich.
Classification: Typic Haploxeroll, fine-loamy, mixed, mesic.
Vegetation: Annual grasses; soft chess, wild oat, lupine. Parent Material: Basaltic material classified as diabase. Relief: Hilly to mountainous with gently to moderately steep rolling hills. The slope at the sample site location was about 25 percent, plain, toward the southeast. Elevation: 2,100 feet. Drainage: Surface drainage is rapid, internal drainage is moderate. Climate: 35-40 inches of rainfall.
Remarks: Many worms in surface 7-inch and occasional to few worms to a depth of 16 inches, krotovinas very abundant to a depth of 22 inches.

HORIZON		DESCRIPTION
A_1	0-7"	Dark grayish brown (10YR 4/2; very dark grayish brown to very dark brown, 10YR 2.5/2, moist) light silty clay loam. Moderate medium to fine granular structure. Hard, friable, slightly plastic and nonsticky. There are many roots and worms, also krotovinas. The reaction is 7.0. Grades clearly and smoothly into:
B_2	7-16"	Dark grayish brown (10YR 4/2; very dark brown, 10YR 2/2, moist) silty clay loam, slightly finer-textured than the horizon above. Weak, medium to fine subangular blocky. Hard, firm to friable, slightly plastic and nonsticky. There are thin continuous clay skins on the vertical faces of the structural aggregates. Many roots. Some worm casts and krotovinas. The reaction is 7.0. The lower boundary is clear and wavy.
B_3	16-22"	Indistinctly brown and dark grayish brown mottled (10YR 4/3-4/2; dark brown to very dark grayish brown, 10YR 3/3-3/2, moist) clay loam. Very weak medium and fine subangular blocky. Hard, firm to friable, slightly plastic and slightly sticky. There are thin, patchy darker colored clay skins on the vertical faces. Some roots and numerous krotovinas. The reaction is 7.0. The lower boundary is clear and varies from wavy to tonguelike, due to krotovina action.
C_1	22-33"	Mottled yellowish brown and dark brown (10YR 5/4-3/3; dark yellowish brown, 10YR 4/4, mottled with very dark brown, 10YR 2/2, manganese and iron facings on the structural aggregates, moist) light clay loam slightly coarser-textured then the horizon above. Very weak medium to fine subangular blocky. Very hard, firm to friable, slightly plastic and slightly sticky. Some thin, patchy clay skins on vertical faces. Few roots. The reaction is 7.0. The lower boundary is gradual and wavy.
C_{21}	33-45"	Mottled yellowish brown, dark brown, and pale yellow (10YR 5/4-3/3 and 2.5Y 7/4; yellowish brown and dark brown, 10YR 5/4-3/2, with dark colored iron and manganese facings, moist) loam. Massive to very weak subangular blocky. Very hard, firm, nonplastic and nonsticky. The reaction is 7.0. The lower boundary is gradual and wavy into:
C_{22}	45-57"	Similarly colored gritty loam. Massive. Very hard, firm, nonplastic and nonsticky. Reaction is 7.0. The lower boundary is gradual and wavy.
C_{23}	57-65"	Similarly colored sandy loam. Massive. This material grades gradually with depth into the hard diabase bedrock.

1/ The Sweeney series is in a fine-loamy, mixed, mesic family of Typic Argixerolls. This pedon lacks an argillic horizon.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Haploxeroll, fine-loamy, mixed, thermic
SOIL San Andreas sandy clay loam (taxadjunct) SOIL Nos. S65Calif-27-28 LOCATION Monterey County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65533 - 65537

Depth (In.)	Horizon	1B1b Size class and particle diameter (mm) Total: Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	* Coarse fragments 1A2a: > 2 Pct.	2 – 19 Pct. of < 76mm	19 – 76 Pct. of < 76mm
		Pct. of < 2 mm																
0-1	A11	64.7	16.1	19.2	17.4	17.8	8.5	13.6	7.4	8.2	7.9	22.7	57.3	0	19	12	12	0
1-8	A12	64.4	16.2	19.4	17.0	17.4	8.1	14.3	7.6	8.0	8.2	22.7	56.8	0	19	10	10	0
8-17	B2	64.4	14.6	21.0	19.4	19.0	7.9	11.9	6.2	6.7	7.9	18.8	58.2	0	21	9	9	0
17-21	B3	65.8	14.8	19.4	18.1	19.3	8.8	13.4	6.2	6.3	8.5	18.8	59.6	0	19	10	10	0
21-36+	C	83.1	9.9	7.0	21.6	28.6	11.3	16.1	5.5	5.0	4.9	17.3	77.6	0	7	13	13	0

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. Iron as Fe Pct.	6E1b Carbonate as $CaCO_3$ Pct.	Bulk density: 4A1f 1/3 bar g/cc	4A1h Oven dry g/cc	g/cc	3B2 Cm	Water content: Pct.	4B1c 1/3 bar Pct.	4B2 15 bar Pct.	4D1 Extensibility COLE in./in.	4D1 Extensibility COLE in./in.	pH: 8C1a H_2O 1:1		
0-1	1.65	0.135	12		-							9.7			6.6		
1-8	0.88	0.067	13		-	1.67	1.72		1.00		11.4	7.5	0.011	0.011	6.6		
8-17	0.30				-	1.74	1.82		1.00		12.7	9.0	0.014	0.014	6.7		
17-21	0.20				-							9.1			6.5		
21-36+	0.05				-	1.99	1.99		1.00		7.7	5.1	0.002	0.002	6.3		

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	5A3a Sum		6G1d KCl Ext. Al^{+++}					Base saturation: 5C1 NH_4OAc Pct.	Pct.
	meq/100 g															
0-1	15.1	5.4	0.2	0.5	21.2		21.8								97	
1-8	15.0	6.2	0.2	0.2	21.6		22.5								96	
8-17	20.2	8.0	0.3	0.1	28.6		28.3								100+	
17-21	18.2	7.3	0.4	0.1	26.0		25.0								100+	
21-36+	13.1	5.3	0.4	0.1	18.9		17.7								100+	

Depth (In.)	Clay mineralogy (≤0.002 mm) 7A: Mont.	Verm.	Mica	Kaolin	X-ray
0-1	xxxx				
1-8					
8-17	xxxx			t	
17-21					
21-36+	xxxx	x			

* From characterization sample (5Kg) (except as noted).

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

SAN ANDREAS SANDY CLAY LOAM (taxadjunct) 1/
S65Calif-27-28

Location: Monterey County, California, 400 feet west of S¼ corner of SE¼, Sec. 18, T17S, R7E, 6 miles on road to Pinnacles from Soledad. Date of Sampling: May 27, 1965.
Described by: Lewis C. Leifer. Collectors: W. D. Nettleton and B. R. Brasher, C. J. Weisel, R. D. Waggoner, F. J. Pecarich; site selection by T. D. Cook.
Classification: Typic Haploxeroll, fine-loamy, mixed, thermic. Noncalcic Brown(medial).
Vegetation: California sage, deer vetch, wild oats, red brome, some soft chess.
Climate: Precipitation 10 inches; mean annual temperature 65°F., mean January temperature 55°F., mean July temperature 70°F. Parent Material: Weathered diorite (gruss). Topography: Steep smooth 30 percent south-facing slope. Elevation: 1500 feet. Drainage: Well drained, permeability moderately slow to slow, runoff medium. Soil Moisture: Dry throughout.
Remarks: The paired sample for this site is S65Calif-27-27. Classification assumes mollic epipedon for series as a whole; mollic marginal this site because of weak structure.

HORIZON	DESCRIPTION
A11 RSL 65533	0 to 1 inch, dark brown (10YR 3/3 moist or dry) sandy clay loam; weak coarse platy structure readily breaking to moderate coarse granular; slightly hard, friable, sticky and plastic; plentiful very fine roots; common very fine interstitial pores; slightly acid (pH 6.5); thin layer of fine gravel covers 1/2 of surface; clear smooth boundary.
A12 RSL 65534	1 to 8 inches, dark brown (7.5YR 3/2) sandy clay loam, very dark brown (7.5YR 2/2) moist; weak coarse prismatic structure; very hard, firm, sticky and plastic; plentiful very fine roots mostly on ped exterior; common very fine interstitial and few fine tubular pores; neutral (pH 7.0); vertical joints darkened by organic material; clear wavy boundary.
B2 RSL 65535	8 to 17 inches, dark reddish brown (5YR 3/4 ped interiors) sandy clay loam, dark reddish brown (5YR 3/4m ped interior), dark brown (7.5YR 3/2 ped exteriors, 3/4 rubbed) moist; weak coarse prismatic structure; extremely hard, firm, very sticky and plastic; plentiful very fine roots mostly on ped exteriors; common very fine interstitial pores; continuous colloidal stems, common thin clay stains in pores and on ped faces; neutral (pH 7.0); clear wavy boundary.
B3 RSL 65536	17 to 21 inches, brown (7.5YR 5/4) light sandy clay loam, dark brown (7.5YR 3/4) moist; massive; very hard, firm, sticky and plastic; very few very fine roots; many very fine interstitial pores; few thin clay films in bridges and common colloidal stains; slightly acid (pH 6.5); B3 is an indistinct transition between B2 and C; clear smooth boundary.
C RSL 65537	21 to 36 inches, clean decomposed diorite with common colloidal stains upper part, rock structure, can be dug with hand tools with difficulty, becomes lithic contact at 36 inches.

1/ The San Andreas series is in a coarse-loamy, mixed, thermic family of Typic Haploxerolls. This pedon is in a fine-loamy (more than 18 percent clay) family of the same subgroup.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Haploxeroll, fine, montmorillonitic, thermic
SOIL Rincon clay loam (taxadjunct) SOIL Nos. S64Calif-57-17 LOCATION Yolo County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64488 - 64494

Depth (in.)	Horizon	1B1b Total: Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	Coarse fragments 1A2a: ≥ 2 Pct.	2 – 19 Pct. of < 76 mm	19 – 76 Pct. of < 76 mm
		Pct. of < 2 mm																
0-8	Ap	13.6	51.0	35.4	0.4	1.6	2.4	5.1	4.1	15.0	36.0	22.0	9.5			0		
8-17	B1	13.0	44.7	42.3	0.3	1.1	1.6	4.9	5.1	14.0	30.7	22.2	7.9			0		
17-34	B21t	20.0	45.5	34.5	0.7	1.2	2.1	7.5	8.5	16.8	28.7	30.2	11.5			0		
34-45	B22t	18.4	46.0	35.6	0.4	0.9	1.7	6.9	8.5	15.6	30.4	28.7	9.9			0		
45-54	B31	19.7	47.6	32.7	0.8	0.8	1.5	7.6	9.0	17.8	29.8	32.0	10.7			0		
54-74	B32	34.3	37.9	27.8	1.8	2.5	5.4	13.4	11.2	16.2	21.7	34.7	23.1			0		
74-84+	C1	25.3	43.4	31.3	1.2	2.1	4.2	9.7	8.1	16.0	27.4	29.4	17.2			0		

Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Atterberg limits: Plastic limit	Liquid limit	Plastic index	Water content: 4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility COLE	4D1 Extensibility COLE	pH: 8C1b Saturated Paste	8C1a H_2O 1:1	8C1a H_2O 1:10
	Pct.	Pct.		Pct.	Pct.	Pct. of <0.4 mm			Pct.	Pct.	Pct.	in./in.	in./in.			
0-8	0.87	0.088	10		-	19	29	10			13.1				6.2	6.7
8-17	0.50	0.069	7		-						16.4				6.6	7.1
17-34	0.35	0.048	7		-	19	37	18			15.5				7.4	7.8
34-45	0.30				-						14.3				7.9	8.3
45-54	0.19				tr.						13.0				8.1	8.7
54-74	0.17				1						11.2				8.2	8.8
74-84+	0.17				2	16	29	13			12.5				8.2	8.9

Depth (in.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 6A1: 6N1b Ca	6O1b Mg	6P1a Na	6Q1a K	6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter								mmho/cm
0-8	11.5	9.5	0.2	0.9	22.1	4.1	26.9										0.33
8-17	14.9	11.5	0.2	0.6	27.2	3.2	31.8										0.13
17-34	14.2	9.1	0.4	0.6	24.3		24.6										0.18
34-45	15.9	9.0	0.4	0.5	25.8		27.4										0.25
45-54	17.5	8.4	0.5	0.5	26.9		23.0										0.31
54-74	18.0	7.2	0.4	0.3	25.9		20.8										0.33
74-84+	24.8	8.1	0.5	0.3	33.7		24.2										0.32

Depth (in.)	8A Water at Saturation	Exch. bases: 5B3b Ca	5B3b Mg	5B1b Na	5D2 Exchangeable Na	5C2 Base Sat.	Gypsum	Clay mineralogy (<0.002 mm.) 7A1: Mont.	Verm.	Mica	Kaolin
	Pct.	meq./100 g.			Pct.	Pct.	Pct.	X-ray 7A2			
0-8	42.2				1	82					
8-17	45.0				1	86		xxxx	x	-	xx
17-34	41.2				2	99					
34-45	46.9				1	94		xxxx	-	-	xx
45-54	46.1				2	-					
54-74	42.5				2	-					
74-84+	45.3				2	-		xxxx	-	-	xx

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

RINCON CLAY LOAM (taxadjunct) 1/
S64Calif-57-17

Location: Yolo County, California. A pit located 100 feet south of the northwest corner of NE¼ NE¼, Sec. 26, T.11N., R.2W., located about 9.5 miles west of Zamora. Photo ARB-7K-160.
Date of Sampling: September 29, 1964.
Description by: G. J. Staidl. Collectors: R. E. Nelson, B. R. Brasher, G. M. Kennedy, W. F. Andrews, L. A. Bates, G. J. Staidl, C. B. Goudey.
Classification: Typic Haploxeroll, fine, montmorillonitic, thermic.
Vegetation: Cultivated, fallow at the time of sampling with dryland barley as the major crop. Climate: Average annual precipitation is 17 inches; mean annual temperature 61°F. Parent Material: Alluvium from sedimentary rocks. Topography: Alluvial fan; plane; less than one percent slope; aspect to the west near the midslope. Elevation: 300 feet above sea level. Drainage: Runoff is slow; permeability is moderately slow to slow; drainage class is well drained. Soil Moisture: The profile was moist below 8 inches.
Remarks: (1) Truog soil reaction test used in field pH determination; (2) Paired sample No. 64 Cal. 57-16; (3) Diagnostic horizons--mollic epipedon. (4) Soil temperature - 25" - 25.5°C; 40" - 25.0°C; 50" - 24.5°C; 64" - 24.0°C; 79" - 22.0°C; (5) B.P.R. Sample horizons: Ap - 0-8; B21t - 17-34; C1 - 74-84.

HORIZON	DESCRIPTION
Ap RSL 64488	0 to 8 inches, grayish brown (10YR 5/2) silty clay loam, dark brown (10YR 3/3) moist; strong very coarse crumb structure; very hard, firm, slightly sticky, plastic; plentiful micro and very fine random roots; many micro and very fine tubular pores and common fine interstitial pores; medium acid (pH 6.0); clear smooth boundary.
B1 RSL 64489	8 to 17 inches, yellowish brown (10YR 5/4) silty clay loam, dark yellowish brown (10YR 3/4) moist; strong, very coarse prismatic structure; very hard, firm, sticky, plastic; plentiful micro and very fine random roots; many micro tubular pores; common thin clay films lining pores; neutral (pH 7.0); clear smooth boundary.
B21t RSL 64490	17 to 34 inches, yellowish brown (10YR 5/4) silty clay, dark yellowish brown (10YR 3/4) moist; moderate coarse prismatic breaking to moderate coarse angular blocky structure; very hard, very firm, sticky, very plastic; few micro and very fine random roots; many micro tubular pores; many moderately thick clay films occurring on ped faces and in pores; mildly alkaline (pH 7.5); slickensides; diffuse boundary.
B22t RSL 64491	34 to 45 inches, yellowish brown (10YR 5/4) silty clay loam, dark yellowish brown (10YR 3/4) moist; moderate medium and coarse prismatic structure; very hard, very firm, sticky, very plastic; few micro and very fine random roots; many micro tubular pores; continuous, moderately thick, clay films in pores and on ped faces; moderately alkaline (pH 8.0); clear wavy boundary.
B31 RSL 64492	45 to 54 inches, yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium prismatic structure; hard, firm, sticky, plastic; very few micro vertical roots; many micro tubular pores; continuous, moderately thick, clay films in pores and on ped faces; moderately alkaline (pH 8.0), slightly effervescent, lime is disseminated and in seams; clear wavy boundary.
B32 RSL 64493	54 to 74 inches, yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium prismatic structure; hard, friable, sticky, plastic; many micro tubular pores; continuous thin clay films in pores and on ped faces; moderately alkaline (pH 8.0), strongly effervescent, lime is disseminated and in seams; clear wavy boundary.
C1 RSL 64494	74 to 84 inches plus, pale brown (10YR 6/3) clay loam, dark yellowish brown (10YR 4/4) moist; massive; hard, friable, sticky, plastic; common micro and very fine tubular pores; common thin clay films in pores; moderately alkaline (pH 8.0), strongly effervescent, lime is disseminated and in soft masses.

1/ The Rincon series is in a fine, montmorillonitic, thermic family of Mollic Haploxeralfs. This pedon has a mollic epipedon and lacks an argillic horizon.

SOIL SURVEY LABORATORY Riverside, California

OIL TYPE Landlow silty clay loam **LOCATION** Merced County, California

SOIL FAMILY: Aquic Haploxeroll, fine, montmorillonitic, thermic

SOIL NOS. S55Calif. 24.1 **LAB. NOS.** 55273-280

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)							3A1		2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2	
0- 4	A_{1p}	0.3	0.8	1.8	9.8	8.2	46.1	33.0	31.2	29.4	0	cl
4-10	B_{21}	0.1	0.5	2.0	11.1	9.3	36.8	40.2	30.4	23.3	0	c
10-17	B_{22}	0.0	0.4	1.9	11.0	10.1	38.1	38.5	30.0	25.8	0	cl
17-21	B_{31}	0.1	0.4	2.0	10.9	10.6	39.1	36.9	32.0	25.4	0	cl
21-32	B_{32}	0.3	0.8	2.4	10.1	10.4	46.4	29.6	34.8	29.0	0	cl
32-48	B_{33}	0.0	0.6	1.1	4.4	4.9	48.0	41.0	21.6	34.5	0	sic
48-60	C_1	0.1	0.4	0.8	15.9	12.9	44.7	25.2	44.0	26.5	0	l
60-65	C_2	0.2	0.7	1.6	10.8	8.1	54.5	24.1	32.3	37.9	0	sil

8C1b pH SATURATED PASTE 1:1	8C1a pH 1:5	8C1a pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	4A3a Bulk Density g/cc	8A1a Elec. Conduc. EC×10³ MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	6F1a GYPSUM mil./100g. SOIL	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS. %
7.5		8.1	1.35	0.115	11.7	1.54	2.7		0			12.9
8.1		8.4	0.74	0.059	12.5	1.65	2.4		0			15.0
8.3		9.2	0.62	0.053	11.7	1.68	2.9	<0.5	0			15.7
8.4		9.0	0.39	0.032	12.2	1.71	3.9	<0.5	0			15.1
8.3		9.1	0.15	0.018		1.76	7.1	<0.5	0			13.3
8.0		8.7	0.14	0.020		1.75	14.5	<0.5	0			14.6
8.2		9.5	0.09			1.75	14.1	<1	0			11.2
8.4		9.6	0.09			1.58	16.2	1	0			10.9

5A2a CATION EXCHANGE CAPACITY (+ Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	5B1b Exch. Na 6P2a	5B1b Exch. K 6Q2a	5D1 EXCH. Na %	SATURATION EXTRACT SOLUBLES 6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg	6J1a HCO_3 + CO_3	6K1a Cl	8A1 8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
29.4	13.4	11.8		2.4	0.8	8.2	20.0	0.3	9.1	8.2	12.6	48.3
33.9	11.0	12.4		6.3	0.7	18.6	20.2	0.2	2.2	5.8	13.4	58.0
30.3	8.6	10.8		9.4	0.6	31.0	26.2	0.2	1.2	6.4	12.9	77.6
27.6	8.0	9.9		10.6	0.5	38.4	34.2	0.2	1.4	5.9	18.5	76.7
22.5	10.2	7.7		9.3	0.5	41.3	62.5	0.4	4.2	3.9	39.9	54.0
27.8	11.9	8.2		9.2	0.7	33.1	128.7	0.2	34.9	2.0	53.2	56.9
18.3	10.7	6.3		9.3	0.5	50.8	132.5	0.2	14.0	2.7	88.3	45.3
17.3	11.4	7.5		8.4	0.5	48.6	145.0	0.2	18.3	2.7	114.3	42.3

LANDLOW SILTY CLAY LOAM
S55Calif-24-1

Location: Merced County, California. In the Los Banos SCD on the Los Banos Outlying Nursery in the middle of Check No. 15 from the south field fence, 100 feet into the field east of the west fence, SW1/4 SE1/4 SW1/4 sec. 35, T. 9 S., R. 10 E.
Date of Sampling: April 19, 1955.
Description by: R. C. Huff. Collectors: R. C. Huff, R. E. Nelson, George Edmunson, Rudolph Ulrich.
Classification: Aquic Haploxeroll, fine, montmorillonitic, thermic.
Vegetation: The area where the sample was taken is part of the Los Banos Outlying Nursery and is planted to a mixture of Goars tall fescue and birdsfoot trefoil.
Climate: Rainfall approximately 8 inches, characterized by hot, dry summers and relatively cool, moist winters. Parent Material: Fine-textured sedimentary alluvium, which originated mainly from sandstone and shale rocks from the eastern side of the Coast Range Mountains. Relief: Nearly level to level (0-1 percent) very gently sloping basin rim; very slightly concave. Leveled for irrigation. Elevation: 95 feet. Drainage: Surface drainage is very slow, internal drainage, slow. The water table normally fluctuates within 10 feet of the surface.
Remarks: Some evidence of worm activity.

HORIZON		DESCRIPTION
A_{1p}	0- 4"	Grayish brown (10YR 5/2, very dark grayish brown 3/2 moist) silty clay loam; moderate fine and medium subangular blocky. Hard, firm, slightly plastic and nonsticky. Noncalcareous. pH of 8.0. The lower boundary is clear and smooth.
B_{21}	4-10"	Grayish brown (10YR 5/2, very dark brown 2/2 moist) clay. Moderate fine angular blocky. Very hard, firm, plastic and slightly sticky. Noncalcareous. pH of 8.0. The lower boundary is gradual and smooth.
B_{22}	10-17"	Grayish brown (10YR 5/2, very dark grayish brown 3/2 moist, with darker faces 10YR 2/2) slightly coarser-textured clay than the horizon above. Very hard, firm, plastic and slightly sticky. Very slight evidence of being calcareous. pH 8.0. This grades clearly and with a wavy boundary into:
B_{31}	17-21"	Grayish brown (2.5Y 5/2, very dark grayish brown 3/2 moist) silty clay loam. Weak, fine subangular blocky. Hard, firm, slightly plastic and nonsticky. There are a very few very fine (less than 1 mm.) manganese shot scattered throughout this horizon. The soil is very slightly calcareous. pH is 8.0. The lower boundary is clear and smooth.
B_{32}	21-32"	Gray brown (2.5Y 5/2, dark grayish brown 4/2 moist) slightly coarser-textured silty clay loam than the horizon above. Weak medium subangular blocky. Hard, firm, slightly less plastic than the horizon above and nonsticky. Few very fine (less than 1 mm.) manganese shot scattered throughout the horizon. The soil effervesces slightly with HCl. This grades clearly and smoothly into:
B-33	32-48"	Light olive brown (2.5Y 5/4, dark grayish brown 4/2 moist) light silty clay loam. Weak fine subangular blocky. Hard, firm, slightly plastic and nonsticky. Very few very fine (less than 1 mm.) manganese shot scattered throughout the horizon and also very conspicuous gypsum crystals 1 to 5 mm. in size, which are soft and light gray to white in color. Effervesces with HCl. This grades clearly and smoothly into:
C_1	48-60"	Light olive brown (2.5Y 5/4, dark olive brown 3/4 moist) heavy loam. Massive, breaking into weak, medium conchoidal aggregates with metallic-appearing manganese coatings on the structural faces. Hard, firm, slightly plastic and nonsticky. The soil effervesces with HCl. Lower boundary is gradual and smooth.
C_2	60-65"	Light olive brown (2.5Y 5/4, dark olive brown 3/4 moist) heavy loam. Massive, breaks to weak medium conchoidal aggregates which have very conspicuous manganese coatings on the structural faces. Hard, firm, slightly plastic and nonsticky. There is a strong effervescence with HCl.

OIL SURVEY LABORATORY Riverside, California

SOIL TYPE Landlow silty clay (taxadjunct) **LOCATION** Riverside County, California

SOIL FAMILY: Aquic Haploxeroll, fine, montmorillonitic, thermic.

SOIL NOS. S57Calif-33-6 **LAB. NOS.** 57495 - 57500

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0- 6	A1	0.2	0.2	0.2	0.9	1.8	52.5	44.2	12.0	42.9	0	sic
6-10	B1	0.2	0.3	0.2	0.8	1.5	46.4	50.6	10.6	37.9	0	sic
10-24	B21	0.1	0.3	0.2	0.7	1.5	45.6	51.6	10.0	37.6	0	sic
24-30	B22	0.1	0.2	0.2	0.6	1.6	47.3	50.0	9.7	39.6	0	sic
30-42	C1	0.3	0.3	0.2	0.7	1.7	47.8	49.0	9.8	40.2	0	sic
42-60+	C2	0.1	0.4	0.2	0.8	2.2	49.1	47.2	11.1	40.8	0	sic

8C1b SATURATED PASTE 1:1	pH 8C1a 1:10	6J1a HCO_3* meq/l	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6I1a CO_3* meq/l	8A1a Elec. Conduc. EC×10³ MILLIMHOS PER CM @25°C.	6E1b $CaCO_3$ equivalent %	6F1a GYPSUM me./100g. SOIL		4A3a Bulk Density g/cc.	4B2 Soil Water 15 atmos. %
7.5	8.0	5.0	0.98	0.111	8.8	0.0	5.6	2.9				17.3
7.9	8.3	4.6	0.68	0.067	10.1	0.0	7.0	4.8				19.3
8.0	9.2	4.6	0.60	0.047	12.8	0.0	11.5	4.5				20.9
7.9	8.5	3.1	0.45	0.036	12.5	0.0	15.1	4.8			1.54	21.3
7.8	8.0	2.6	0.41	0.033	12.4	0.0	11.0	5.6	5		1.49	21.5
7.8	8.0	2.6	0.35			0.0	23.3	6.4	12		1.56	21.9

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	5B1b Exch. Na 6P2a	5B1b Exch. K 6Q2a	5D1 EXCH. Na %	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	6N1a	6O1a	6K1a	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
38.1	38.8	19.4	-	3.8	1.7	10	28.8	0.7	23.1	6.6	27.4	65.4
40.3	34.4	9.9	-	8.1	0.7	20	52.0	0.3	8.1	4.6	57.6	71.0
40.0	31.1	8.9	-	19.7	1.2	49	105.0	0.3	8.4	4.6	105.1	84.6
41.1	33.7	9.8	-	19.4	1.1	47	173.0	0.5	41.1	13.6	155.5	83.0
41.0	40.4	10.8	-	21.0	1.0	51	198.0	0.4	32.4	17.4	195.8	84.1
41.3	65.0	9.4	-	18.7	0.9	45	216.0	0.5	44.5	16.3	204.0	86.5

LANDLOW SILTY CLAY (taxadjunct) 1/
S57Calif-33-6

Sampled by: George Borst, R. E. Nelson, Cliff Henry and Arnold Knecht, June 4, 1957. Description by: Fred Eggers.

Location: 200' N of the S 1/4 corner of Sec. 33, T4S, R3W. On the Rynsberger Ranch in the triangle between Ellis Road, highway 395 and the San Jacinto River, about 1 mile east of Perris, Riverside County, California.

Elevation: 1413 feet. Precipitation: 12 inches.

Classification: Aquic Haploxeroll, fine, montmorillonitic, thermic.

Vegetation: Salt grass and annual grasses and weeds.
Parent Material: Mixed alluvium, chiefly granitic. Physiography: Flood plain.
Drainage: Slow.

HORIZON		DESCRIPTION
S57Calif-33-6-1 A1	0-6"	Dark gray (10YR 4/1 dry, very dark gray 3/1 moist) silty clay; moderately defined fine granular; hard when dry, firm when moist; sticky and very plastic when wet; moderately slow permeability; many plant roots; pH 8.2; slight effervescence; occasional small pores; clear smooth lower boundary.
S57Calif-33-6-2 B1	6-10"	Gray (10YR 5/1 dry, very dark gray 3/1 moist) silty clay; strongly defined medium subangular blocky with a slight tendency to prismatic structure; very hard when dry, very firm when moist; sticky and very plastic when wet; moderately slow permeability; many plant roots; occasional small pores; pH 8.2; slight effervescence; gradual smooth lower boundary.
S57Calif-33-6-3 B21	10-24"	Gray (10YR 6/1-5/1 dry, dark gray 4/1 moist) clay; strongly defined medium subangular blocky; definitely prismatic on drying; many prominent clay skins, extremely hard when dry, very firm when moist; very sticky and very plastic when wet; slow permeability; occasional plant roots; occasional small pores; pH 8.4; strong effervescence; gradual smooth lower boundary.
S57Calif-33-6-4 B22	24-30"	Gray (10YR 6/1-5/1 dry, dark gray 4/1 moist) clay; strongly defined medium subangular blocky; definitely prismatic; on drying prominent clay skins; extremely hard when dry, very firm when moist; very sticky and very plastic when wet; slow permeability; few roots; pH 8.4; calcium carbonate and calcium sulphate in seams; gradual smooth lower boundary.
S57Calif-33-6-5 C1	30-42"	Gray (10YR 6/1-5/1 dry, dark gray 4/1 moist) silty clay; blocky; very hard when dry, very firm when moist; sticky and plastic when wet; moderately slow permeability; no plant roots; pH 8.4; many seams of gypsum and some line concretions; abrupt wavy lower boundary.
S57Calif-33-6-6 C2	42-60"+	Gray (10YR 6/1-5/1 dry, dark gray 4/1 moist) silty clay, blocky; very hard when dry, very firm when moist; sticky and plastic when wet; moderately slow permeability; no plant roots; pH 8.4; many seams of gypsum and some line concretions.

1/ This pedon lacks mottles with chromas of 2 or less but is presumed to be saturated with water for 90 days or more within 1 meter in most years.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Aridic Haploxeroll, coarse-loamy, mixed, mesic

SOIL Calpine sandy loam SOIL Nos. S61Calif-32-19 LOCATION Sierra Valley, Plumas County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 61730 - 61735

Depth (in.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)			Coarse fragments 2A2: ≥ 2 Pct.	2 – 19 Pct. of < 76 mm	19 – 76 Pct. of < 76 mm
		Size class and particle diameter (mm) 3A1																
		Pct. of < 2 mm																
0–3	A11	79.5	11.5	9.0	9.5	27.5	16.9	21.0	4.6	4.2	18.5	7.3	65.2			4		
3–13	A12	77.8	11.8	10.4	6.1	20.3	17.2	27.0	7.2	4.4	25.5	7.4	56.7			4		
13–21	A3	78.7	10.9	10.4	5.8	21.1	17.8	27.4	6.6	4.1	24.3	6.8	58.5			4		
21–30	B1	76.2	12.3	11.5	4.7	19.5	17.6	27.7	6.7	4.3	24.6	8.0	55.9			4		
30–46	B2	81.2	11.0	7.8	7.0	21.9	19.9	26.8	5.6	4.2	21.5	6.8	63.9			8		
46–59	C1	84.3	9.7	6.0	2.1	9.2	20.7	44.2	8.1	3.7	29.3	6.0	58.7			1		
59–81+	C2g	Not sampled																

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N		6E1b Carbonate as $CaCO_3$ Pct.	6C2a Ext. Iron as Fe Pct.	Bulk density g/cc	Bulk density g/cc	Bulk density g/cc		Water content Pct.	Water content Pct.	4B2 15 bar Pct.				pH 8C1b Sat. Paste	pH 8C1a 1:10
0–3	2.30	0.144	16		–	0.8							6.4				5.8	6.2
3–13	0.98	0.076	13		–	0.9							5.8				6.0	6.3
13–21	0.63	0.048	13		–	0.9							5.2				6.1	6.4
21–30	0.41	0.033	12		–	1.0							5.8				6.3	6.6
30–46	0.15				–	0.8							5.3				6.5	6.6
46–59	0.08				–	0.6							5.3				6.6	6.6
59–81+																		

Depth (in.)	Extractable bases 6N2c Ca	6O2c Mg	6P2a Na	5B1a 6Q2a K	6H2a Ext. Acidity	Cat. Exch. Cap. 5A2a NaOAc	Water extract from saturated paste Ca	Mg	Na	K		CO_3	HCO_3	Cl	SO_4	Electrical conductivity
	meq/100 g						meq/liter									mmho/cm
0–3	6.7	1.2	0.1	0.5	6.2	14.2										
3–13	6.8	1.2	0.2	0.4	5.1	14.2										
13–21	6.1	1.3	0.1	0.6	3.6	12.2										
21–30	6.1	1.5	0.2	0.5	3.6	12.8										
30–46	6.0	1.7	0.1	0.2	2.0	10.7										
46–59	6.1	1.9	0.1	0.1	1.7	10.7										
59–81+																

Depth (in.)	Water at Saturation Pct.	Exchangeable Na Pct.		Gypsum Pct.	5C3 Base Sat. (Sum) Pct.		
0–3					58		
3–13					63		
13–21					59		
21–30					69		
30–46					80		
46–59					83		
59–81+							

CALPINE SANDY LOAM

S61Calif-32-19

Location: Sierra Valley, Plumas County, California. Center of NE1/4 SE1/4 section 27, T. 23 N., R. 14 E. Approximately 3/4 mile southwest of Beckwourth just west of Highway A-23 (Beckwourth-Calpine road).
Date of Sampling: September 19, 1961.
Collectors: Grant Kennedy, Reuben Nelson, John Rogers, Paul Nazar, James McLaughlin, Eugene Begg.
Vegetation: The vegetation is silver sage, big sage, dryland sedges, and bitter brush. Climate: Estimated annual precipitation 15 inches. Nearest weather station (Portola): Mean annual temperature 45.1° F.; January average 28.7° F.; July average 62.6° F.; mean annual precipitation 20.62 inches.
Parent Material: Mixed but dominantly granitic alluvium. Relief: Slightly undulating low terrace with a slope less than 2 percent. Elevation: 4880 feet. Drainage: Moderately well drained, runoff very slow and permeability is rapid in the upper part of the profile and moderate below.
Remarks: This is a Brunizem with a weakly prismatic B2 horizon. The C2g horizon was not sampled. The C2g was stratified sand and coarse sand. A water table was found at 8 feet. Samples were taken for the California Division of Highways and the Bureau of Public Roads from the A12 horizon (3-13 inches), the B2 horizon (30-46 inches) and the C1 horizon (46-59 inches).
Classification: Aridic Haploxeroll, coarse-loamy, mixed, mesic.

HORIZON	DESCRIPTION
A11 RSL No. 61730	0 to 3 inches, dark grayish brown (10YR 4/2) sandy loam (near loamy sand), very dark brown (10YR 2/2) when moist; moderate very fine platy structure; loose, very friable, nonsticky and nonplastic; abundant very fine, plentiful fine and few medium roots; many very fine tubular and interstitial pores; strongly acid (pH 5.5); clear, smooth boundary.
A12 RSL No. 61731	3 to 13 inches, dark grayish brown (10YR 4/2) sandy loam, very dark brown (10YR 2/3) when moist; weak coarse platy structure; loose, very friable, slightly sticky and slightly plastic; abundant very fine, plentiful fine and few medium roots; many very fine tubular and interstitial pores; strongly acid (pH 5.5); gradual, smooth boundary.
A3 RSL No. 61732	13 to 21 inches, dark grayish brown (10YR 4/2) sandy loam, very dark brown (10YR 2/3) when moist; weak medium to coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; abundant very fine, plentiful fine and few medium roots; common very fine tubular and interstitial, few fine and medium tubular pores; few thin clay films in pores and bridges; strongly acid (pH 5.5); clear, smooth boundary.
B1 RSL No. 61733	21 to 30 inches, brown (10YR 5/3) sandy loam, dark yellowish brown (10YR 3/4) when moist; weak coarse prismatic structure; hard, firm, nonsticky and nonplastic; plentiful very fine and few fine to medium roots; common very fine tubular and interstitial and few fine to medium tubular pores; common thin clay films in pores and bridges; medium acid (pH 6.0); gradual, smooth boundary.
B2 RSL No. 61734	30 to 46 inches, variegated light yellowish brown (10YR 6/4) and yellow (10YR 7/6) sandy clay loam (near sandy loam), yellowish brown (10YR 5/4) when moist; weak coarse prismatic structure; hard, firm, slightly sticky and slightly plastic; few very fine, fine, and medium roots; common very fine tubular and interstitial and few fine to medium tubular pores; common thin clay films in pores and bridges; medium acid (pH 6.0); gradual, smooth boundary.
C1 RSL No. 61735	46 to 59 inches, light yellowish brown (10YR 6/4) loamy fine sand, dark yellowish brown (10YR 4/4) when moist; massive; slightly hard, firm, nonsticky and nonplastic; few fine, very fine and medium roots; many very fine interstitial and few fine to medium tubular pores; medium acid (pH 6.0); clear, wavy boundary.
C2g RSL No. 61736	59 to 81 inches +, three of the dominant colors are light yellowish brown (10YR 6/4), dark reddish brown (5YR 3/2) and yellow (10YR 7/8), moist colors are reddish yellow (7.5YR 6/6), yellowish red (5YR 5/8) and dark reddish brown (2.5YR 3/4); manganese stains are apparent; texture varies in stratified layers from coarse sand to sand; single grained; loose, nonsticky and nonplastic; very few very fine, fine and medium roots; many very fine interstitial and few very fine tubular pores; medium acid reaction (pH 6.0).

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Aridic Haploxeroll, coarse-loamy, mixed, mesic

SOIL Calpine sandy loam **SOIL Nos.** S61Calif-46-5 **LOCATION** Sierra Valley, Sierra County, California

SOIL SURVEY LABORATORY Riverside, California **LAB. Nos.** 61724 - 61729

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.2)			Coarse fragments 2A2: ≥ 2 Pct.	Coarse fragments 2A2: 2 – 19 Pct. of < 76 mm	Coarse fragments 2A2: 19 – 76 Pct. of < 76 mm
		Pct. of < 2 mm																
0–4	A11	77.2	13.7	9.1	5.5	16.2	15.5	29.8	10.2	6.7	7.0	33.3	50.6			2		
4–11	A12	76.5	12.1	11.4	6.0	14.7	14.9	29.2	11.7	6.4	5.7	34.2	48.7			2		
11–17	A3	75.2	12.3	12.5	3.9	12.7	15.5	30.8	12.3	6.3	6.0	36.1	45.4			2		
17–27	B1	74.6	11.7	13.7	5.9	15.2	14.9	28.1	10.5	5.8	5.9	32.3	48.1			2		
27–41	B2	71.7	14.9	13.4	2.8	11.9	12.1	30.2	14.7	7.5	7.4	40.4	38.8			3		
41–58	C1	80.4	10.5	9.1	4.2	21.3	19.4	28.2	7.3	4.6	5.9	25.2	59.8			4		
58–76+	IIC2	Not sampled																

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N		6E1b Carbonate as $CaCO_3$ Pct.		Bulk density g/cc	g/cc	g/cc		Water content Pct.	Pct.	4B2 15 bar Pct.			pH 8C1b Sat. Paste	pH 8C1a 1:10
0–4	3.56	0.251	14		–								10.1			6.0	6.3
4–11	0.93	0.073	13		–								6.1			6.2	6.5
11–17	0.56	0.054	10		–								6.1			6.2	6.5
17–27	0.27				–								6.7			6.1	6.5
27–41	0.12				–								7.6			6.3	6.7
41–58	0.06				–								6.6			6.8	6.9
58–76+																	

Depth (In.)	Extractable bases 6N2c Ca meq/100 g	6O2c Mg	6P2a Na	5B1a 6Q2a K	6H2a Ext. Acidity	Cat. Exch. Cap. 5A2a NaOAc	Water extract from saturated paste Ca meq/liter	Mg	Na	K	CO_3	HCO_3	Cl	SO_4	Electrical conductivity mmho/cm
0–4	9.5	2.5	0.1	0.7	7.6	19.3									
4–11	6.2	1.9	0.1	0.6	4.7	10.5									
11–17	5.8	2.2	0.1	0.3	3.8	13.3									
17–27	5.8	3.0	0.2	0.2	3.5	13.3									
27–41	7.6	4.7	0.2	0.1	2.5	14.8									
41–58	7.0	4.9	0.4	0.1	1.4	14.3									
58–76+															

Depth (In.)	Water at Saturation Pct.	5C3 Base Sat. (Sum) Pct.	Clay Mineralogy (<0.002 mm.) Mont-morillonite X-ray	Vermiculite X-ray	Mica X-ray	Kaolinite X-ray	Kaolinite % DTA
0–4		63	–	t	xx	x	15
4–11		65					
11–17		69					
17–27		72					
27–41		83	xx	x	–	x	15
41–58		89	xxx	–	–	x	8
58–76+							

– = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

CALPINE SANDY LOAM

S61Calif-46-5

Location: Sierra Valley, Sierra County, California. Southeast corner of the NW1/4SW1/4 of section 11, T. 21 N., R. 14 E. 3/4 mile north of Terral Farm Headquarters. Date of Sampling: September 18, 1961. Collectors: Grant Kennedy, Reuben Nelson, John Rogers, Paul Nazar, James McLaughlin, Eugene Begg. Vegetation: The vegetation is silver sage and sedges. Climate: Estimated annual precipitation 16 inches. Nearest weather station (Sierraville): Mean annual temperature 46.0° F.; January average 28.2° F.; July average 63.6° F.; mean annual precipitation 25.78 inches. Parent Material: Alluvium from mixed sources. Relief: Very slightly undulating low terrace with a slope of less than 1 percent. Elevation: 4905 feet. Drainage: Moderately well drained; very slow runoff; rapidly permeable in the upper part of the profile and moderate below. Soil Moisture: Profile dry to 41 inches; very moist at 58 inches.

Remarks: This is a Brunizem with a weakly prismatic B2 horizon. There are evident krotovinas in the A3 and B1 horizons that are about 2½ inches in diameter. The IIC2 horizon (58-76 inches) was not sampled. Samples were taken for the California Division of Highways and the Bureau of Public Roads from the A12 horizon (4-11 inches), from the B2 horizon (27-41 inches) and from the C1 horizon (41-58 inches).

Classification: Aridic Haploxeroll, coarse-loamy, mixed, mesic.

HORIZON	DESCRIPTION
A11 RSL No. 61724	0 to 4 inches, dark grayish brown (10YR 4/2) sandy loam, very dark brown (10YR 2/2) when moist; moderate very fine platy structure; loose, very friable, nonsticky and nonplastic; abundant very fine, and few fine to coarse roots; many very fine and few fine and medium tubular and interstitial pores; strongly acid (pH 5.5); clear, smooth boundary.
A12 RSL No. 61725	4 to 11 inches, dark gray (10YR 4/1) sandy loam, very dark brown (10YR 2/2) when moist; weak coarse platy structure; soft, friable, nonsticky and nonplastic; plentiful very fine to medium and few coarse roots; common very fine tubular and interstitial, common fine, and few coarse tubular pores; strongly acid (pH 5.5); clear, smooth boundary.
A3 RSL No. 61726	11 to 17 inches, dark grayish brown (10YR 4/2) sandy loam, very dark brown (10YR 2/3) when moist; weak coarse subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; plentiful very fine to medium and few coarse roots; common very fine tubular and interstitial, common fine and few coarse tubular pores; few thin clay films in pores and bridges; strongly acid (pH 5.5); clear, smooth boundary.
B1 RSL No. 61727	17 to 27 inches, brown (10YR 5/3) sandy loam (near sandy clay loam), brown (10YR 4/3) when moist; weak coarse prismatic structure; hard, firm, slightly sticky and slightly plastic; few fine to medium roots; common very fine and fine tubular, few medium tubular, and common very fine interstitial pores; common thin clay films in pores and bridges; strongly acid (pH 5.5); gradual, smooth boundary.
B2 RSL No. 61728	27 to 41 inches, light yellowish brown (10YR 6/4) sandy clay loam, brown (10YR 4/3) when moist; weak coarse prismatic structure; very hard, firm, slightly sticky and slightly plastic; very few fine roots; common very fine and fine, few medium tubular, and common very fine interstitial pores; common thin clay films in pores and bridges; medium acid (pH 6.0); clear, smooth boundary.
C1 RSL No. 61729	41 to 58 inches, light yellowish brown (10YR 6/4) loamy sand, olive brown (2.5Y 4/4) when moist; massive; slightly hard, friable, nonsticky and nonplastic; very few fine roots; common very fine and fine tubular, and many very fine interstitial pores; few thin clay films in pores; slightly acid (pH 6.5); abrupt, wavy boundary.
IIC2	58 to 76 inches +, loamy sand to coarse sand texture; massive structure; friable to very friable; very few fine roots; reaction is neutral (pH 7.0).

Notes: The IIC2 horizon is stratified loamy fine sand and coarse sand. The soil is micaceous. Mottling increases with depth and the profile becomes gleyed at 70 inches. A gleyed horizon (5GY 5/1) occurred at 96 inches. It had a sandy clay loam texture. Free water was not encountered but is probably present at depths near 70 inches most years. Profile was dry to 41 inches, slightly moist to 54 inches and very moist at 70 inches.

SOIL URVEY LABORATORY Riverside, California

SOIL TYPE Soquel loam (taxadjunct) **LOCATION** San Luis Obispo Co.

SOIL FAMILY: Cumulic Haploxeroll, fine-loamy, mixed, mesic

SOIL NOS. S55Ca1. 40-3 **LAB. NOS.** 55459-464

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0- 3	A p1	0.5	1.2	3.9	25.0	17.4	33.4	18.6	50.6	17.3	1	1
3-8½	A p2	0.4	1.2	3.9	24.6	17.4	34.3	18.2	51.3	17.2	1	1
8½-15	C_1	0.3	1.2	4.0	25.3	17.4	34.1	17.7	51.5	17.3	2	1
15-24	C_2	0.0	0.6	2.4	19.6	19.5	40.3	17.6	55.6	18.0	0	1
24-40	C_3	0.1	0.2	1.2	11.6	16.7	46.7	23.5	58.5	13.5	0	1
40-50	A_{1b}	0.0	0.1	0.3	5.7	12.2	51.6	30.1	37.6	31.1	0	sicl

pH			ORGANIC MATTER				8A1a Elec. Conduc.	6E1b	6F1a	MOISTURE TENSIONS		
8C1b SATURATED PASTE 1:1	1:5	8C1a 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	EC x 10³ MILLIMHOS PER CM @25°C	$CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	4B2 1/10 ATMOS. %	4B2 1/3 ATMOS. %	4B2 15 ATMOS.
7.2		7.7	1.15	0.092	12.5		1.9					9.8
7.2		8.2	1.12	0.087	12.9		0.4					10.5
7.4		8.3	1.02	0.078	13.1		0.4					10.3
7.3		8.1	0.83	0.068	12.2		0.5					10.9
7.4		8.2	1.24	0.089	13.9		0.4					13.3
7.4		8.2	1.45	0.115	12.6		0.4					20.2

5A2a	EXTRACTABLE CATIONS 5B					BASE SAT. %	SATURATION EXTRACT SOLUBLE 8A1					8A
CATION EXCHANGE CAPACITY	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	5C3	6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg		6K1a Cl	MOISTURE AT SATURATION
← Na →	milliequivalents per 100g. soil →						← milliequivalents per liter →					%
26.6	14.1	10.7	2.6	0.5	0.4	91	5.00	0.3	14.3			36.8
27.1	13.5	10.3	2.6	0.4	0.4	90	1.7	0.1	2.5			35.0
26.3	14.0	10.6	2.7	0.4	0.4	90	1.6	0.1	2.2			35.9
31.4	14.1	12.4	2.9	0.4	0.3	90	1.6	0.1	3.3			40.6
35.8	15.7	16.9	3.2	0.1	0.4	91	0.4	0.04	3.9			48.0
37.5	19.9	18.3	3.4	0.3	0.4	92	0.5	0.1	3.5			58.2

1/ Percent of the whole soil

SOQUEL LOAM (taxadjunct) 1/
S55Calif-40-3

Location: About 5/8 mile W. of farm buildings on George Mello farm, San Luis Obispo County, California.

Collectors: W. M. Johnson, Rudolph Ulrich, Lewis Leifer, W. G. Harper, L. R. Wohletz, J. M. Williams. Samples taken September 8, 1955. Description by W. M. Johnson.
Classification: Cumulic Haploxeroll, fine-loamy, mixed, mesic.
Elevation: About 40 feet.

Vegetation: Cultivated field. Planted to sugar beets at time samples were taken. Irrigated.

Relief: Gently sloping, low terrace-like surface. Slope about 1½ percent, plane, toward the east.

Drainage: Well drained. Runoff is medium; permeability is moderate.

Parent material: Loamy, noncalcareous alluvium from mixed sources.

Remarks: Fertilization history of the field was not obtained. Sugar beets looked very healthy. Clods on the soil surface in many places had a thin, patchy white efflorescence that suggested soluble salts.

HORIZON		DESCRIPTION
A_{p1}	0-3"	Very dark grayish brown to grayish brown (10YR 5/2; 3/2 moist) loam. Cloddy from tillage. Weak coarse and medium granular. Very hard, friable, plastic, slightly sticky. Many roots. pH 7.5. Abrupt, smooth lower boundary.
A_{p2}	3-8½"	Very dark grayish brown (10YR 3/2, moist) loam. Weak medium and coarse granular. Friable, slightly plastic, nonsticky. Very many worm casts and burrows. Roots numerous. pH 7.5. Gradual lower boundary.
C_1	8½-15"	Finely, indistinctly mottled very dark gray and very dark grayish brown (10YR 3/1 and 3/2, moist) loam. Massive. Friable, slightly plastic, nonsticky. Compact in places. Common worm burrows and casts. pH 7.5. Common roots. Gradual lower boundary.
C_2	15-24"	Mottled very dark gray and olive brown (10YR 3/1 and 2.5Y 4/4, moist) loam with occasional specks of strong brown. Weak, medium subangular blocky with many worm casts and burrows. Roots common. pH 7.5. Gradual lower boundary.
C_3	24-40"	Very dark gray (10YR 3/1, moist) loam finely mottled with dark grayish brown and very dark grayish brown. Massive with very many worm casts and burrows. Friable, plastic, slightly sticky. Roots common. pH 7.5. Gradual lower boundary.
A_{1b}	40-50"+	Black (10YR 2/1, moist) silty clay loam, finely mottled with very dark grayish brown. Moderate medium granular. Friable, plastic, slightly sticky. Many worm casts and burrows. Roots common. pH 7.5. Bits of carbonized plant material are scattered throughout. Probably surface of old marsh.

1/ The Soquel series is in a fine-loamy, mixed, mesic family of Pachic Haploxerolls. This pedon has an organic carbon content that decreases irregularly with depth and remains above 0.3 percent at 50 inches.

U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Pachic Haploxeroll, coarse-loamy, mixed, thermic
SOIL Sheridan loam SOIL Nos. S65Calif-27-21 LOCATION Monterey County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65565 - 65569

Depth (In.)	Horizon	1B1b Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05)	Total: Silt (0.05–0.002)	Total: Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0 1)	Sand: Very fine (0.1–0.05)	Silt (0.05–0 02)	Silt: Int. III (0.02–0 002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	* Coarse fragments 1A2a: > 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76mm	
0-6	A11															11	11	0 **
6-15	A12															13	13	0 **
15-30	A13	68.9	21.9	9.2	9.8	17.3	11.5	21.5	8.8	6.7	15.2	27.2	60.1	0	9	12	12	0 **
30-41	C1															20	20	0 **
41-60+	C2															13	13	0 **

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$		Bulk density: 4A1f 1/3 bar	4A1h Oven dry		Water content:	4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility COLE	4D1 Extensibility COLE	pH: 8C1a H_2O 1:1		
	Pct.	Pct.		Pct.	Pct.		g/cc	g/cc	g/cc	Pct.	Pct.	Pct.	in./in.	in./in.			
0-6	2.98	0.238	13												5.6		
6-15	1.38	0.114	12												5.8		
15-30	1.05														6.0		
30-41	0.27														6.3		
41-60+	0.02														6.5		

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	5A2a NaOAc	6G1d KCl Ext. Al^{+++}	Atterberg limits: Plastic limit	Liquid limit	Plastic index	Base saturation 5C1 NH_4OAc	
	meq/100 g									Pct. of <0.4 mm			Pct.	Pct.
0-6	13.0	4.2	0.3	0.3	17.8	9.0	22.6						79	
6-15	15.4	6.1	0.4	0.1	22.0	7.1		27.2		29	37	8	87	
15-30	14.4	6.7	0.3	0.1	21.5		23.3						92	
30-41	11.9	8.6	0.4	0.1	21.0		22.0						95	
41-60+	9.9	8.5	0.4	0.1	18.9		19.4			32	33	1	97	

Depth (In.)	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Mica	Kaolin.
	X-ray			

* From characterization sample (5Kg)(except as noted).
** 2-19 mm. from characterization sample, 19-76 mm. from field volume estimate.

SHERIDAN LOAM
S65Calif-27-21

Location: Monterey County, California. SE corner SW¼ SW¼, Sec. 16, T18S, R1E. About 3.5 miles from Bixby Bridge (on Hwy. #1) on old Coast Road, 1 mile up Rancho Calera Road from Old Coast Road, about 20 feet down from ridge top. (Coastal grass site). Date of Sampling: May 25, 1965.
Description by: Lewis C. Leifer. Collectors: W. D. Nettleton, B. R. Brasher, C. J. Weisel, R. D. Waggoner, F. J. Pecarich; site selection by T. D. Cook.
Classification: Pachic Haploxeroll, coarse-loamy, mixed, thermic. Regosol (brunizemic).
Vegetation: Range grass, red brome, soft chess, lupine (brush side slopes). Climate: Precipitation 35 to 45 inches; mean annual soil temperature at 20 inches is assumed to be greater than 59° F. Parent Material: Weathered diorite (gruss). Topography: Convex smooth ridgetop on W. and slightly N. side of ridge, 45 percent west-facing slope. Elevation: 1400 feet. Drainage: Well drained, moderately permeable, medium runoff. Soil Moisture: Dry to 8 inches, moist below.
Remarks: Field pH by Truog Kit. Closely related soil on brush covered south slope a few hundred feet away is S65Calif-27-20-1 through 6. The closely paired site is S65Calif-27-22-1 through 5. Other closely related but not paired to this site are S65Calif-27-23, S65Calif-27-24, S65Calif-27-25, S65Calif-27-26. Gopher activity makes up 5 to 10 percent of profile. Asterisks indicate horizons sampled for California Division of Highways.

HORIZON	DESCRIPTION
A11 RSL 65565	0 to 6 inches, dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak fine and medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; plentiful very fine roots; common very fine interstitial and few very fine and fine tubular pores; medium acid (pH 6.0); gradual smooth boundary.
*A12 RSL 65566	6 to 15 inches, dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; moderate fine and medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; plentiful very fine roots; many very fine interstitial and few very fine, fine and medium tubular pores; slightly acid (pH 6.3); diffuse smooth boundary.
A13 RSL 65567	15 to 30 inches, dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; dark grayish brown (10YR 4/2) moist, rubbed; moderate medium and coarse granular structure; slightly hard, very friable, slightly sticky and slightly plastic; plentiful very fine roots; many very fine interstitial and few very fine, fine and medium tubular pores; slightly acid (pH 6.5); few lumps, 5 to 10 percent C1 material in lower part of horizon; abrupt irregular boundary.
C1 RSL 65568	30 to 41 inches, strong brown (7.5YR 5/6) dry and moist, coarse sandy loam, brown (7.5YR 5/4 when rubbed) moist; massive; weathered diorite readily cut by hand tools; hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine interstitial pores; common thin clay films and very few moderately thick clay films in pores with most films concentrated near the AC boundary; slightly acid (pH 6.5); diffuse smooth boundary.
*C2 RSL 65569	41 to 60 inches, brown (7.5YR 5/4) coarse sandy loam, strong brown (7.5YR 5/6) moist; massive; weathered diorite readily cut by hand tools when moist; very hard, friable, slightly sticky and slightly plastic; very few very fine roots; common very fine interstitial pores; no clay films, clean; slightly acid (pH 6.5).

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Pachic Haploxeroll, coarse-loamy, mixed, thermic
SOIL Sheridan loam SOIL Nos. S65Calif-27-22 LOCATION Monterey County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65570 - 65574

Depth (In.)	Horizon	1B1b Total: Sand (2-0.05)	Silt (0.05-0.002)	Clay (< 0.002)	Sand: Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Silt: 0.05-0.02	Int. III (0.02-0.002)	Int. II (0.2-0.02)	(2-0.1)	3A1a Carbonate clay	3A1a Noncarbonate clay	* Coarse fragments 1A2a: > 2	2 - 19	19 - 76
		Pct. of < 2 mm														Pct.	Pct. of < 76mm	
0-6	A11															10	10	0 **
6-17	A12															14	14	0 **
17-32	A13	57.8	30.6	11.6	5.9	13.3	9.1	17.6	11.9	13.2	17.4	35.1	45.9	0	12	13	13	0 **
32-43	C1															14	14	0 **
43-60+	C2															16	16	0 **

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$		Bulk density: 4A1f 1/3 bar	4A1h Oven dry		Water content: 4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH: 8C1a H_2O 1:1		
	Pct.	Pct.		Pct.	Pct.		g/cc	g/cc	g/cc	Pct.	Pct.	in./in.	in./in.			
0-6	1.76	0.139	13											5.9		
6-17	0.89	0.072	12											6.1		
17-32	0.66										10.5			6.3		
32-43	0.20													6.7		
43-60+	0.10													6.7		

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	5A3a Sum		6G1d KCl Ext. Al^{+++}	Base saturation 5C1: NH_4OAc Pct	Pct
	meq/100 g										Pct	
0-6	15.8	8.3	0.3	0.3	24.7	10.2	28.2				88	
6-17	15.8	9.6	0.3	0.1	25.8	3.6	29.6				87	
17-32	15.9	10.6	0.4	0.1	27.0		29.5				92	
32-43	15.8	11.4	0.6	0.1	27.9		30.5				92	
43-60+	17.0	13.3	0.6	0.1	31.0		31.6				98	

Depth (In.)	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Mica	Kaolin
	X-ray			

* From characterization sample (5Kg)(except as noted).
** 2-19 mm. from characterization sample, 19-76 mm. from field volume estimate.

SHERIDAN LOAM
S65Calif-27-22

Location: Monterey County, California, center of E½ SE¼ NE¼ Sec. 21, T18S, R1E, 3.5 miles from Bixby Bridge on Highway #1, about 1.8 mile up Rancho Calera Road from Old Coast Road, 1200 feet SSE from Ranch house, about 100 feet down from ridge top. (Coastal grass site). Date of Sampling: May 25, 1965.
Description by: Lewis C. Leifer. Collectors: W. D. Nettleton, B. R. Brasher, C. J. Weisel, R. D. Waggoner, F. J. Pecarich; site selection by T. D. Cook.
Classification: Pachic Haploxeroll, coarse-loamy, mixed, thermic. Regosol (brunizemic).
Vegetation: Range, soft chess, annual fescue, wild oats, ripgut brome, lupine.
Climate: Precipitation is 35 to 45 inches; mean annual soil temperature at 20 inches is assumed greater than 59° F. Parent Material: Weathered diorite (grus). Topography: Convex steep slope of 30 percent facing NW about 100 feet below ridge crest. Elevation: 2000 feet. Drainage: Well drained, moderately permeable, medium runoff. Soil Moisture: Dry (All) moist below.
Remarks: The paired profile is S65Calif-27-21-1 through 5. A related site under brush is S65Calif-27-20 and related inland sites are S65Calif-27-23, S65Calif-27-24, S65Calif-27-25, and S65Calif-27-26. Field pH by Truog Kit.

HORIZON	DESCRIPTION
A11 RSL 65570	0 to 6 inches, dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/3) moist; medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; plentiful very fine roots; common very fine interstitial, few very fine, fine and medium tubular pores; medium acid (pH 6.0), soil somewhat compacted by trampling and contains about 5 percent small rock fragments; gradual smooth boundary.
A12 RSL 65571	6 to 17 inches, dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak coarse angular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine interstitial and few very fine, fine and medium tubular pores; medium acid (pH 6.0); 5 percent rock fragments, structure may reflect tillage or trampling in past years; clear smooth boundary.
A13 RSL 65572	17 to 32 inches, dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist, common indistinct very dark grayish brown (10YR 3/2) lumps; moderate medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine interstitial, common very fine and few fine tubular pores; medium acid (pH 6.0); 5 to 8 percent rock fragments plus 5 percent lumps of rotten diorite; abrupt irregular boundary.
C1 RSL 65573	32 to 43 inches, strong brown (7.5YR 5/6) gritty loam, darker brown (7.5YR 5/6) moist; massive; shows rock structure, fine grained with some coarse crystals; hard, friable, slightly sticky and slightly plastic; very few very fine roots; common very fine interstitial pores; few thin clay films in pores; slightly acid (pH 6.5); few black specks on rock joints, rock easily cut with hand tools, contains 20 percent pockets of A1 material due to gophers; diffuse smooth boundary.
C2 RSL 65574	43 to 60 inches, similar to above except material is very hard when dry, has very few thin clay films in pores and is a little less weathered.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Pachic Haploxeroll, coarse-loamy, mixed, thermic.
SOIL Sheridan loam SOIL Nos. S65Calif-27-24 LOCATION Monterey County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65580 - 65585

Depth (In.)	Horizon	1B1b Size class and particle diameter (mm) 3A1												3A1a Carbonate clay	3A1a Noncarbonate clay	* Coarse fragments 1A2a			
		Total			Sand					Silt						> 2	2 - 19	19 - 76	
		Sand (2-0.05)	Silt (0.05-0.002)	Clay (< 0.002)	Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	0.05-0.02	Int. III (0.02-0.002)	Int. II (0.2-0.02)	(2-0.1)			Pct.	Pct. of < 76mm		
		Pct. of < 2 mm																	
0-8	A11	71.3	17.7	11.0	16.5	22.0	9.9	16.1	6.8	7.3	10.4	21.7	64.5	0	11	9	9	0	**
8-18	A12	71.6	17.1	11.3	17.3	21.9	9.4	15.7	7.3	6.7	10.4	22.0	64.3	0	11	12	12	0	**
18-28	A13	69.5	18.5	12.0	12.9	20.9	9.7	17.1	8.9	7.9	10.6	25.3	60.6	0	12	16	16	0	**
28-39	A14	70.0	18.6	11.4	11.8	20.4	9.6	18.6	9.6	7.9	10.7	26.6	60.4	0	11	11	11	0	**
39-43	C1	87.7	8.4	3.9	26.9	30.9	9.4	15.1	5.4	4.7	3.7	17.1	82.3	0	4	16	16	0	**
43-57+	C2	89.2	8.7	2.1	25.1	30.8	10.6	16.4	6.3	5.3	3.4	19.4	82.9	0	2	25	25	0	**

Depth (In)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$		Bulk density 4A1f 1/3 bar	Bulk density 4A1h Oven dry		3B2 Cm	Water content	Water content 4B1c 1/3 bar	Water content 4B2 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH 8C1a H_2O 1:1		
	Pct	Pct		Pct.	Pct		g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.	in./in.			
0-8	1.68	0.129	13				1.51	1.54		0.95		12.0	5.0	0.005	0.005	6.4		
8-18	0.73	0.062	12				1.44	1.45		0.93		13.2	5.1	0.003	0.003	6.4		
18-28	0.52						1.44	1.49		0.91		13.6	5.8	0.010	0.009	6.5		
28-39	0.37						1.55	1.59		0.93		13.3	6.1	0.007	0.007	6.6		
39-43	0.15						1.95	1.99		0.88		7.5	2.7	0.007	0.006	6.5		
43-57+	0.08						2.07	2.07		0.79		6.7	2.3	0.001	0.000	6.5		

Depth (In.)	Extractable bases 5B1a 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity 5A1a NH_4OAc	Cation Exch. Capacity 5A3a Sum		6G1d KCl Ext. Al^{+++}				5D2 Exch. Na		Base saturation 5C1 NH_4OAc	
	meq/100 g													Pct.		Pct	Pct.
0-8	9.4	1.7	0.3	0.2	11.6		12.7									91	
8-18	10.4	2.1	0.4	0.1	13.0		13.7									95	
18-28	13.1	3.0	0.4	0.1	16.6		16.9									98	
28-39	14.2	3.8	0.5	0.1	18.6		18.0									100+	
39-43	6.4	1.9	0.4	0.1	8.8		8.1							5		100+	
43-57+	5.0	1.4	0.4	0.1	6.9		5.8							7		100+	

Depth (In.)	Clay mineralogy (<0.002 mm) 7A Mont.	Verm.	Mica	Kaolin	
	X-ray				

* From characterization sample (5Kg) (except as noted).
** 2-19 mm. from characterization sample, 19-76 mm. from field volume estimate.

SHERIDAN FINE GRAVELLY LOAM
S65Calif-27-24

Location: Monterey County, California, about 100 feet below top of ridge, 250 feet west of E¼ corner SE¼ Sec. 30, T15S, R6E, about 3.5 miles up Johnson Canyon Road from Armstrong Ranch main gate. (16" rainfall, inland, grass, north slope). Date of Sampling: May 26, 1965.
Description by: Lewis C. Leifer. Collectors: W. D. Nettleton, B. R. Brasher, C. J. Weisel, R. D. Waggoner, F. J. Pecarich; site selection by T. D. Cook.
Classification: Pachic Haploxeroll, coarse-loamy, mixed, thermic. Regosol (brunizemic).
Vegetation: Range, grass, annual fescue, soft chess, ripgut. Climate: Precipitation is 14 to 20 inches; mean annual temperature is 60°F., mean January is 50°F., and mean July is 66°F. Parent Material: Weathered diorite (gruss). Topography: Moderately steep hills, locally slightly convex, 25 percent North-facing slopes. Elevation: 2850 feet. Drainage: Well drained, permeability is moderately rapid, runoff is medium. Soil Moisture: All is nearly dry, moist below.
Remarks: Field pH by Truog Kit. The closely paired sample is S65Calif-27-26-1 through 6. Geographically S65Calif-27-23 is a few hundred feet away on a south exposure; S65Calif-27-25 is also on a south slope, but about one mile away. Other Sheridan profiles are under higher rainfall near the coast and are Numbers S65Calif-27-20, profile No. 21 and profile No. 22.

HORIZON	DESCRIPTION
A11 RSL 65580	0 to 8 inches, dark gray (2.5Y 4/1), near dark grayish brown (10YR 4/2) fine gravelly loam, very dark brown (10YR 2/2) moist; moderate medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; abundant very fine roots; many very fine interstitial pores; slightly acid (pH 6.5); top one inch strong fine and medium granular structure with mat of very many very fine roots, rest of horizon somewhat compacted by trampling; gradual smooth boundary.
A12 RSL 65581	8 to 18 inches, dark gray (10YR 4/1) fine gravelly loam, very dark brown (10YR 2/2) moist; strong medium and coarse granular structure; slightly hard, very friable, slightly sticky and slightly plastic; plentiful very fine roots; many very fine interstitial and few fine and medium tubular pores; slightly acid (pH 6.2); gradual smooth boundary.
A13 RSL 65582	18 to 28 inches, dark gray (10YR 4/1) fine gravelly loam, very dark brown (10YR 2/2) moist; strong medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine interstitial and few fine tubular pores; slightly acid (pH 6.2); gradual smooth boundary.
A14 RSL 65583	28 to 39 inches, similar to horizon above in most respects. Split for sampling purposes. Lower part has some indistinct very dark grayish brown (10YR 3/2 moist) lumps of C1 material; clear wavy boundary.
C1 RSL 65584	39 to 43 inches, mixed brown (7.5YR 5/4) and very dark gray (10YR 3/1) loamy coarse sand, similar colors moist (7.5YR 4/4, 10YR 3/1); massive; hard, firm, nonsticky and nonplastic; very few very fine roots; few thin clay films in pores and major rock joints, many colloidal stains on grains; slightly acid (pH 6.5); consists of rotten diorite, has rock structure, easily cut with hand tools when moist; gradual wavy boundary.
C2 RSL 65585	43 to 57 inches, similar to above (10YR 5/3, 3/1 dry and 5/3, 5/1 moist); very hard dry with few colloidal stains.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Pachic Haploxeroll, coarse-silty, mixed, thermic
SOIL Salinas silty clay loam (taxadjunct) SOIL Nos. S65Calif-27-3 LOCATION Monterey County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65518 - 65525

Depth (in.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand (Pct. of < 2 mm) Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt Int. III (0.05–0.02)	Silt Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	* Coarse fragments 1A2a >2 Pct	2 – 19 (Pct. of < 76 mm)	19 – 76 (Pct. of < 76 mm)	
0–5	Ap1	31.7	47.6	20.7	0.2	0.8	1.3	12.4	17.0	23.8	23.8	49.5	14.7	0	21	0	0	0	**
5–15	A12	30.1	49.9	20.0	0.1	0.7	1.4	11.8	16.1	24.7	25.2	49.1	14.0	0	20	0	0	0	**
15–23	A13	30.1	52.1	17.8	0.1	0.8	1.5	11.8	15.9	26.9	25.2	51.0	14.2	0	18	0	0	0	**
23–39	C1	33.6	50.7	15.7	0.2	0.8	1.6	13.1	17.9	27.0	23.7	54.3	15.7	0	16	0	0	0	**
39–59	C2	49.5	42.0	8.5	0.1	0.4	0.5	7.3	41.2	31.7	10.3	78.7	8.3	0	9	0	0	0	**
59–64	C3	27.3	62.3	10.4	0.0	0.2	0.2	2.2	24.7	44.8	17.5	71.2	2.6	0	10	0	0	0	**
64–71	C4	25.9	59.3	14.8	0.1	0.2	0.4	7.2	18.0	30.6	28.7	54.4	7.9	0	15	0	0	0	**
71–82+	C5	69.2	25.2	5.6	0.0	0.2	0.3	18.7	50.0	19.0	6.2	86.4	19.2	0	6	0	0	0	**

Depth (in.)	6A1a Organic carbon (Pct.)	6B1a Nitrogen (Pct.)	C/N	6C2a Ext. Iron as Fe (Pct.)	6E1b Carbonate as $CaCO_3$ (Pct.)	Bulk density 4A1f 1/3 bar (g/cc)	4A1h Oven dry (g/cc)	(g/cc)	5C1 Cm	Water content (Pct.)	4B1c 1/3 bar (Pct.)	4B2 15 bar (Pct.)	4D1 Extensibility COLEF in./in.	4D1 Extensibility COLE in./in.	pH 8C1b Saturated Paste	8C1a H_2O 1:1	8C1a H_2O 1:10
0–5	2.74	0.252	11	0.9	-	1.27	1.40		0.83		25.4	18.3	0.032	0.032		7.9	
5–15	1.32	0.126	10	1.0	-	1.39	1.47		1.00		22.7	12.0	0.019	0.019		8.0	
15–23	0.77			0.9	-	1.30	1.38		1.00		23.8	10.6	0.020	0.020		8.0	
23–39	0.52			0.9	tr.	1.29	1.37		1.00		21.4	9.6	0.021	0.021		8.0	
39–59	0.23			0.7	1	1.34	1.36		1.00		14.4	6.4	0.004	0.004		8.2	
59–64	0.23			0.8	2	1.37	1.39		1.00		20.9	6.8	0.004	0.004		8.3	
64–71	0.34			1.0	2	1.23	1.29		1.00		31.2	9.5	0.017	0.017		8.3	
71–82+	0.11			0.6	1							5.6				8.2	

Depth (in.)	Extractable bases 6H2a Ca	6O2a Mg	6P2a Na	5B1a 6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 8A1 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K		6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0–5	23.2	10.1	0.8	3.2	37.3			24.6	7.3	6.6	5.5	3.2		2.2	14.7	0.6		1.75
5–15	12.9	7.9	1.0	3.2	25.0			23.1	3.4	3.9	7.6	3.5		1.2	8.9	0.8	5.7	1.55
15–23	12.8	7.9	1.1	2.3	24.1			21.4	3.0	3.9	6.6	1.8		0.5	5.8	0.9	6.2	1.29
23–39	18.2	8.0	1.3	1.1	28.6			18.8	2.8	3.3	6.7	0.6		-	4.2	1.2	7.0	1.20
39–59	18.0	6.5	1.3	0.3	26.1			14.0	2.9	3.1	7.9	0.2		0.7	2.2	2.3	8.8	1.36
59–64	20.0	7.6	1.7	0.3	29.6			16.1	3.4	3.3	10.2	0.2		-	2.5	3.1	11.6	1.70
74–71	22.4	10.1	1.8	0.4	34.7			21.6	4.0	4.4	9.9	0.2		-	2.4	3.2	12.1	1.70
71–82+	18.0	5.3	1.1	0.2	24.6			11.9	1.9	2.1	6.1	0.2		-	2.1	1.7	6.2	1.02

Depth (in.)	8A Water at Saturation (Pct.)	5D2 Exchangeable Na (Pct.)	5B1b Exch. Na meq./100g.	Gypsum (Pct.)	5C1 Base Sat. NH_4OAc (Pct.)	Clay mineralogy (<0.002 mm.) 7A Mont.	Verm.	Mica	Kaolin.	
						< X-ray >				
0–5	55.6		0.5		100+	xxx		x	x	
5–15	51.8		0.6		100+					
15–23	47.6		0.8		100+					
23–39	44.1	5	1.0		100+					
39–59	39.8	7	1.0		100+					
59–64	45.1	7	1.2		100+					
64–71	48.5	6	1.3		100+					
71–82+	42.3	8	0.9		100+	xxxx			x	

* From characterization sample (5Kg)(except as noted).
** 2-19 mm. from characterization sample, 19-76 mm. from field volume estimate.

\- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

SALINAS SILTY CLAY LOAM (taxadjunct) 1/
S65Calif-27-3

Location: Monterey County, California. 150 feet SSW from NE corner of field, 0.7 mile along dirt road in a southwesterly direction from Metz Road, 400 feet N of the entrance to the Nello Solari Ranch on Metz Road about 5.5 miles north of King City.
Date of Sampling: May 18, 1965.
Description by: Lewis C. Leifer. Collectors: W. D. Nettleton, B. R. Brasher, C. J. Weisel, R. D. Waggoner, F. J. Pecarich; site selection by T. D. Cook.
Classification: Pachic Haploxeroll, coarse-silty, mixed, thermic. Brunizem (minimal).
Vegetation: Irrigated alfalfa, 20 tons per acre, barnyard manure applied 1963-64 season.
Climate: Precipitation 12 inches; mean annual temperature 59°F., January mean 50°F., July mean 65°F. Parent Material: Moderately fine textured alluvium from dominantly sedimentary formations. Topography: Nearly level (<1 percent), high flood plain not subject to new deposition. Elevation: 260 feet. Drainage: Moderately well drained, moderately slow permeability, medium runoff. Soil Moisture: Moist throughout, about field capacity.
Remarks: Field pH by Truog Kit; paired sample S65Calif-27-11-1 through 7.

HORIZON	DESCRIPTION
Ap RSL 65518	0 to 5 inches, dark gray (10YR 4/1 toward 4/2) silty clay loam, very dark gray (10YR 3/1) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; plentiful very fine and medium roots; few very fine interstitial, many very fine and few fine tubular pores; moderately alkaline (pH 8.0), noncalcareous; gradual smooth boundary.
A12 RSL 65519	5 to 15 inches, dark gray (10YR 4/1 toward 4/2) silty clay loam, very dark gray (10YR 3/1) moist; strong medium subangular blocky structure; hard, firm, sticky and plastic; plentiful very fine and medium roots; common very fine interstitial and common fine and few medium tubular pores; moderately alkaline (pH 8.0), noncalcareous; slight compaction of horizon due to tillage; gradual smooth boundary.
A13 RSL 65520	15 to 23 inches, grayish brown (2.5Y 5/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few fine and medium, plentiful very fine roots; common very fine interstitial and common fine and medium tubular pores; moderately alkaline (pH 8.0), noncalcareous, lower portion of profile slightly effervescent with disseminated lime; horizon has some very diffuse mixture of A and C; gradual smooth boundary.
C1 RSL 65521	23 to 39 inches, grayish brown (2.5Y 5/2) silty loam, very dark grayish brown (2.5Y 3/2) moist; weak medium subangular blocky structure; slightly hard, friable, sticky and plastic; few very fine and plentiful medium roots; many very fine interstitial and many very fine and common tubular pores; moderately alkaline (pH 8.0), slightly effervescent with disseminated lime; some large rodent holes filled with A1 material; clear smooth boundary.
C2 RSL 65522	39 to 59 inches, light brownish gray (2.5Y 6/2) very fine sandy loam, olive brown (2.5Y 4/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; few very fine and few medium roots; many very fine interstitial and few fine tubular pores; moderately alkaline (pH 8.0), slightly effervescent with disseminated lime; clear smooth boundary.
C3 RSL 65523	59 to 64 inches, light brownish gray (2.5Y 6/2) silt loam, olive brown (2.5Y 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine and few very fine roots; many very fine interstitial and few fine tubular pores; moderately alkaline (pH 8.0); strongly effervescent with disseminated lime; clear smooth boundary.
C4 RSL 65524	64 to 71 inches, light brownish gray (2.5Y 6/2) light silty clay loam, olive brown (2.5Y 4/3) moist; massive; slightly hard, friable, sticky and plastic; few very fine and few fine roots; common very fine interstitial, many very fine tubular pores; moderately alkaline (pH 8.0); strongly effervescent with disseminated lime; clear wavy boundary.
C5 RSL 65525	71 to 86 inches, light brownish gray (2.5Y 6/3) light fine sandy loam, light olive brown (2.5Y 5/3) moist; massive; soft, very friable, slightly sticky and nonplastic; few very fine roots; many very fine interstitial and few very fine tubular pores; moderately alkaline (pH 8.0); noncalcareous.

1/ The Salinas series is in a fine-loamy, mixed, thermic family of Pachic Haploxerolls. This pedon has slightly less than 18 percent clay and less than 15 percent sand coarser than very fine.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Pachic Haploxeroll, fine-loamy, mixed, mesic

SOIL Linne silty clay SOIL Nos. S62Calif-42-11 LOCATION Santa Barbara County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62130 - 62135

Depth (in.)	Horizon	1B1b Total: Sand (2-0.05)	Silt (0.05-0.002)	Clay (< 0.002)	Sand: Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Silt: 0.05-0.02	Int. III (0.02-0.002)	Int. II (0.2-0.02)	(2-0.1)			Coarse fragments 2A2: >2	2 - 19	19 - 76
		Pct. of < 2 mm														Pct	Pct. of < 76 mm	
0-9	Ap	36.1	31.4	32.5	0.2	1.1	3.0	19.3	12.5	15.1	16.3	39.8	23.6			0		
9-14	A12	42.7	27.3	30.0	0.2	1.1	3.1	23.7	14.6	13.6	13.7	43.6	28.1			0		
14-29	A13	43.8	26.7	29.5	0.2	1.0	2.9	24.3	15.4	13.3	13.4	45.1	28.4			0		
29-32	AC	47.2	24.7	28.1	0.3	1.0	2.6	26.1	17.2	11.7	13.0	47.0	30.0			0		
32-36	C1ca	57.2	24.6	18.2	1.0	2.8	2.7	30.6	20.1	10.2	14.4	53.3	37.1			0		
36-51+	C2	55.6	30.7	13.7	2.1	3.4	2.2	21.1	26.8	17.1	13.6	60.3	28.8			0		

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	3A1a Carbonate in <0.002 mm. Pct.	6E1b Carbonate as $CaCO_3$ Pct.	6C2a Ext. Iron as Fe Pct.	Bulk density: 4A1f 1/3 bar clods g/cc	4A1h Oven-dry clods g/cc	g/cc	Water content: Pct.	4B1c 1/3 bar clods Pct.	4B2 15 bar Pct.	4D1 Extensibility COLE ft./ft.			pH: 8C1b Sat. Paste H_2O	8C1a 1:10 H_2O
0-9	1.90	0.175	11	tr.	2	0.5	1.19	1.42			29.5	18.6	0.059			7.3	8.1
9-14	0.97	0.100	10	1	4	0.5	1.26	1.45			26.3	16.3	0.047			7.5	8.4
14-29	0.72	0.072	10	3	5	0.3	1.21	1.43			29.4	16.3	0.056			7.6	8.6
29-32	0.56	0.060	9	9	16	0.1	1.32	1.42			27.0	16.3	0.025			7.8	8.7
32-36	0.35			6	27	0.1	1.38	1.40			24.7	7.7	0.007			7.8	8.8
36-51+	0.23			5	24	0.1	1.55	1.58			12.4	7.7	0.007			8.1	9.0

Depth (in.)	Extractable bases 5B1a: 6N2b Ca	6O2c Mg	6P2a Na	6Q2a K	6H2a Ext. Acidity	Cation Exch. Capacity 5A2a NaOAc			Water extract from saturated paste 8A1: 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K		6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0-9	44.0	2.0	0.3	0.4	0.2	39.8			7.1	0.7	1.0	0.1		-	7.0	0.3		0.69
9-14	41.2	1.6	0.3	0.3	-	34.0			4.2	0.6	1.0	Tr.		-	4.2	0.1		0.45
14-29	38.3	1.5	0.3	0.2	-	31.6			3.5	0.4	1.0	0.1		-	3.7	Tr.		0.40
29-32	32.3	1.6	0.4	0.1	-	24.0			3.5	0.6	1.5	0.1		-	4.1	Tr.		0.46
32-36	25.3	1.2	0.4	0.1	-	14.1			2.6	0.4	1.6	Tr.		-	3.3	0.2		0.38
36-51+	23.0	1.4	0.5	0.1	-	12.9			1.9	0.3	2.1	Tr.		-	2.9	0.3		0.37

Depth (in.)	8A Water at Saturation Pct.	Exchangeable Na Pct.	5B1b Exch. Na meq/100g.	Gypsum Pct.			
0-9	59.1	1	0.3				
9-14	53.4	1	0.3				
14-29	54.9	1	0.3				
29-32	56.3	1	0.3				
32-36	42.7	2	0.3				
36-51+	35.2	3	0.4				

LINNE CLAY LOAM
S62Calif-42-11

Location: Santa Barbara County, California. Latitude 34° 48' 62" N., Longitude 120° 21' 06" W; equivalent to center of Sec. 4, T8N, R33W; from just north of Solomon Summit 1½ mi. south on Union Oil Company road and 750 feet east; 11 miles southeast of Santa Maria; field sheet 2B108. Date of Sampling: April 20, 1962.
Description by: L. C. Leifer. Collectors: R. E. Nelson, Lothair Grant, G. E. Shipman, C. J. Hilliker, L. C. Leifer.
Classification: **Pachic Haploxeroll, fine-loamy, mixed, mesic.**
Vegetation: Heavy growth wild oats, bur clover, a little annual lupine and ripgut brome. Use: Range, but was cultivated 10 to 15 years ago; little evidence of tillage in field, but fairly sharp break in soil structure on pit walls. Climate: Precipitation 15 inches. Mean annual temperature 57°F., July 61°F., and January 50°F. Parent Material: Soft marly sediments. Topography: Round smooth hills, locally slightly convex smooth, 22 percent northeast slope near crest of ridge. Elevation: 850 feet. Drainage: Well drained. Runoff is medium. Permeability is moderately slow. Soil Moisture: Moderately moist at sampling time. All horizons approaching wilting point.
Remarks: Field pH determinations by Hellige-Truog triplex indicator. Paired site not sampled.

HORIZON	DESCRIPTION
Ap RSL 62130	0 to 9 inches, very dark gray (10YR 3/1) clay loam, black (10YR 2/1) when moist; moderate coarse subangular blocky structure, 1/6 to 1/3 of horizon strong fine granular between larger peds, larger peds break mostly to granules; very hard, friable, sticky and plastic; plentiful very fine roots; many very fine, few fine interstitial pores; slightly effervescent disseminated lime, moderately alkaline (pH 8.0); clear smooth boundary.
A12 RSL 62131	9 to 14 inches, dark gray (10YR 4/1) clay loam, black (10YR 2/1) when moist; weak coarse prismatic structure; very hard, friable, sticky and plastic; plentiful very fine roots; many very fine, common fine interstitial pores and few fine tubular pores; strongly effervescent disseminated lime and some fine lime filaments especially on faces of larger peds, moderately alkaline (pH 8.0); gradual wavy boundary.
A13 RSL 62132	14 to 29 inches, gray (10YR 5/1) clay loam, very dark gray (10YR 3/1) when moist; weak coarse prismatic structure, breaks to medium and coarse angular blocky with much medium granular; very hard, friable, sticky and plastic; few very fine roots; many very fine interstitial and few fine and medium tubular pores; violently effervescent disseminated lime and many fine lime filaments especially on faces of larger peds, moderately alkaline (pH 8.0); gradual smooth boundary.
AC RSL 62133	29 to 32 inches, gray and light gray (10YR 5/1 and 7/1) sandy clay loam, gray and light grayish brown (10YR 5/1 and 6/2) when moist; massive; tends to break to weak coarse and medium angular blocky with some coarse granules; very hard, friable, sticky and plastic; very few very fine roots; many very fine interstitial and few fine tubular pores; violently effervescent disseminated lime and many distinct lime filaments, moderately alkaline (pH 8.0); clear irregular boundary.
C1ca RSL 62134	32 to 36 inches, white (N8/ and 10/) fine sandy loam, very pale brown and white (10YR 7/2 and 8/2) when moist; massive; extremely hard, firm, sticky and plastic; no roots; common very fine interstitial and few very fine tubular pores; this horizon somewhat discontinuous and variable in thickness, also broken by squirrel holes; violently effervescent, moderately alkaline (pH 8.0); clear irregular boundary.
C2 RSL 62135	36 to 51 inches +, white (N 8/) mudstone, light gray and pale yellow (2.5Y 7/2 and 8/4) when moist; massive; very hard, firm, slightly sticky and slightly plastic; common very fine interstitial and very few fine tubular pores, strongly effervescent, moderately alkaline (pH 8.0).

NOTE: About 1/4 of Ap made up of krotovinas 2 to 3 inches across; 1/3 of A12 and A13 is krotovinas filled with strong fine and medium granular soil. Roots tend to concentrate in krotovinas and along weak vertical joints. Several krotovinas gray and dark gray (10YR 5/1 and 4/1m) 2 to 3 inches in diameter go several feet into C and also cross the AC and C1ca horizon. A few white fragments of C 1/16 to 1/8 inches scattered through all of A horizons.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Sweeney silty clay loam (taxadjunct) **LOCATION** San Mateo County, California

SOIL FAMILY: Pachic Haploxeroll, fine-loamy, mixed, mesic

SOIL NOS. S55-Calif.-41-9 **LAB. NOS.** 55366-55372

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 mm. 2/	
0- 6	A1	1.2	4.1	4.5	14.5	12.0	38.3	25.4	38.3	21.6	1	l
6-17	B2	1.5	4.3	4.2	13.8	12.1	37.6	26.5	39.2	19.7	2	l
17-23	B3	2.2	6.3	5.6	15.9	12.5	35.0	22.5	38.0	19.9	5	l
23-30	C1	2.2	9.2	8.4	22.0	15.3	28.6	14.3	43.0	14.9	1	fsl
30-48	C21	1.9	9.6	8.2	21.3	15.1	30.1	13.8	44.2	14.6	1	fsl
48-64	C22	8.3	21.5	11.6	22.5	12.6	17.1	6.4	35.6	7.6	0	cosl
64-70	C23	4.7	18.9	13.3	25.1	11.1	21.7	5.2	38.1	9.7	0	fsl

pH			ORGANIC MATTER			EST% SALT (BUREAU CUP)	8A1a Elec. Conduc. EC×10³ MILLIMHOS PER CM @25°C.	Free Fe_2O_3 6C1b %	GYPSUM me./100g. SOIL	4A3a Bulk Density g./cc.		4B2 Soil Water 15 atmos. Pct.
8C1b SATURATED PASTE 1:1	8C1a 1:5	8C1a 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N							
6.4		6.9	2.14	0.177	12.1		0.7	1.9		1.12		14.3
6.5		6.9	1.50	0.130	11.5		0.5	1.9		1.32		15.0
6.5		7.0	0.86	0.077	11.2		0.3	1.7				14.9
6.6		7.2	0.26				0.4	1.5				14.7
6.9		6.8	0.24				0.3	1.5		1.49		14.2
6.8		7.2	0.07				0.3	1.0				11.9
6.3		7.3	0.07				0.3	0.9				12.5

5A2a CATION EXCHANGE CAPACITY	EXTRACTABLE CATIONS 5B					BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE 8A1					8A MOISTURE AT SATURATION
	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a		6P1a Na	6Q1a K	6N1a 6O1a Ca+Mg	6J1a 1/ HCO_3	6K1a Cl	
(Na)	milliequivalents per 100g. soil →						← milliequivalents per liter →					%
51.5	24.7	20.1	8.6	0.7	0.3	84	1.1	0.1	6.3	5.2	0.4	49.3
56.3	25.4	21.2	7.7	1.2	0.2	86	1.0	0.1	2.2	2.4	0.5	47.8
60.8	25.5	23.1	7.0	1.0	0.2	88	0.8	0.1	1.1	2.2	0	45.1
62.4	28.7	24.2	6.9	0.7	0.1	89	0.8	Tr.	2.2	1.3	0	43.2
60.9	25.3	25.4	6.8	1.1	0.1	88	0.8	Tr.	1.3	1.0	0	42.2
66.2	26.6	24.1	7.8	1.3	0.1	87	0.7	Tr.	1.6	0.8	0	41.0
68.9	33.8	23.6	8.8	0.9	0.7	87	0.7	Tr.	1.0	0.7	0	43.9

1/ No $CO_3^{=}$ found

2/ Percent of the whole soil

SWEENEY SILTY CLAY LOAM (taxadjunct) 1/
S55Calif-41-9

Location: San Mateo County, California in the San Mateo County SCD, west side of Highway 5 (Skyline Highway), 3.65 miles south of Sky Londa, 100 feet north of U. S. Coast and Geodetic survey benchmark No. 0.387 dated 1936. Date of Sampling: May 17, 1955.

Description by: Ralph E. Nelson. Collectors: Reuben E. Nelson, Ralph E. Nelson, and Rudolph Ulrich.

Classification: Pachic Haploxeroll, fine-loamy, mixed, mesic.

Vegetation: Annual grasses consisting of wild oat, soft chess, bur clover, some California lupine. Climate: 35-40 inches rainfall. Parent Material: Basaltic material classified as diabase. Relief: Hilly to mountainous with gently to moderately steep rolling hills. The slope at the sampling location was about 6 percent, slightly concave toward the southeast. Elevation: 2,100 feet. Drainage: Surface drainage is medium, internal drainage is moderate.

Remarks: Many worms in surface 6 inch and occasional to few worms to a depth of 17 inches.

HORIZON		DESCRIPTION
A_1	0- 6"	Dark grayish brown (10YR 4/2; very dark grayish brown to very dark brown, 10YR 2.5/2, moist) light silty clay loam. Moderate medium to fine granular structure. Hard, friable, slightly plastic and nonsticky. This horizon contains many roots and many worm casts. The reaction is 7.0. The lower boundary is smooth and clear.
B_2	6-17"	Dark grayish brown (10YR 4/2; very dark grayish brown and very dark brown, 10YR 2/2-3/2, moist) silty clay loam, slightly finer textured than horizon above. Weak medium subangular blocky. Hard, firm to friable, slightly plastic and nonsticky. There are thin continuous clay skins on the vertical faces of the structural aggregates. There are many roots and a few worm casts. The reaction is 7.0. This horizon grades clearly and with a wavy boundary into:
B_3	17-23"	Indistinctly mottled dark brown and dark grayish brown (10Y 4/3-4/2; dark brown and very dark grayish brown, 10YR 3/3-3/2, moist) clay loam. Weak medium and fine subangular blocky. Hard, firm to friable, plastic and slightly sticky. There are thin patchy clay skins on the darker vertical faces of the structural aggregates. There are numerous roots, a few worm casts, and some krotovinas. The reaction is 7.0. The lower boundary is clear but tonguelike.
C_1	23-30"	Mottled yellowish brown and dark brown (10YR 5/4-3/3; dark yellowish brown and very dark grayish brown, 10YR 4/4-3/2, moist) light clay loam. Very weak medium subangular blocky. Hard, firm, slightly plastic and slightly sticky. There are some thin patchy clay skins on vertical surfaces and dark metallic segregations which glisten in the sunlight. Very few roots. The reaction is 7.0. Grades with a gradual and wavy lower boundary into:
C_{21}	30-48"	Mottled yellowish brown and dark brown (10YR 5/4-3/3; dark yellowish brown and very dark grayish brown, 10YR 4/4-3/2, moist) loam. Massive to very weakly medium subangular blocky. Hard, firm, slightly plastic and very slightly sticky. There are darker colored metallic segregations which appear to be iron and mangenese coatings on the weathered rock fragments. The reaction is 7.0. Grades gradually and with a wavy lower boundary into:
C_{22}	48-64"	This horizon consists of a mixture of colors, yellowish brown, strong brown, and white (10YR 5/4, 7.5YR 5/6, and 2.5Y 8/2; dark yellowish brown, 10YR 4/4, strong brown 7.5 YR 5/6-5/8, light yellowish brown, 10YR 6/4 and coatings of dark brown and very dark gray brown, 10YR 3/3-3/2, moist) gritty loam. Massive, hard, friable, nonplastic and nonsticky. There are darker metallic segregations, probably iron and manganese. The reaction is 7.0. Grades gradually and with a wavy lower boundary to:
C_{23}	64-70"	Similarly colored gritty sandy loam. Massive. This material grades at variable depth into the hard diabase bedrock.

1/ The Sweeney series is in a fine-loamy, mixed, mesic family of Typic Argixerolls. This pedon lacks an argillic horizon and has a mollic epipedon thicker than 20 inches.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Pachic Haploxeroll, fine-loamy, mixed, thermic
SOIL Salinas silty clay loam SOIL Nos. S65Calif-27-11 LOCATION Monterey County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65526 - 65532

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand (Pct. of <2 mm): Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	* Coarse fragments 1A2a: >2 (Pct.)	2 – 19 (Pct. of <76 mm)	19 – 76 (Pct. of <76 mm)	
0-5	Ap1	43.2	32.2	24.6	0.4	1.0	1.7	19.4	20.7	14.9	17.3	50.2	22.5	0	25	0	0	0	**
5-13	Ap2	43.7	31.7	24.6	0.5	0.8	1.6	19.3	21.5	14.6	17.1	50.9	22.2	0	25	0	0	0	**
13-23	A13	32.8	40.9	26.3	0.1	0.1	0.3	12.5	19.8	18.1	22.8	48.4	13.0	0	26	0	0	0	**
23-33	A14	42.9	36.7	20.4	0.1	0.3	0.4	17.0	25.1	18.6	18.1	58.1	17.8	0	20	0	0	0	**
33-40	A15	63.4	25.1	11.5	0.2	0.3	0.7	26.7	35.5	16.8	8.3	74.6	27.9	0	12	0	0	0	**
40-49	C1	70.1	21.0	8.9	0.2	0.3	0.7	29.0	39.9	15.6	5.4	79.8	30.2	0	9	0	0	0	**
49-75+	C2	61.3	29.0	9.7	0.1	0.2	0.3	15.2	45.5	21.9	7.1	80.6	15.8	0	10	0	0	0	**

Depth (In.)	6A1a Organic carbon (Pct.)	6B1a Nitrogen (Pct.)	C/N	6C2a Ext. Iron as Fe (Pct.)	6E1b Carbonate as $CaCO_3$ (Pct.)	Atterberg limits (Pct. of <0.4 mm): Plastic limit	Liquid limit	Plastic index	Water content (Pct.)	4B1c 1/3 bar (Pct.)	4B2 15 bar (Pct.)	4D1 Extensibility COLEF in./in.	4D1 Extensibility COLE in./in.	pH: 8C1b Saturated Paste	8C1a H_2O 1:1	8C1a H_2O 1:10
0-5	1.36	0.129	11		-						11.8				7.8	
5-13	1.26	0.116	11		-	19	33	14			12.7				7.8	
13-23	1.17				-						14.0				7.7	
23-33	0.84				-						11.2				7.8	
33-40	0.41				-						6.9				8.0	
40-49	0.30				tr.						5.4				8.3	
49-75+	0.15				2		-	N.P.			6.0				8.3	

Depth (In.)	Extractable bases (meq/100 g): 6N2a Ca	6O2a Mg	6P2a Na	5B1a 6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste (meq/liter): 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K	8A1 6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity (mmho/cm)
0-5	17.3	7.7	1.5	1.4	27.9			24.5									
5-13	17.4	7.7	1.4	1.4	27.9			25.5									
13-23	18.7	9.0	1.8	0.8	30.3			28.4									
23-33	16.0	7.7	1.6	0.5	25.8			24.9									
33-40	10.2	4.9	4.0	0.8	19.9		18.2		2.2	1.6	6.4	0.2	0.2	2.6	1.5		1.06
40-49	14.3	4.0	0.9	0.3	19.5			11.7									
49-75+	18.7	4.6	0.9	0.1	24.3			12.3									

Depth (In.)	8A Water at Saturation (Pct.)	5D2 Exchangeable Na (Pct.)	5B1b Exch. Na meq./100g.	Gypsum (Pct.)	5C1 Base Sat. NH_4OAc (Pct.)	Clay mineralogy (<0.002 mm.) 7A (X-ray): Mont.	Verm.	Mica	Kaolin.
0-5		6			100+				
5-13		5			100+				
13-23		6			100+				
23-33		6			100+				
33-40	37.4	21	3.2		100+				
40-49		8			100+				
49-75+		7			100+				

* From characterization sample (5Kg)(except as noted).
** 2-19 mm. from characterization sample, 19-76 mm. from field volume estimate.

SALINAS SILTY CLAY LOAM
S65Calif-27-11

Location: Monterey County, California, 1.3 mile south of Chualar (town) underpass on Highway 101, 1100 feet southwest on paved road, 600 feet southeast on Farm Road, about 30 feet northeast into field. Date of Sampling: May 20, 1965.
Description by: Lewis C. Leifer. Collectors: W. D. Nettleton, B. R. Brasher, C. J. Weisel, R. D. Waggoner, F. J. Pecarich. Site selection by T. D. Cook.
Classification: **Pachic Haploxeroll, fine-loamy, mixed, thermic. (Brunizem).**
Vegetation: Truck crops, onions just harvested. Climate: Precipitation 12 inches; mean annual temperature 58°F., mean January 50°F., mean July 65°F. Parent Material: Moderately fine textured alluvium from dominantly sedimentary formations. Topography: Nearly level (<1 percent), high level flood plain not subject to new deposition. Elevation: 100 feet. Drainage: Moderately well drained, moderately slow permeability; medium runoff. Soil Moisture: Dry to 5 inches, moderately moist below.
Remarks: Field pH by Truog Kit; paired sample S65Calif-27-3-1 through 8. Asterisk indicates horizons sampled for California Division of Highways. **This site unusually compacted, firm moist and of weak structure on edge of field subject to long and heavy traffic.**

HORIZON	DESCRIPTION
Ap1 RSL 65526	0 to 5 inches, very dark gray (10YR 3/1) heavy silty clay loam, very dark gray, black when rubbed (10YR 3/1, 2/1) moist; weak coarse subangular blocky structure; very hard, firm, very sticky and plastic; few very fine roots; many very fine interstitial, common very fine and few fine tubular pores; moderately alkaline (pH 8.0), noncalcareous; clear smooth boundary.
*Ap2 RSL 65527	5 to 13 inches, very dark gray (10YR 3/1) moist or dry, heavy silty clay loam; weak coarse subangular blocky structure; very hard, firm, very sticky and plastic; plentiful very fine roots; common very fine interstitial, few medium and fine tubular pores; moderately alkaline (pH 8.0), noncalcareous; clear smooth boundary.
A13 RSL 65528	13 to 23 inches, very dark gray, moist or dry (10YR 3/1) silty clay loam; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; few very fine roots; common very fine interstitial and common very fine and few fine tubular pores; moderately alkaline (pH 8.0), noncalcareous; some dark grayish brown (10YR 4/2m) lumps and mottles, probably due to rodent activity, increasing with depth; gradual wavy boundary.
A14 RSL 65529	23 to 33 inches, dark gray (10YR 4/1) silt loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; no roots; many very fine interstitial and common very fine and few fine tubular pores; nonalkaline (pH 8.0), noncalcareous; this horizon and all following horizons have about 10 to 15 percent of the area in krotovinas that have been filled with darker soil material, probably caused by rodents; diffuse smooth boundary.
A15 RSL 65530	33 to 40 inches, grayish brown (2.5Y 5/2) very fine silty loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; many very fine interstitial, few medium and fine and common very fine tubular pores; moderately alkaline (pH 8.0), noncalcareous; about 5 percent of the root channels of the A15, C1, and C2 are filled with darker soil material; gradual smooth boundary.
C1 RSL 65531	40 to 49 inches, grayish brown (2.5Y 5/2) fine sandy loam, olive brown (2.5Y 4/3) moist; massive; soft, very firm, nonsticky and nonplastic; many very fine interstitial, few very fine and fine tubular pores; moderately alkaline (pH 8.0), slightly effervescent with disseminated lime; gradual smooth boundary.
*C2 RSL 65532	49 to 75 inches, light brownish gray (2.5Y 6/2) very fine sandy loam, light olive brown (2.5Y 5/3) moist; massive; soft, friable, slightly sticky and slightly plastic; many very fine interstitial pores; moderately alkaline (pH 8.0), strongly effervescent with disseminated lime.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Pachic Haploxeroll, fine, montmorillonitic, thermic
SOIL Rincon clay loam (taxadjunct) SOIL Nos. S64Calif-57-16 LOCATION Yolo County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64480 - 64487

Depth (in.)	Horizon	1B1b Total Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Size class and particle diameter (mm) 3A1 Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Noncarbonate clay	Coarse fragments 1A2a: > 2 Pct.	2 – 19	19 – 76 Pct. of ≤ 76 mm
		Pct. of ≤ 2 mm																
0-8	Ap	7.1	61.6	31.3	0.2	0.2	0.1	1.4	5.2	21.1	40.5	27.4	1.9			0		
8-15	A12	6.1	61.0	32.9	0.2	0.1	0.1	1.1	4.6	20.9	40.1	26.4	1.5			0		
15-21	B1	3.1	59.5	37.4	tr.	0.1	tr.	0.5	2.5	16.6	42.9	19.5	0.6			0		
21-29	B21t	4.0	58.6	37.4	tr.	tr.	0.1	0.6	3.3	20.3	38.3	24.1	0.7			0		
29-43	B22t	3.7	57.0	39.3	tr.	0.1	tr.	0.5	3.1	18.3	38.7	21.8	0.6			0		
43-56	B23t	4.3	59.4	36.3	tr.	tr.	tr.	0.7	3.6	17.2	42.2	21.4	0.7			0		
56-72	B3	6.8	60.3	32.9	0.1	0.2	0.1	1.2	5.2	16.9	43.4	23.1	1.6			0		
72-76	C1	14.7	59.8	25.5	0.4	0.6	0.3	2.8	10.6	22.3	37.5	35.3	4.1			0		

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. Iron as Fe Pct.	6E1b Carbonate as $CaCO_3$ Pct.	Bulk density: 4A1f 1/3 bar g/cc	4A1h Oven dry g/cc	g/cc	3B2 Cm	Water content: Pct.	4B1c 1/3 bar Pct.	4B2 15 bar Pct.	4D1 Extensibility COLE in./in.	4D1 Extensibility COLE in./in.	pH: 8C1b Saturated Paste	8C1a H_2O 1:1	8C1a H_2O 1:10
0-8	1.74	0.156	11	1.8	-	1.48	1.68		1.00		24.8	14.3	0.043	0.043		7.7	8.1
8-15	1.47	0.141	10	1.8	-	1.57	1.76		1.00		22.7	15.5	0.037	0.037		8.0	8.4
15-21	1.42	0.135	11	1.9	-	1.45	1.67		1.00		23.6	16.8	0.048	0.048		7.8	8.5
21-29	1.11	0.111	10	2.0	-	1.47	1.70		1.00		24.8	17.1	0.050	0.050		7.9	8.6
29-43	0.79	0.086	9	2.0	-	1.58	1.81		1.00		22.0	17.0	0.045	0.045		8.0	8.6
43-56	0.61	0.061	10	1.9	-	1.43	1.62		1.00		22.7	16.2	0.043	0.043		8.0	8.5
56-72	0.40			1.8	2	1.38	1.55		1.00		25.1	14.7	0.039	0.039		8.3	8.9
72-76	0.30			1.6	3	1.42	1.54		1.00		23.4	11.9	0.028	0.028		8.5	9.0

Depth (in.)	Extractable bases 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	5B1a Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 8A1: 6N1b Ca	6O1b Mg	6P1a Na	6Q1a K		6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0-8	16.8	10.9	1.1	1.4	30.2		28.1		3.4	4.1	5.2	0.4		-	5.8	4.2		1.18
8-15	16.0	11.2	1.0	1.1	29.3		26.5											0.59
15-21	15.8	13.2	1.4	0.9	31.3		32.8											0.52
21-29	16.0	14.5	1.6	0.7	32.8		34.2											0.45
29-43	14.8	15.0	1.3	0.5	31.6		32.8											0.49
43-56	12.4	16.4	1.0	0.5	30.3		31.4											0.52
56-72	13.5	18.5	0.8	0.5	33.3		28.8											0.62
72-76+	14.1	18.0	0.7	0.3	33.1		24.3											0.61

Depth (in.)	8A Water at Saturation Pct.	Exch. bases: 5B3b Ca	5B3b Mg	5B1b Na meq./100 g.	5D2 Exchangeable Na Pct.	5C2 Base Sat. Pct.	Gypsum Pct.	Atterberg limits: Plastic limit	Liquid limit	Plastic index Pct. of <0.4 mm.
0-8	45.1				4	-		20	39	19
8-15	47.8				4	-				
15-21	50.7				4	95				
21-29	46.9				5	96				
29-43	48.9				4	96		22	46	24
43-56	50.3				3	95				
56-72	52.3				3	-				
72-76+	50.6				3	-		21	34	13

RINCON CLAY LOAM (taxadjunct) 1/
S64Calif-57-16

Location: Yolo County, California. A pit located 1/8 mile west of County Road 95B and 3/8 mile north of County Road 18A, T.10N., R.1E. (section lines not surveyed), 5 miles northwest of Woodland. Photo ABB-47T-16. Date of Sampling: September 29, 1964.
Description by: C. B. Goudey. Collectors: R. E. Nelson, B. R. Brasher, G. M. Kennedy, W. F. Andrews, G. J. Staidl, C. B. Goudey.
Classification: **Pachic Haploxeroll, fine, montmorillonitic, thermic.**
Vegetation: Fallow (safflower was prior crop). Climate: 15.5 inches average annual precipitation and mean annual temperature of 61°F. Parent Material: Alluvium from sedimentary rocks. Topography: Alluvial fan; plane; less than one percent slope; near toe. Elevation: 80 feet. Drainage: Runoff is slow; permeability is moderately slow to slow; well drained. Soil Moisture: Profile was moist below 15 inches.
Remarks: (1) Truog and Thymol blue field pH determinations; (2) Paired profile 64 Cal. 57-17; (3) Diagnostic horizons -- Mollic epipedon, (4) Soil temperature - 12" - 28°C; 18" - 27°C; 25" - 26°C; 36" - 25°C; 50" - 23°C; 64" - 23°C; 74" - 22°C.; (5) B23, B3, and C1 horizons contained fragments of charcoal and reddish weathered rock-like material; (6) BPR samples taken from the A12, B22 and C1 horizons.

HORIZON	DESCRIPTION
Ap RSL 64480	0 to 8 inches, grayish brown (2.5Y 5/2) silty clay loam, very dark grayish brown (10YR 3/2) when moist; surface 3 inches disturbed, below strong coarse prismatic structure; very hard, friable, sticky and plastic; plentiful micro to fine random roots; common micro to very fine tubular and interstitial pores; moderately alkaline (pH 8.0); clear smooth boundary.
A12 RSL 64481	8 to 15 inches, grayish brown (2.5Y 5/2) silty clay loam, very dark grayish brown (10YR 3/2) when moist; strong coarse prismatic structure; very hard, friable, sticky and plastic; plentiful micro to fine random and few medium vertical roots; many micro to very fine tubular and interstitial pores; moderately alkaline (pH 8.0); clear wavy boundary.
B1 RSL 64482	15 to 21 inches, grayish brown (2.5Y 5/2) silty clay loam, very dark grayish brown (10YR 3/2) when moist; moderate coarse prismatic structure; hard, firm, sticky (appears to be stickier than above) and plastic; plentiful micro to very fine random and plentiful fine vertical roots; common micro and fine tubular pores; common thin clay films on ped faces and in pores; moderately alkaline (pH 8.0); clear wavy boundary.
B21t RSL 64483	21 to 29 inches, grayish brown (2.5Y 5/2) silty clay, very dark grayish brown (10YR 3/2) when moist; moderate coarse prismatic structure breaking to moderate coarse angular blocky; hard, very firm, sticky and plastic; plentiful micro to very fine random and plentiful fine vertical roots; common micro to very fine tubular pores; many thin clay films on ped faces and in pores; moderately alkaline (pH 8.0); gradual wavy boundary.
B22t RSL 64484	29 to 43 inches, grayish brown (2.5Y 5/2) silty clay loam, very dark grayish brown (10YR 3/2) when moist; moderate coarse angular blocky structure; hard, very firm, sticky and plastic; plentiful micro to very fine random and plentiful fine vertical roots; common micro tubular pores; many moderately thick clay films on ped faces and in pores; moderately alkaline (pH 8.0); gradual wavy boundary.
B23t RSL 64485	43 to 56 inches, grayish brown (10YR 5/2) and pale brown (10YR 6/3) silty clay loam, very dark grayish brown (10YR 3/2) and brown to dark brown (10YR 4/3) when moist, (darker color is due to colloidal stains); moderate medium prismatic structure; hard, firm, sticky and plastic; plentiful micro to very fine random and plentiful fine vertical roots; many micro to very fine tubular and vesicular pores; many moderately thick clay films on ped faces and in pores; moderately alkaline (pH 8.0); gradual wavy boundary.
B3 RSL 64486	56 to 72 inches, light yellowish brown (10YR 6/4) and brown (10YR 5/3) clay loam, dark yellowish brown (10YR 4/4) and dark brown (10YR 3/3) when moist; massive, breaking to weak medium subangular blocky structure; hard, firm, sticky and plastic; plentiful micro to very fine random and plentiful fine vertical roots; many micro to very fine vesicular and tubular pores; few moderately thick clay films on ped faces and many thin clay films in pores; moderately alkaline (pH 8.0); strongly effervescent, lime occurs in soft masses; gradual irregular boundary.
C1 RSL 64487	72 to 76 inches plus, pale brown (10YR 6/3) clay loam, dark yellowish brown (10YR 4/4) when moist; massive; hard, friable, slightly sticky and slightly plastic; few micro random roots; common micro to very fine tubular pores; many thin clay films in pores; moderately alkaline (pH 8.0); strongly effervescent with disseminated lime.

1/ The Rincon series is in a fine, montmorillonitic, thermic family of Mollic Haploxeralfs. This pedon has a mollic epipedon more than 20 inches thick and lacks an argillic horizon.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Pachic Ultic Haploxeroll, clayey skeletal, mintmorillonitic, thermic
SOIL Santa Lucia shaly clay loam (taxadjunct) SOIL Nos. S62Calif-42-10 LOCATION Santa Barbara County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 62126 - 62129

Depth (In.)	Horizon	1B1b Total: Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002) 1/	Size class and particle diameter (mm) Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)			Coarse fragments 2A2: > 2 Pct.	2 – 19 Pct. of < 2 mm	19 – 76 Pct. of < 19 mm
		Pct. of < 2 mm																
0–8	A11	26.8	35.3	37.9	5.8	8.0	3.8	5.8	3.4	8.0	27.3	14.2	23.4				25	
8–17	A12	23.9	35.8	40.3	4.1	6.3	3.4	5.8	4.3	8.5	27.3	15.8	19.6				19	
17–24	A13	23.2	34.0	42.8	4.7	5.8	3.2	5.6	3.9	8.0	26.0	14.9	19.3				26	
24–36+	R		Rock															

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct.		Bulk density g/cc	g/cc	g/cc		Water content Pct.	Pct.	4B2 15 bar Pct.			pH 8C1a H_2O 1:1	8C1c 1 N KCl 1:1	(1:1)
0–8	9.43	0.743	13										36.7			6.0	5.2	
8–17	6.54	0.494	13										37.0			5.9	5.2	
17–24	5.55	0.443	13										36.2			5.8	5.0	
24–36+		Rock																

Depth (In.)	Extractable bases 5B1a: 6N2b Ca	602c Mg	6P2a Na	6Q2a K		6H2a Ext. Acidity	Cation Exch. Capacity 5A3a Sum									Base saturation 5C3 Sum	
	meq/100 g															Pct.	Pct.
0–8	29.6	9.2	0.5	5.6		24.1	70.0									66	
8–17	30.0	10.9	0.9	2.8		24.5	69.1									64	
17–24	25.1	12.4	1.0	1.9		26.5	66.9									60	
24–36+		Rock															

Depth (In.)	3A1 Clay fraction mineralogy 7A2 X-ray 2/
0–8	
8–17	MM 3
17–24	
24–36+	AM 6

1/ Shale fragments of sand and silt size break down in particle size distribution analysis. The soil has the chemical properties of a material of higher clay content and the mechanical properties of one of lower clay content.

2/ Mineral code:
MM = montmorillonite
AM = amorphous
Approximate weight fraction (X-ray)
3 = one-fifth to one-third
6 = indeterminate

SANTA LUCIA SHALY CLAY LOAM (taxadjunct) 1/
S62Calif-42-10

Location: Santa Barbara County, California. NW¼ of NE¼ Sec. 5, T.9N, R.35W. Very near watershed divide in Casmalia Hills, reached by trail road east southeast out of Corralitos Ranch headquarters; 5 airline miles south and slightly west of Guadalupe. Date of Sampling: April 19, 1964.
Description by: L. C. Leifer. Collectors: R. E. Nelson, Lothair Grant, G. E. Shipman, C. J. Hilliker, L. C. Leifer.
Classification: Pachic Ultic Haploxeroll, clayey skeletal, montmorillonitic, thermic.
Vegetation: Oak-grass used for range; ripgut brome, foxtail barley, alfilaria, a few thistle, scattered coast live oak with 35 percent canopy; sample site 35 and 50 feet from trees and no tree roots in pit. Climate: Precipitation 16 inches. Mean annual temperature 57°F., January 49°F., July 63°F. Parent Material: Diatomaceous shale, Monterey. Topography: Generally steep hills, locally plane 18 percent north northwest. Elevation: 1500 feet. Drainage: Well drained. Runoff is medium. Permeability is moderate. Soil Moisture: Nearly dry in upper 8 inches, slightly moist below.
Remarks: Field determinations of pH by Hellige-Truog triplex indicator. Paired site sample numbers are Santa Lucia S62Calif-42-9-1 through 4.

HORIZON	DESCRIPTION
A11 RSL 62126	0 to 8 inches, very dark gray (10YR 3/1) shaly light clay loam, black (10YR 2/1) when moist; 10 percent by volume of angular shale fragments larger than 3/4"; weak coarse and medium subangular blocky structure, upper 3/4 to 1" medium to strong fine granular on about 3/4 of surface; slightly hard, friable, slightly sticky and slightly plastic; abundant very fine roots; many very fine interstitial pores; medium acid (pH 6.0); gradual wavy boundary.
A12 RSL 62127	8 to 17 inches, very dark gray (10YR 3/1) very shaly light clay loam slightly finer than above, black (10YR 2/1) when moist; 50percent by volume of angular shale fragments larger than 3/4"; strong, fine and medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; abundant very fine roots; many very fine interstitial pores; medium acid (pH 6.0); gradual wavy boundary.
A13 RSL 62128	17 to 24 inches, very dark gray (10YR 3/1) very shaly clay loam, black (10YR 2/1) when moist; 50 percent by volume of rock fragments larger than 3/4"; strong fine and medium granular structure; slightly hard, friable, sticky and plastic; abundant very fine roots; many very fine interstitial pores; strongly acid (pH 5.5); abrupt irregular boundary.
R RSL 62129	24 to 36 inches plus, hard weakly fractured Monterey shale; locally dips from 24 inches on left face of pit to 35 inches on right; contains some porcelaneous strata. Shale is somewhat harder than at site S62Calif-42-9-4.

NOTE: Shale fragments over 3/4 inch in diameter discarded from samples going to Riverside laboratory.

1/ The Santa Lucia series is in a clayey-skeletal, mixed, thermic family of Pachic Ultic Haploxerolls. This pedon is in a montmorillonitic family of the same subgroup.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Pachic Ultic Haploxeroll, fine-loamy, mixed, frigid
SOIL Tournquist loam SOIL Nos. S66Calif-25-1 LOCATION Modoc County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 66327 - 66333

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	3A1 Int II (0.2–0.02)	Int I (2–0.1)	3A1a Non-carbonate clay	1/ Coarse fragments: > 2	2 – 19	19 – 76
		Pct of < 2 mm													Pct	Pct. of < 76mm	
0-4	A1	45.3	38.8	15.9	4.2	8.8	7.9	14.9	9.5	15.6	23.2	33.0	35.8	16	4	4	-
4-14	A3	45.4	37.5	17.1	4.6	8.5	7.7	14.5	10.1	13.8	23.7	31.9	35.3	17	2	2	-
14-21	B21	44.1	35.5	20.4	3.2	7.9	8.1	14.7	10.2	12.6	22.9	30.8	33.9	20	39	3	1
21-34	B22	42.5	36.4	21.1	3.1	7.9	7.9	14.2	9.4	14.0	22.4	31.3	33.1	21	3	2	1
34-45	IIC	45.4	33.5	21.1	8.0	10.4	6.6	11.4	9.0	13.5	20.0	28.7	36.4	21	2	1	1
45-50	R	49.7	29.0	21.3	8.2	11.8	6.7	11.5	11.5	12.2	16.8	30.3	38.2	21	-	-	-
0-8	A 2/														6	5	1

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven dry	Bulk density	3B2 C'	Water content	4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH: 8C1a H_2O 1:1	pH: NaF 1:50 2 min.	
	Pct.	Pct.		Pct.	Pct.	g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.	in./in.			
0-4	3.86	0.151	26	5.0		0.98	1.04		0.98		29.3	17.7	0.021	0.020	5.6	7.3	
4-14	1.94	0.094	21	5.2		1.06	1.13		0.99		29.6	16.4	0.021	0.021	6.0		
14-21	0.98	0.062	16	5.3		1.12	1.20		0.79		29.2	17.4	0.022	0.017	6.0		
21-34	0.68			5.4		1.15	1.24		0.99		33.2	18.1	0.023	0.023	6.0	7.6	
34-45	0.71			5.0								22.5			6.1		
45-50	0.82			5.1								24.1			6.1	7.6	
0-8	2.51	0.124	20	5.3								16.6			6.2		

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	5A3a Sum	6G1d KCl Ext. Al^{+++}	Base saturation: 5C1 NH_4OAc	5C3 Sum
	meq/100 g									Pct.	Pct.
0-4	12.3	5.0	0.4	1.7	19.4	20.3	35.4	39.7	0.2	55	49
4-14	13.5	5.1	0.3	1.5	20.4	13.2	30.2	33.6		68	61
14-21	11.4	5.6	0.2	1.3	18.5	11.4	26.0	29.9		71	62
21-34	9.7	7.0	0.2	1.2	18.1	10.5	26.4	28.6		69	63
34-45	12.4	8.7	0.2	0.8	22.1	10.7	32.5	32.8		68	67
45-50	11.9	7.6	0.5	0.4	20.4	10.2	33.5	30.6		61	67
0-8	15.4	4.7	0.8	0.4	21.3	13.8	32.2	35.1		66	61

Depth (In.)	Clay mineralogy (<0.002 mm) 7A: Illite (X-ray)	Kaolinite* (X-ray)		Kaolinite* Whole soil (DTA)	Kaolinite* Clay (DTA)
0-4	t	t		27	28
4-14				29	
14-21				32	
21-34		x		38	30
34-45		x		36	28
45-50				58	
0-8					

*The clay is disordered kaolinite that has a low intensity X-ray pattern.

1/ From characterization sample (5 kg) except that the percentage >76 mm. was calculated from field volume estimates and included in the >2 mm. column.

Micromorphology

66327 Strongly granular; granules consisting of aggregates and coated andesite pseudomorphs. A few pseudomorphs have clay skin fragments in interior voids.

66328 Similar to 66327, except granules are more diffuse.

66329 Similar to 66328, but granules are larger. Clay skin fragments inside pseudomorphs are more abundant.

66330 Similar to 66329 but granules are very indistinct.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

2/ Composite of 20 subsamples taken in a 15x12' grid adjacent to the master pedon.

TOURNQUIST LOAM
S66Calif-25-1

Location: Modoc County, California. NW¼ NW¼ Sec. 33, T48N, R11E, 402 feet east of line tag between Sections 32 and 33. Date of Sampling: May 20, 1966.
Description by: J. S. Cahoon. Collectors: J. E. McClelland, J. P. Tribe, K. Flach, D. R. Taylor, G. H. Simonson, R. W. Mayko, J. S. Cahoon.
Classification: Pachic Ultic Haploxeroll, fine-loamy, mixed, frigid.
Vegetation: Timber and grasses. Ponderosa pine, white fir, squaw carpet, serviceberry, strawberry, bitterbrush, balsamroot, pine grass. Climate: Estimated as follows: average annual precipitation is 18 inches; mean annual air temperature 44°F., mean summer air temperature is 57°F. Deep snow covers the ground in winter. Parent Material: Reddish mudflow consisting of rounded andesitic boulders and cobbles in loamy matrix capped by a thin mantle of higher ash content is suggested. Topography: Tableland. Slope gradient is 1 percent. Elevation: 5450 feet. Drainage: Well drained, permeability is moderate, runoff is slow. Soil Moisture: Moist throughout.
Remarks: BPR samples were taken of the A horizon, 0 to 14 inches, and the B2 horizon, 14 to 34 inches. Field determination of pH was made with bromthymol blue indicator. About 10 percent volume of fine rounded concretions or "shot" occurred throughout. Coarse fragment volume commonly is 30 to 40 percent in the B2 of Tournquist soils. The A horizons of these soils appear to have low bulk density and a higher ash content compared to underlying horizons. Soil temperature at 20 inches was 49°F. at time of sampling.

HORIZON	DESCRIPTION
O1	2 to 0 inches, fresh and partly decomposed litter of pine needles and leaves.
A1 RSL 66327	0 to 4 inches, reddish brown (5YR 4/3) loam, dark reddish brown (5YR 3/2) moist; strong very fine granular structure; soft to slightly hard, very friable, slightly sticky and slightly plastic; many fine roots; many very fine interstitial pores; slightly acid (pH 6.5); clear smooth boundary.
A3 RSL 66328	4 to 14 inches, reddish brown (5YR 4/3) loam, dark reddish brown (5YR 3/3) moist; moderate very fine granular structure; soft to slightly hard, very friable, slightly sticky and slightly plastic; many fine roots; many very fine interstitial pores; slightly acid (pH 6.4); clear smooth boundary.
IIB21 RSL 66329	14 to 21 inches, reddish brown (5YR 4/3) gravelly loam, dark reddish brown (5YR 3/3) moist; moderate very fine granular and weak medium subangular blocky structure; slightly hard, friable, slightly sticky and plastic; many fine roots; common very fine tubular pores; stone line of hard andesite or basalt at top of this horizon; slightly acid (pH 6.4); gradual smooth boundary.
IIB22 RSL 66330	21 to 34 inches, reddish brown (5YR 4/4) gravelly clay loam, dark reddish brown (5YR 3/4) moist; moderate fine subangular blocky structure; slightly hard, friable, sticky and plastic; many fine roots; common very fine tubular pores; common pebbles of soft andesite; slightly acid (pH 6.5); abrupt smooth boundary.
IIIC RSL 66331	34 to 45 inches, reddish brown (5YR 4/4) very gravelly and cobbly clay loam, dark reddish brown (5YR 3/4) moist; massive; few very fine to medium roots; about 90 percent soft gravels and cobbles that are coated with thin clay films; slightly acid (pH 6.5); gradual smooth boundary.
R RSL 66332	45 to 50 inches, hard, fractured andesite. Not sampled.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Crouch loamy coarse sand (taxadjunct) **LOCATION** San Diego County, California

SOIL FAMILY: Ultic Haploxeroll, sandy, mixed, mesic.

SOIL NOS. S60Calif-37-5 **LAB. NOS.** 60418 - 60424

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1										TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 1/	
0- 2	A11	13.3	26.1	10.4	19.5	9.4	15.1	6.2	29.8	5.7	21	lcos
2- 7	A12	12.0	23.2	9.6	20.2	10.3	17.1	7.6	31.5	7.6	13	cosl
7-10	AC	10.4	22.6	9.7	20.9	9.7	16.9	9.8	30.9	8.0	12	cosl
10-20	C1	29.0	38.5	8.6	10.8	2.7	5.7	4.7	10.6	2.5	27	cos
20-29	C2	17.5	31.4	13.2	18.5	6.8	8.1	4.5	20.9	3.2	21	cos-lcos
29-37	C3	19.1	30.3	11.5	17.7	5.7	9.5	6.2	20.5	3.7	23	lcos
37-46+	C4	22.2	29.1	11.0	15.2	5.1	9.3	8.1	18.2	4.3	24	lcos

	pH		ORGANIC MATTER						Free	MOISTURE TENSIONS		
	8C1a H_2O 1:1	8C1c KCl 1:1	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC x 10^3 MILLIMHOS PER CM 25°C.	$CaCO_3$ equivalent %	Fe_2O_3 6C1b %	1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
	6.2	5.6	3.33	0.196	17.0				0.6			7.1
	7.1	6.2	1.90	0.128	14.8				0.7			5.0
	7.5	6.5	1.14	0.077	14.8				0.7			4.9
	7.4	6.0	0.12						0.4			2.6
	7.2	5.6	0.08						0.7			3.2
	6.8	4.9	0.05						0.7			4.8
	6.8	4.7	0.05						0.6			5.5

5A2a	EXTRACTABLE CATIONS 5B1a					BASE SAT. %	Sum of Cations					
CATION EXCHANGE CAPACITY (Na)	6N2b Ca	6G2c Mg	6H2a H	6P2a Na	6Q2a K	5C3	me/100 g soil 5A3a	K				MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						milliequivalents per liter →					
14.4	11.0	1.5	5.3	0.1	0.6	71	18.5					
16.1	12.9	1.4	2.9	0.1	0.5	84	17.8					
12.8	9.9	1.4	1.5	0.1	0.5	89	13.4					
4.4	2.7	0.7	0.5	0.1	0.3	88	4.3					
5.3	3.0	0.8	1.1	0.1	0.2	79	5.2					
12.2	9.1	2.0	1.7	0.1	0.1	87	13.0					
14.6	10.5	2.4	1.7	0.2	0.1	89	14.9					

1/ Percent of the whole soil

CROUCH LOAMY COARSE SAND (taxadjunct) 1/
S60Calif-37-5

Description: George Borst
Date of Sampling: November 10, 1960
Collectors: Reuben Nelson, Lothair Grant, Fred C. Eggers, John Wachtell, and George Borst
Location: Approximately 4200 feet south of northeast corner, sec. 23, T. 11 S., R. 4 E., southeast of Montezuma Valley Prison Camp, San Diego County, Calif.
Elevation: 4,000 feet Relief: Moderately sloping, 6 percent.
Vegetation: Native chaparral Use: Range.
Drainage: Somewhat excessively drained
Parent Material: Deeply weathered granitic rock
Climate: This soil occurs under about 17" annual rainfall. The mean annual temperature is about 57°, the mean January temperature about 44°, and the mean July temperature about 73°.
Remarks: This soil has a thicker A horizon and a more prominent B horizon than that sampled as S60Calif37-3. This site is probably more nearly modal for the series.
Classification: **Ultic Haploxeroll, sandy, mixed, mesic.**

HORIZON		DESCRIPTION
A11	0- 2"	Grayish brown (10YR 5/2) loamy coarse sand, very dark grayish brown (10YR 3/2) when moist; weak very fine crumb structure; soft, very friable, nonsticky and nonplastic; abundant very fine random roots; slightly acid (pH 6.5); micaceous; clear smooth boundary.
A12	2- 7"	Grayish brown (10YR 5/2) loamy coarse sand, very dark grayish brown (10YR 3/2) when moist; weak fine crumb structure; soft, friable, nonsticky and nonplastic; abundant fine random roots; neutral (pH 7.2); micaceous; clear wavy boundary, with tongues of this horizon penetrating the underlying material.
AC	7-10"	Brown (10YR 5/3) loamy coarse sand, dark brown (10YR 3/3) when moist; massive; slightly hard, friable, nonsticky and nonplastic; plentiful fine to medium random roots; neutral (pH 7.2); micaceous; clear wavy boundary.
C1	10-20"	Brown (10YR 5/3) loamy coarse sand, containing very pale brown (10YR 7/3) and dark gray (10YR 4/1) mineral particles, dark brown (10YR 4/3), pale brown (10YR 6/3), and very dark gray (10YR 3/1) when moist; massive; hard, friable, nonsticky and nonplastic; few medium to coarse angular roots; common fine random tubular pores; few thin clay films in pores and on mineral grains; slightly acid (pH 6.5); micaceous; diffuse smooth boundary.
C2	20-29"	Brown (10YR 5/3) loamy coarse sand, containing very pale brown (10YR 7/3) and dark gray mineral particles, dark brown (10YR 4/3), pale brown (10YR 6/3), and very dark gray (10YR 3/1) when moist; massive; hard, friable, nonsticky and nonplastic; few medium to coarse random roots; common fine random tubular pores; few thin clay films in pores and on mineral grains; slightly acid (pH 6.3); micaceous; gradual smooth boundary.
C3	29-37"	Brown (10YR 5/3) loamy coarse sand, containing very pale brown (10YR 7/3) and dark gray (10YR 4/1) mineral particles, dark brown (10YR 4/3), pale brown (10YR 6/3), and very dark gray (10YR 3/1) when moist; massive; hard, friable, nonsticky and nonplastic; few medium to coarse random roots; few fine random tubular pores; few thin clay films on mineral grains; micaceous; medium acid (pH 6.0); clear smooth boundary.
C4	37-46"+	Very pale brown (10YR 7/3), brown (10YR 5/3), and dark gray (10YR 4/1) disintegrated granite of coarse sand texture, pale brown (10YR 6/3), dark brown (10YR 4/3), and very dark gray (10YR 3/1) when moist; massive; hard, friable, nonsticky and nonplastic; few medium to coarse random roots; medium acid (pH 6.0).

1/ **The Crouch series is in a coarse-loamy, mixed, mesic family of Ultic Haploxerolls. This pedon contains less clay than required for the series (sandy loam).**

OIL SURVEY LABORATORY Riverside, California

SOIL TYPE Sheephead stony fine sandy loam **LOCATION** San Diego County, California

SOIL FAMILY: Ultic Haploxeroll, loamy, mixed, mesic, shallow

SOIL NOS. S60Calif-37-7 **LAB. NOS.** 60431 - 60436

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0- 4	A11	5.7	11.6	8.3	32.7	17.5	17.9	6.3	48.6	8.7		fsl-ls
4- 8	A12	3.9	12.0	7.7	31.0	17.2	21.7	6.5	49.7	10.6		fsl
8-24	R &C	1.7	6.4	7.7	36.0	24.5	19.0	4.7	62.8	5.9		fsl
24-40	R &C	3.7	10.6	9.6	31.9	19.4	17.3	7.5	51.9	6.2		fsl
40-51	R &C	1.6	7.2	7.3	31.9	21.6	24.3	6.1	58.2	9.3		fsl
51-57+	C	not determined										

pH 8C1a H_2O 1:1	pH 8C1c KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC x 10^3 MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	Free Fe_2O_3 6C1b %	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
6.2	5.4	4.09	0.161	25.4				1.6			6.7
6.7	5.3	0.83	0.044	18.9				1.5			4.5
6.6	4.9	0.26	0.013					1.7			3.9
6.2	4.5	0.12						1.7			4.2
6.3	4.2	0.15						2.0			5.9
		not determined						1.5			

5A2a CATION EXCHANGE CAPACITY (- Na)	EXTRACTABLE CATIONS 6N2b Ca	6Q2c Mg	6H2a H	6P2a Na	5B1a 6Q2a K	BASE SAT. % 5C3	Sum of Cations me./100 g. soil 5A3a	g. K	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						milliequivalents per liter →		
15.5	10.1	1.3	5.5	0.1	0.5	69	17.5		
9.6	5.2	1.2	2.5	0.1	0.3	73	9.3		
6.7	3.1	1.0	1.8	0.1	0.2	71	6.2		
7.3	3.5	1.2	2.2	0.1	0.2	69	7.2		
11.9	6.3	2.2	3.0	0.2	0.1	75	11.8		
9.9	5.2	2.1	2.3	0.2	<0.1	77	9.8		

1/ The coarse fragments were discarded when the soils were sampled.

SHEEPHEAD STONY FINE SANDY LOAM
S60Calif-37-7

Location: Approximately 800 feet south-southeast of entrance to the Lucky S Ranch gate on Sunrise Highway in SW1/4 of Section 7, T. 14 S., R. 5 E., San Diego County, California. Date of Sampling: November 15, 1960.
Description by: George Borst. Collectors: Reuben Nelson, Fred C. Eggers, Cliff Henry, and George Borst.
Classification: Ultic Haploxeroll, loamy, mixed, mesic, shallow.
Vegetation: Native chaparral. Climate: This soil occurs under an average annual rainfall of about 30 inches, a mean annual temperature of 53° F., a mean January temperature of 39° F., and a mean July temperature of 70° F. Parent Material: Deeply weathered micaceous schist. Use: Range. Relief: Steep, 40 percent. Elevation: 5,000 feet. Drainage: Somewhat excessively drained. Reaction: pH was determined in the field with a Truog (Hellige) soil reaction kit. Remarks: The weathered schist is thinly laminated, highly micaceous, with a dip of about 76°. The R&C horizon was subdivided for laboratory analysis at 24 inches and 40 inches.

HORIZON

A11 RSL No. 60431	0 to 4 inches, dark grayish brown (10YR 4/2) fine sandy loam, dark brown (10YR 3/3) when moist; weak very fine crumb structure; soft, very friable, nonsticky and nonplastic; abundant very fine random roots; slightly acid (pH 6.5); highly micaceous; clear smooth boundary.
A12 RSL No. 60432	4 to 8 inches, brown (10YR 5/3) highly micaceous fine sandy loam, dark brown (10YR 3/3) moist; weak fine crumb structure; soft, friable, nonsticky and nonplastic; abundant fine roots; common fine tubular pores; slightly acid (pH 6.2); clear, irregular boundary.
R&C RSL Nos. 60433 60434 60435	8 to 51 inches, fractured foliar micaceous schist and light yellowish brown (10YR 6/4) angular gravelly or stony fine sandy loam, yellowish brown (10YR 5/4) moist; massive; soft, friable, nonsticky and nonplastic; common medium to coarse roots; medium acid (pH 6.0); diffuse, irregular boundary.
R RSL No. 60436	51 to 57 inches +, pale yellow (2.5Y 7/4) deeply weathered foliar schist; yellowish brown (10YR 5/4) when moist, with yellowish red (5YR 4/8) colloidal coatings on the rock fragments; few coarse random roots; medium acid (pH 6.0).

SOIL SURVEY LABORATORY Riverside, California

OIL TYPE Crouch loamy sand **LOCATION** San Diego County, California

SOIL FAMILY: Ultic Haploxeroll, coarse-loamy, mixed, mesic

SOIL NOS. S61Calif-37-3 **LAB. NOS.** 6117 - 6123

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0- 5	A11	14.2	19.4	9.4	19.5	8.7	21.7	7.1	29.3	12.3	42	cosl
5-12	A12	16.6	22.2	10.0	19.4	6.6	18.7	6.5	25.2	11.1	41	cosl-lcos
12-24	AC	14.2	21.4	10.3	19.0	11.4	17.8	5.9	29.0	9.8	45	lcos-cosl
24-34	C1	15.1	21.8	10.0	20.9	8.4	18.6	5.2	27.9	10.8	34	" "
34-42	C2	9.5	18.9	9.9	22.6	9.2	23.4	6.5	32.1	13.7	18	cosl
42-55	C3	16.6	29.9	9.2	19.1	6.1	13.1	6.0	22.7	7.1	36	lcos
55-61+	C4	18.2	32.6	10.2	18.4	5.2	9.5	5.9	19.6	4.9	59	lcos

pH		ORGANIC MATTER			EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent	Free Fe_2O_3	MOISTURE TENSIONS		
8C1a H_2O 1:1	8C1c KCl 1:1	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N				6C1b %	1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
6.9	6.1	2.58	0.122	21.1				0.8			7.7
6.7	5.7	1.13	0.059	19.2				0.7			6.2
6.5	5.3	0.63	0.032					0.8			5.4
6.4	4.8	0.22	0.015					0.9			5.4
6.4	4.9	0.23						0.8			5.8
6.4	5.0	0.13						0.7			5.6
6.4	4.9	0.14						0.7			5.4

5A2a CATION EXCHANGE CAPACITY	EXTRACTABLE CATIONS 5B1a					BASE SAT. %	Sum of Cations				MOISTURE AT SATURATION
	6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K	5C3	me./100g. soil 5A3a	Ca	Mg	Na	K
(+ Na)	milliequivalents per 100g. soil →						milliequivalents per liter →				%
20.5	14.9	1.7	5.4	0.2	1.0	77	23.2				
15.4	9.1	1.5	5.0	0.2	1.0	70	16.8				
14.9	8.2	0.5	3.6	0.2	0.6	73	13.1				
13.0	8.8	0.5	2.3	0.2	0.2	81	12.0				
12.2	8.8	0.5	2.3	0.2	0.3	81	12.1				
8.9	5.2	0.5	1.6	0.2	0.3	79	7.8				
8.3	4.4	0.4	1.8	0.2	0.3	75	7.1				

1/ Percent of the whole soil

CROUCH LOAMY SAND
861Calif-37-3

Description: George Borst
Date of Sampling: January 18, 1961
Collectors: Reuben Nelson, Cliff Henry, and George Borst
Location: About 1/2 mile southwest of Matagual Ranch headquarters on the south side of reservation road, in NW1/4 sec. 35, T. 11 S., R. 3 E. (projected), Santa Ysabel Indian Reservation, San Diego County, California.
Elevation: 4,500 feet
Relief: Very steep, 60 percent
Use: Forestry
Vegetation: Mixed coniferous and deciduous forest
Drainage: Somewhat excessively drained
Parent Material: Deeply weathered granitic rock
Climate: This soil occurs under an average annual rainfall of about 38", a mean annual temperature of 53°, a mean January temperature of 39°, and a mean July temperature of 70°.
Remarks: A deep layer of forest duff, approximately 2 inches in thickness, occurs at the surface
Classification: Ultic Haploxeroll, coarse-loamy, mixed, mesic.
Reaction: pH was determined in the field with a Truog (Hellige) soil reaction kit

HORIZON		DESCRIPTION
A11	0- 5"	Dark grayish brown (10YR 4/2) loamy sand, dark brown (10YR 3/3) when moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; abundant very fine vertical roots; many very fine interstitial pores; slightly acid (pH 6.5); clear smooth boundary.
A12	5-12"	Brown (10YR 5/3) loamy sand, dark brown (10YR 3/3) when moist; weak fine granular structure; soft, very fine, nonsticky and nonplastic; few medium random roots; many very fine interstitial pores; slightly acid (pH 6.2); gradual smooth boundary.
AC	12-24"	Pale brown (10YR 6/3) loamy sand, dark brown (10YR 4/3) when moist; massive; soft, very friable, nonsticky and nonplastic; plentiful medium to coarse random roots; medium acid (pH 6.0); gradual smooth boundary.
C1	24-34"	Pale yellow (2.5Y 8/4) loamy sand, light olive brown (2.5Y 5/4) when moist; massive; soft, very friable, nonsticky and nonplastic; few medium to coarse random roots; medium acid (pH 6.0); abrupt smooth boundary.
C2	34-42"	Pale yellow (2.5Y 8/4) sandy loam, light yellowish brown (2.5Y 6/4) when moist; massive; hard, firm, nonsticky and nonplastic; few medium to coarse random roots; common medium random interstitial pores; medium acid (pH 6.0); abrupt smooth boundary.
C3	42-55"	Pale yellow (2.5Y 8/4) coarse sand, light olive brown (2.5Y 5/4) when moist; massive; slightly hard, friable, nonsticky and nonplastic; few medium random roots; common fine random tubular pores; medium acid (pH 6.0); gradual smooth boundary.
C4	55-61"+	White (2.5Y 8/2) deeply weathered granitic rock of coarse sand texture, containing black (10YR 2/1) mineral particles and dark yellowish brown (10YR 4/4) films on cleavage planes, light gray (2.5Y 7/2) and black (10YR 2/1) when moist; few medium random roots; medium acid (pH 6.0).

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Crouch sandy loam **LOCATION** San Diego County, California

SOIL FAMILY: Ultic Haploxeroll, coarse-loamy, mixed, mesic.

SOIL NOS. S61Calif-37-6 **LAB. NOS.** 6141 - 6147

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1										TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	2/ CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 1/	
0- 3	A11	11.7	23.3	8.8	14.7	7.1	23.0	11.4	25.2	13.4	20	sosl
3-13	A12	10.0	21.9	8.9	15.8	7.8	23.5	12.1	26.8	13.5	16	sosl
13-29	A3	12.2	24.6	8.4	14.2	7.4	22.6	10.6	25.4	12.7	17	cosl
29-42	B1	8.1	19.1	8.9	18.4	10.2	24.2	11.1	32.3	13.2	8	cosl
42-56	B2	11.6	21.7	9.0	16.3	9.2	21.6	10.6	29.3	11.4	7	cosl
56-70	B31	27.2	24.1	8.7	13.8	6.7	11.9	7.6	21.0	5.8	17	lcos
70-88	B32	19.3	23.3	11.8	20.9	6.6	11.1	7.0	25.5	4.4	17	lcos

DEPTH INCHES	pH 8C1a H_2O 1:1	pH 8C1c KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	Free Fe_2O_3 6C1b %	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
0- 3	6.4	5.2	2.25	0.148	15.2				1.3			8.0
3-13	6.0	4.8	1.31	0.103	12.7				2.0			8.1
13-29	6.2	4.4	0.48	0.040	12.0				1.8			8.3
29-42	6.1	4.0	0.35	0.029					2.0			10.2
42-56	6.0	3.8	0.15						1.9			11.8
56-70	6.4	3.7	0.08						1.6			7.8
70-88	6.3	3.7	0.05						1.9			6.9

DEPTH INCHES	5A2a CATION EXCHANGE CAPACITY (← Na)	EXTRACTABLE CATIONS 5B1a 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K	BASE SAT. % 5C3	Sum of Cations me./100 g. soil 5A3a	Sum of Cations me./100g. clay	Sum of Cations me./100g. clay + fine silt
		milliequivalents per 100g. soil →								
0- 3	19.8	11.1	2.4	6.4	0.2	0.6	69	20.7	182	83
3-13	16.5	9.3	2.3	6.5	0.2	0.5	66	19.0	157	74
13-29	19.3	11.0	3.2	5.3	0.3	0.3	74	20.1	190	86
29-42	28.0	17.8	5.8	6.0	0.4	0.2	80	30.2	272	124
42-56	35.2	22.1	8.0	6.4	0.4	0.1	83	37.0	349	168
56-70	27.8	18.6	5.7	4.3	0.4	0.1	85	29.1	383	217
70-88	28.6	17.1	4.3	4.0	0.6	<0.1	85	27.0	371	228

Sands all include considerable mica.

1/ Percent of total soil

2/ B2 and B3 horizons incompletely dispersed

CROUCH SANDY LOAM
S61Calif-37-6

Description: George Borst
Date of Sampling: January 25, 1961
Collectors: Reuben Nelson, Lothair Grant, and George Borst
Location: Approximately 500 feet south of north 1/4 corner, sec. 29, T. 12 S., R. 4 E., about 2 miles north-northeast of Julian, San Diego County, California.
Elevation: 4,500 feet Relief: Steep, 40 percent
Vegetation: Forest, mostly oak and cedar Use: Woodland
Drainage: Well drained, moderately slow subsoil permeability
Parent Material: Deeply weathered granitic rock
Climate: This soil occurs under an average annual rainfall of about 38", a mean annual temperature of 53°, a mean January temperature of 39°, and a mean July temperature of 70°.
Remarks: The A horizon of this soil is relatively thick, and erosion relatively slight, as compared with most soils in this series in San Diego County.
Classification: **Ultic Haploxeroll, coarse-loamy, mixed, mesic.**

HORIZON		DESCRIPTION
A11	0- 3"	Very dark grayish brown (10YR 3/2) sandy loam, very dark brown (10YR 2/2) when moist; weak very fine crumb structures; soft, very friable, nonsticky and slightly plastic; abundant very fine random roots; many very fine interstitial pores; slightly acid (pH 6.5); abrupt smooth boundary.
A12	3-13"	Dark grayish brown (10YR 4/2) sandy loam, very dark grayish brown (10YR 3/2) when moist; massive; slightly hard, friable, nonsticky and slightly plastic; plentiful fine random roots; common fine random tubular pores; slightly acid (pH 6.5); clear smooth boundary.
A3	13-29"	Dark yellowish brown (10YR 4/4) sandy loam, containing burrows filled with soil of the overlying horizon, dark yellowish brown (10YR 3/4) when moist; massive; slightly hard, friable, slightly sticky and plastic; plentiful medium random roots; common fine random pores; slightly acid (pH 6.5); clear wavy boundary.
B1	29-42"	Yellowish brown (10YR 5/4) sandy loam, dark yellowish brown (10YR 4/4) when moist; massive; hard, firm, slightly sticky and plastic; few medium random roots; few fine random tubular pores; colloid in bridges between mineral grains; slightly acid (pH 6.5); clear wavy boundary.
B2	42-56"	Yellowish brown (10YR 5/4) sandy clay loam, dark yellowish brown (10YR 4/4) when moist; massive; hard, firm, sticky and plastic; few coarse random roots; common medium random tubular pores; many thick clay films on fractures planes; slightly acid (pH 6.5); gradual smooth boundary.
B31	56-70"	Yellowish brown (10YR 5/4) sandy clay loam, containing very dark grayish brown (10YR 3/2) and very pale brown (10YR 8/4) mineral particles, dark yellowish brown (10YR 4/4) when moist; massive; hard, firm, sticky and plastic; few coarse random roots; common medium random tubular pores; many thick clay films on fractured planes; slightly acid (pH 6.5); gradual smooth boundary.
B32	70-88"+	Yellowish brown (10YR 5/4) coarse sandy loam, containing very dark grayish brown (10YR 3/2) and very pale brown (10YR 8/4) mineral particles, dark yellowish brown (10YR 4/4) when moist; massive; hard, firm, slightly sticky and slightly plastic; common thick clay films on fracture planes; slightly acid (pH 6.5).

OIL SURVEY LABORATORY Riverside, California

SOIL TYPE Crouch sandy loam **LOCATION** San Diego County, California

SOIL FAMILY: Ultic Haploxeroll, coarse-loamy, mixed, mesic.

SOIL NOS. S61Calif-37-7 **LAB. NOS.** 6148 - 6155

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1						2/			2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0- 4	A11	7.1	19.9	11.0	21.8	8.4	22.4	9.4	31.7	12.0	3	cosl
4-19	A12	8.3	21.5	11.1	20.6	8.1	20.3	10.1	29.4	11.1	2	cosl
19-28	A3	7.8	19.7	10.6	21.6	8.2	20.7	11.4	30.2	11.3	2	cosl
28-38	B1	9.1	23.8	10.8	19.6	7.0	18.8	10.9	26.9	10.3	3	cosl
38-50	B21	5.4	21.6	12.0	23.4	8.2	19.2	10.2	30.6	10.2	2	cosl
50-61	B22	4.9	22.1	12.0	22.9	8.0	17.5	10.6	29.8	8.9	1	cosl
61-73	B23	4.5	24.1	11.2	22.5	8.9	16.7	10.1	30.4	9.1	1	cosl
73-91+	B3	4.4	19.1	9.7	24.7	13.5	21.6	7.0	40.8	10.2	4	sl

	pH		ORGANIC MATTER			ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C.		Free Fe_2O_3	MOISTURE TENSIONS		
	8C1a H_2O 1:1	8C1c KCl 1:1	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)		$CaCO_3$ equivalent %	6C1b %	1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
0- 4	6.7	5.6	2.17	0.130	16.7				1.3			6.4
4-19	6.1	4.6	0.63	0.050	12.6				1.5			5.9
19-28	6.2	4.5	0.36	0.032					1.5			6.0
28-38	6.3	4.6	0.27	0.022					1.5			7.3
38-50	6.3	4.2	0.22						1.5			7.0
50-61	6.3	4.2	0.16						1.6			8.1
61-73	6.3	4.3	0.14						2.0			8.1
73-91+	6.4	3.9	0.11						1.2			7.9

5A2a CATION EXCHANGE CAPACITY (+ Na)	EXTRACTABLE CATIONS 5B1a					BASE SAT. % 5C3	Sum of Cations me./100g. soil 5A3a	Sum of Cations me./100g. clay	Sum of Cations me./100g. clay + fine silt
	6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K				
	milliequivalents per 100g. soil →								
14.4	9.0	2.0	4.0	0.1	0.7	75	15.8	168	74
11.1	4.7	1.1	4.4	0.2	0.4	59	10.8	107	51
11.2	5.1	1.2	4.0	0.1	0.4	63	10.8	95	48
11.0	5.1	1.5	3.7	0.1	0.3	65	10.7	98	50
15.8	7.8	2.5	4.1	0.2	0.1	72	14.7	144	72
16.2	8.7	2.9	4.1	0.3	0.1	75	16.1	152	83
14.6	8.9	2.9	3.9	0.3	0.1	76	16.1	159	88
20.6	13.0	3.4	4.0	0.6	0.1	81	21.1	301	123

1/ Percent of total soil

2/ B2 and B3 horizons incompletely dispersed

Sands all include considerable mica

CROUCH SANDY LOAM
S61Calif-37-7

Description: George Borst
Date of Sampling: January 25, 1961
Collectors: Reuben Nelson, Lothair Grant, and George Borst
Location: Approximately 900 feet northeast of south 1/4 corner, sec. 19, T. 12 S., R. 4 E., about 2 miles north of Julian, San Diego County, Calif.
Elevation: 4,100 feet Relief: Steep, 35 percent. Use: Woodland - range
Vegetation: Open forest, with scattered oak and manzanita
Drainage: Well drained, moderately slow subsoil permeability
Parent Material: Deeply weathered granitic rock
Climate: This soil occurs under an average annual precipitation of about 38". The mean annual temperature is 53°, the mean January temperature is 39°, and the mean July temperature 70°.
Remarks: The A horizon of this soil is relatively thick, and erosion relatively slight, as compared with most soils in this series in San Diego County.
Classification: **Ultic Haploxeroll, coarse-loamy, mixed, mesic.**

HORIZON		DESCRIPTION
A11	0- 4"	Dark grayish brown (10YR 4/2) sandy loam, very dark grayish brown (10YR 3/2) when moist; weak very fine crumb structure; soft, very friable; nonsticky and nonplastic; abundant very fine vertical roots; many very fine interstitial pores; highly micaceous; slightly acid (pH 6.5); abrupt smooth boundary.
A12	4-19"	Dark brown (10YR 4/3) sandy loam, very dark grayish brown (10YR 3/2) when moist; massive; slightly hard, friable, slightly sticky and slightly plastic; plentiful fine random roots; common medium random tubular pores; highly micaceous; medium acid (pH 6.0); clear wavy boundary.
A3	19-28"	Brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) when moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine random roots; common medium random tubular pores; highly micaceous; medium acid (pH 6.0); clear smooth boundary.
B1	28-38"	Yellowish brown (10YR 5/4) sandy clay loam, dark yellowish brown (10YR 3/4) when moist; weak medium angular blocky structure; hard, firm, slightly sticky and slightly plastic; few medium random roots; few coarse and common medium random tubular pores; common moderately thick clay films on ped faces; highly micaceous; medium acid (pH 6.0); gradual smooth boundary.
B21	38-50"	Yellowish brown (10YR 5/4) sandy clay loam, dark yellowish brown (10YR 3/4) when moist; moderate coarse angular blocky structure; hard, firm, slightly sticky and plastic; few medium random roots; few medium random tubular pores; common moderately thick clay films on ped faces; highly micaceous; medium acid (pH 5.8); gradual smooth boundary.
B22	50-61"	Light yellowish brown (10YR 6/4) sandy clay loam, dark yellowish brown (10YR 4/4) when moist; moderate coarse angular blocky structure; hard, firm, slightly sticky and plastic; few medium random roots; few medium random tubular pores; few moderately thick clay films on ped faces; highly micaceous; medium acid (pH 5.8); abrupt smooth boundary.
B23	61-73"	Brownish yellow (10YR 6/6) and yellowish brown (10YR 5/4) sandy clay loam, light yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4) when moist; moderate coarse angular blocky structure; hard, firm, slightly sticky and plastic; few medium random roots; few medium random tubular pores; few moderately thick clay films on ped faces; highly micaceous; medium acid (pH 5.8); gradual smooth boundary.
B3	73-91"+	Light yellowish brown (10YR 6/4) and yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) and (10YR 3/4) when moist; massive; hard, firm, slightly sticky and slightly plastic; few medium random roots; colloid in bridges between mineral grains; medium acid (pH 5.8).

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Ultic Haploxeroll, coarse-loamy, mixed, mesic
SOIL Stoner loam (taxadjunct) SOIL Nos. S66Calif-47-9 LOCATION Siskiyou County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 66393 - 66400

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Non-carbonate clay	1/ Coarse fragments 1A2a: > 2	2 – 19	19 – 76
		Pct. of < 2 mm												Pct.	Pct.	Pct. of < 76mm	
0-3	A11	64.5	27.2	8.3	22.0	17.6	7.1	10.9	6.9	10.4	16.8	23.2	57.6	8	51	48	3
3-6	A12	62.4	28.6	9.0	18.9	15.9	7.3	12.1	8.2	11.1	17.5	26.0	54.2	9	50	47	3
6-11	A3	64.2	26.8	9.0	20.1	16.4	7.8	11.9	8.0	9.9	16.9	24.5	56.2	9	47	45	2
11-24	B1t	63.2	27.4	9.4	19.7	16.5	7.3	11.7	8.0	10.1	17.3	24.6	55.2	9	41	39	2
24-40	B21t	65.0	23.9	11.1	21.8	17.7	7.1	10.8	7.6	9.2	14.7	22.3	57.4	11	36	35	1
40-46	B22t	64.4	24.0	11.6	18.5	17.9	8.0	12.3	7.7	9.5	14.5	23.7	56.7	12	38	37	1
46-58+	B23t	65.1	24.1	10.8	19.6	17.0	7.9	12.9	7.7	9.8	14.3	24.3	57.4	11	32	34	8
0-6	A1 2/														43	42	1

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven dry	Bulk density	3B2 C'	Water content	Water content: 4B1c 1/3 bar	Water content: 4B2 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH: 8C1a H_2O 1:1		
	Pct	Pct		Pct.	Pct.	g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.	in./in.			
0-3	2.77	0.100	28	2.4								6.5			6.3		
3-6	1.93	0.078	25	2.3		1.41	1.42		0.65		10.8	6.4	0.004	0.003	6.4		
6-11	0.84	0.042	20	2.5		1.52	1.54		0.66		11.0	5.8	0.004	0.003	6.2		
11-24	0.20			2.4		1.76	1.79		0.68		12.2	6.1	0.007	0.005	6.2		
24-40	0.17			2.4		1.71	1.75		0.73		13.0	6.6	0.009	0.006	6.1		
40-46	0.11			2.5		1.76	1.80		0.71		12.6	6.9	0.009	0.006	6.1		
46-58+	0.13			2.6		1.73	1.78		0.68		11.5	6.9	0.010	0.006	6.2		
0-6	1.33	0.063	21	2.3								6.1			6.5		

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	Cation Exch. Capacity: 5A3a Sum		6G1d KCl Ext. Al^{+++}						Base saturation: 5C1 NH_4OAc	5C3 Sum
	meq/100 g															Pct.	Pct.
0-3	11.8	2.0	0.1	0.8	14.7	7.5	19.5	22.2								75	66
3-6	9.9	2.1	0.1	0.6	12.7	6.1	16.3	18.8								78	68
6-11	7.1	2.3	0.1	0.5	10.0	4.1	13.2	14.1								76	71
11-24	5.7	3.1	0.1	0.4	9.3	3.7	12.0	13.0								78	72
24-40	6.9	4.7	0.1	0.4	12.1	3.4	14.9	15.5								81	78
40-46	9.4	6.0	0.1	0.3	15.8	4.2	18.6	20.0								85	79
46-58+	10.7	6.9	0.1	0.2	17.9	3.6	20.2	21.5								89	83
0-6	8.9	2.2	0.1	0.7	11.9	4.5	13.3	16.4								89	73

Depth (In.)	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Illite	Kaolin	Hydrous Mica
	X-ray				
0-3					
3-6					
6-11			xxx		
11-24					
24-40	t	x	xxx	xx	x
40-46					
46-58+		xx	xx	x	x
0-6					

1/ From characterization sample (5 kg).

2/ Composite of 20 subsamples taken in a 15x12' grid adjacent to the master pedon.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

STONER GRAVELLY SANDY LOAM (taxadjunct) 1/
S66Calif-47-9

Location: Siskiyou County, California. Pit located in the upper reaches of McConnaughy Gulch in Scott Valley and on the Denny Ranch. Follow the McConnaughy Gulch Road from the east road around Scott Valley to the locked gate. Take Bee Hive Gulch Road for about $\frac{1}{4}$ mile. Site is south of road about 100 yards and located 1100 feet east and 1500 feet north of SW corner of Sec. 27, T42N, R8W. Date of Sampling: May 25, 1966.
Description by: J. J. Newlun. Collectors: K. W. Flach, S. B. Johnson and D. Lucas.
Classification: Ultic Haploxeroll, coarse-loamy, mixed, mesic.
Vegetation: Dominant vegetation is ponderosa pine and white oak. Very little grass or shrub understory. Well stocked pine stand which is growing moderately slow. Area had been logged and possibly burned. Tree canopy is about 55 percent. Climate: Average annual precipitation is approximately 22 inches, with some in the form of snow. Most precipitation comes in winter and early spring months. Summers are warm and dry. Average January temperature is 31°F., the average July temperature 70°F., and the mean annual temperature 50°F. Parent Material: The soil has formed in gravelly alluvium from mixed rock sources. The parent rock is mainly metamorphic including ultramafic, greenstone, schists, etc. Parent alluvium is often somewhat stratified at depths greater than 36 inches. Parent alluvium was deposited in fan, bottom and terrace positions along drainages from the mountains. The soil contains cobbles, stones and gravel, but most coarse fragments are fine to medium gravels; 20 to 60 percent of the soil volume may be gravels. The amount of material > 2mm varies widely within short distances. Topography: Site is located on a single convex slope with a northwest aspect and a 13 percent gradient. Physiographic position is a terrace. Elevation: 3520 feet. Drainage: Well drained, moderate permeability, medium runoff. Soil Moisture: About 10 percent of field capacity throughout the profile.
Remarks: Reactions determined by Truog soil reaction test. Paired profile is S66Calif-47-10. This profile is a representative of the upper limits of the precipitation zone in which these soils occur in this soil survey area. It has a mollic epipedon and a cambic horizon. There are soils in the area with thicker A horizons. Most of the Stoner soils are cultivated. Surface soil has been lost by erosion. This profile and the paired profile have not been disturbed as far as could be ascertained.

HORIZON	DESCRIPTION
O1 & O2	$\frac{1}{2}$ to 0 inch, new and partially decomposed organic debris. Abrupt smooth boundary.
A11 RSL 66393	0 to 3 inches, dark grayish brown (10YR 4/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium to fine platy breaking to moderate fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; many random interstitial and few fine tubular pores; medium acid (pH 6.0); 40 percent gravels (included in sample); abrupt smooth boundary.
A12 RSL 66394	3 to 6 inches, brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and medium roots; few fine and medium tubular pores; few thin clay films in pores and on ped faces; medium acid (pH 6.0); 40 percent fine and medium gravels and these were included in the sample; clear smooth boundary.
A3 RSL 66395	6 to 11 inches, brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many medium and fine roots; few fine and medium tubular pores; few thin clay films on ped faces and in pores; medium acid (pH 6.0); 40 percent fine and medium gravels (included in sample); clear smooth boundary.
B1 RSL 66396	11 to 24 inches, brown (7.5YR 5/4) gravelly heavy sandy loam, dark brown (7.5YR 4/4) moist; very weak medium prismatic structure, breaking to weak medium subangular blocky; slightly hard, friable, sticky and slightly plastic; many medium, common fine roots; common medium and few fine pores; few thin and moderately thick clay films on ped faces and in pores; medium acid (pH 6.0); 40 percent gravels (included in sample); clear wavy boundary.
B21 RSL 66397	24 to 40 inches, strong brown (7.5YR 5/6) gravelly heavy sandy loam, dark brown (7.5YR 4/4) moist; weak medium prismatic breaking to moderate medium subangular blocky structure; hard, slightly firm, sticky and plastic; many medium and few fine roots; few fine tubular pores; many thin clay films on ped faces and in pores and few moderately thick films in pores; medium acid (pH 6.0); 40 percent medium and fine gravels (included in sample); gradual wavy boundary. One percent coarse fragments not included in sample.
B22 RSL 66398	40 to 46 inches, strong brown (7.5YR 5/6) gravelly heavy sandy loam, dark brown (7.5YR 4/4) moist; weak medium prismatic breaking to weak medium subangular blocky structure; very hard, slightly firm, sticky and plastic; common fine roots; common fine tubular pores; common thin clay films on ped faces and in pores, few moderately thick films in pores; medium acid (pH 6.0); 40 percent fine and medium gravels (included in sample), (2 percent coarse gravel not included); gradual wavy boundary.
B23 RSL 66399	46 to 58 inches, strong brown (7.5YR 5/6) gravelly heavy sandy loam, dark brown (7.5YR 4/4) moist; weak medium subangular blocky structure; very hard, firm, sticky and plastic; few fine roots; few fine tubular pores; few thin and moderately thick clay films in pores; medium acid (pH 5.8); 40 percent fine and medium gravel (included in sample), (2 percent coarse gravel not included in sample).

1/ **The Stoner series is in a coarse-loamy, mixed, mesic family of Typic Xerochrepts. This pedon has a mollic epipedon with a base saturation by sum of cations of less than 75 percent.**

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE San Andreas loam (taxadjunct) **LOCATION** Amador County, California

SOIL FAMILY: Ultic Haploxeroll, coarse-loamy, mixed, thermic.

SOIL NOS. S59Calif-3-17 **LAB. NOS.** 59340 - 59344

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0-9	A_1	7.8	13.5	6.0	12.5	10.8	39.4	10.0	38.8	19.1	2	1-fsl
9-16	A_3	8.7	13.6	5.8	12.2	11.0	38.7	10.0	36.0	21.3	2	1-fsl
16-27	B_2	8.0	12.0	5.7	12.3	11.4	39.1	11.5	36.9	21.3	7	1
27-32	B_3	7.7	12.5	5.2	12.1	11.2	40.3	11.0	35.8	20.2	1	1
32-36+	D_r	Weathered granodiorite										

pH			ORGANIC MATTER			"Free"	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C.		Bulk	MOISTURE TENSIONS		
8C1a H_2O 1:1	8C1c KCl 1:1		6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	Fe_2O_3 6C1b %		$CaCO_3$ equivalent %	Density 4A3a g/cc	1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
5.8	4.5		0.95	0.077	12.3	1.1			1.56			5.3
5.7	4.4		0.44	0.039	11.3	1.3			1.53			5.0
5.8	4.1		0.27	0.028	9.6	1.2			1.56			6.0
5.7	3.9		0.21	0.024		1.8			1.43			6.3
									1.56			

5A2a	EXTRACTABLE CATIONS 5B1a					BASE SAT. % 5C3	Clay mineralogy (<0.002 mm.)					
CATION EXCHANGE CAPACITY ←(Na)	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Na 6P2a	K 6Q2a		Mont.	Verm. X-ray	Mixed layer Mica-Verm. 7A2	Mica	% Kaolin DTA 7A3	% Gibb. DTA 7A3
	milliequivalents per 100g. soil →						←			→		
11.3	5.7	1.4	3.7	<0.1	0.2	66		-	tr	xxxx	12	-
12.0	7.0	1.4	2.4	0.1	0.1	78						
13.9	7.7	2.2	1.9	<0.1	0.1	84	xx	x	xx	xx	17	-
17.1	9.7	3.1	2.6	<0.1	0.1	83	xxx	x	-	-	25	-

1/ Percent of total soil

\- = looked for, but not found
tr = detected, very small amount
x = detected, small amounts
xx = moderate amounts
xxx = large amounts
xxxx = predominant amounts

SAN ANDREAS LOAM (taxadjunct) 1/
S59Calif-3-17

Collectors: Grant Kennedy, Reuben Nelson, Bob Sketchley, and John Rogers.
Date of Sampling: June 19, 1959. Description by: Grant Kennedy.
Location: On H. Farnham Ranch, 1/2 mile from the Junction of Votaw and Shenandoah Roads, on Votaw Road, in the SE1/4 of the SE1/4 of Sec. 31, T8N,R11E., Amador County, California.
Elevation: 1,450 feet.
Relief: Near the crest of a hill in the gently rolling uplands on a slightly convex slope of 5 percent to the NW.
Drainage: Well drained, slow runoff, moderate permeability.
Parent Material: Deeply weathered granodiorite.
Biological activity: Earthworms and burrowing rodents are common in these soils.
Classification: Ultic Haploxeroll, coarse-loamy, mixed, thermic.
Climate: Mean annual rainfall 32".
Vegetation: Oak, annual grasses, and forbs including ripgut, soft chess and filaree.
Remarks: The soil is a weakly developed Brunizem. A few rock outcrops occur in the area. Oriented ring samples were obtained in all horizons and Bureau of Public Roads samples in the A_1, B_2, and D_r horizons.

HORIZON		DESCRIPTION
A_1	0-9"	Brown (10YR 5/3) loam near fine sandy loam, dark brown (10YR 3/3) when moist; massive; slightly hard when dry, friable when moist, nonsticky and slightly plastic when wet; abundant very fine roots; many very fine and fine pores, few medium and coarse; medium acid, pH 5.8; clear, smooth lower boundary.
A_3	9-16"	Brown (10YR 5/3) loam near fine sandy loam, brown (10YR 4/3) when moist; massive; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; abundant very fine, common fine, occasional medium and coarse roots; many very fine and fine, few medium and coarse pores; medium acid, pH 5.7; clear, smooth lower boundary.
B_2	16-27"	Brown (7.5YR 5/4) loam, brown (7.5YR 4/4) when moist; massive; hard when dry, friable when moist, slightly sticky and plastic when wet; abundant very fine, few fine, occasional medium and coarse roots; many very fine and fine, few medium and coarse pores; few thin, discontinuous clay films, colloid mainly in bridges between sand grains; medium acid, pH 5.8; clear, wavy lower boundary.
B_3	27-32"	Mixed light brown, strong brown and pink (7.5YR 6/4, 4/6, and 7/4) loam, reddish brown and brown (5YR 4/4 and 7.5YR 5/4) when moist; massive with granitic appearance in place; hard when dry, friable when moist, slightly sticky and slightly plastic when wet; few very fine to medium roots; common very fine and fine, few medium and coarse pores; few thin discontinuous clay films in pores and old fracture planes; medium acid, pH 5.7; gradual, wavy lower boundary.
D_r	32-36"+	Weathered granodiorite of similar color to horizon above with a few clay films and roots along cleavage planes; medium acid, pH 5.8.

1/ The San Andreas series is in a coarse-loamy, mixed, thermic family of Typic Haploxerolls. This pedon is a taxadjunct because the base saturation of the surface horizon is less than 75 percent.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE San Andreas loam (taxadjunct) **LOCATION** Amador County, California

SOIL FAMILY: Ultic Haploxeroll, coarse-loamy, mixed, thermic.

SOIL NOS. S59Calif-3-18 **LAB. NOS.** 59345 - 59348

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0-7	A_p	9.2	11.5	5.5	12.6	11.7	40.3	9.2	40.2	19.4	9	1-fsl
7-16	A_3	9.0	11.9	5.5	12.0	11.6	40.4	9.6	39.9	19.7	15	1-fsl
16-28	B_2	7.8	11.2	5.1	11.9	12.3	41.9	9.8	41.2	20.5	19	1
28-37+	D_r	Weathered granodiorite										

	pH		ORGANIC MATTER			"Free"	ELECTRICAL CONDUCTIVITY		Bulk	MOISTURE TENSIONS		
8C1a H_2O 1:1	8C1c KCl 1:1		6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	Fe_2O_3 6C1b %	EC x 10^3 MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	Density 4A3a g/cc	4B1a 1/10 ATMOS. %	4B1a 1/3 ATMOS. %	4B2 15 ATMOS. %
6.0	4.9		1.15	0.096	12.0	1.6			1.37	25.7	18.3	4.8
5.9	4.7		0.51	0.053	9.6	1.9			1.55			5.1
6.0	4.6		0.35	0.040	8.8	1.9			1.60	24.3	16.8	4.7
									1.80			

5A2a CATION EXCHANGE CAPACITY (-(Na)	EXTRACTABLE CATIONS 5B1a					BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE				MOISTURE AT SATURATION %
	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Na 6P2a	K 6Q2a		Na	K			
	milliequivalents per 100g. soil ⟶						⟵ milliequivalents per liter ⟶				
11.5	6.3	1.1	3.7	<0.1	0.3	68					
11.4	6.3	1.3	3.7	<0.1	0.2	68					
11.2	7.0	1.2	2.4	<0.1	0.2	78					

1/ Percent of total soil

SAN ANDREAS LOAM (taxadjunct) 1/
S59Calif-3-18

Collectors: Grant Kennedy, Reuben Nelson, Bob Sketchley, John Rogers.
Date of Sampling: June 20, 1959. Description by: Grant Kennedy.
Location: Amador County, California, on the Fererro Ranch, 1/2 mile N. of the junction of Shenandoah Road and Shenandoah School Road, in NE1/4 of SW1/4 of Sec. 36, T8N, R10E.
Elevation: 1,240 feet.
Relief: Gently rolling uplands on a plain slope of 5 percent to the northeast.
Drainage: Well drained, slow runoff, moderate permeability.
Parent Material: Quartz diorite or granodiorite.
Biological activity: Worms and burrowing rodents are present in these soils.
Climate: Mean annual rainfall, 32".
Vegetation: Soft chess, ripgut, filaree, brodela, Digger pine, blue oak, live oak.
Remarks: Minimal Brunizem; a few rock outcrops are present. Oriented ring samples were obtained for all horizons and BPR samples in all except the A_3 horizon.
Classification: Ultic Haploxeroll, coarse-loamy, mixed, thermic.

HORIZON		DESCRIPTION
A_p	0-7"	Brown (10YR 5/3) loam near fine sandy loam, dark brown (10YR 3/3) when moist; massive; slightly hard when dry, friable when moist, nonsticky and nonplastic when wet; abundant very fine roots in upper 2 inches, common very fine and fine roots below; many very fine, few fine pores; medium acid, pH 6.0; clear, smooth lower boundary.
A_3	7-16"	Yellowish brown (10YR 5/5) loam near fine sandy loam, dark brown (10YR 3/3) when moist; massive; slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; common very fine and fine roots; many very fine, few fine pores; few thin discontinuous clay films in pores; medium acid, pH 5.9; gradual smooth lower boundary.
B_2	16-28"	Brown (10YR 5/3) gravelly loam, dark brown (7.5YR 4/4) when moist; massive; very hard when dry, friable when moist, slightly sticky and slightly plastic when wet; common very fine, few fine roots; many very fine, few fine pores; common thin discontinuous clay films in pores; colloid mainly in bridges between sand grains; medium acid, pH 6.0; abrupt, irregular lower boundary.
D_r	28-37"+	Mixed strong brown, very pale brown, or white decomposing granodiorite with a few very fine roots and moderately thick clay films along fracture planes and an occasional quartz dike up to 6 inches thick. The weathered rock is easily displaced with a spade but the fragments are very hard when dry.

1/ The San Andreas series is in a coarse-loamy, mixed, thermic family of Typic Haploxerolls. This pedon is a taxadjunct because the base saturation of the surface horizon is less than 75 percent.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Vertic Haploxeroll, fine, montmorillonitic, thermic
SOIL Zaca silty clay loam SOIL Nos. S65Calif-27-5 LOCATION Monterey County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65475 - 65481

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	1/ Coarse fragments: ≥ 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76mm	
0-4	A11	27.0	30.9	42.1	2.4	4.0	4.2	10.3	6.1	11.3	19.6	22.9	20.9	0	42			
4-16	A12	27.0	29.4	43.6	2.0	3.8	3.9	10.0	7.3	10.2	19.2	23.4	19.7	1	43			
16-23	A13	26.2	30.0	43.8	1.9	3.7	3.9	9.5	7.2	11.2	18.8	24.1	19.0	2	42			
23-40	A14ca	26.3	30.8	42.9	1.9	3.9	4.0	9.5	7.0	11.5	19.3	24.4	19.3	5	38			
40-46	C1ca	27.4	37.5	35.1	1.7	3.1	3.1	9.6	9.9	13.9	23.6	30.1	17.5	4	31			
46-58	C2	39.0	35.9	25.1	2.7	4.9	6.0	15.3	10.1	14.5	21.4	33.5	28.9	1	24			
58-70+	C3	7.6	28.9	63.5	0.3	1.0	0.7	2.2	3.4	5.6	23.3	10.5	4.2	0	64			

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven dry	Bulk density: g/cc	Water content: Pct.	Water content: 4B1c 1/3 bar	Water content: 4B2 15 bar	4D1 Extensibility COLE# in./in.	4D1 Extensibility COLE in./in.	pH: 8C1a H_2O 1:1		
	Pct.	Pct.		Pct.	Pct.	g/cc	g/cc	g/cc	Pct.	Pct.	Pct.					
0-4	2.73	0.229	12		4						18.5			7.9		
4-16	1.05	0.100	11		6						18.4			8.2		
16-23	0.77				8						18.5			8.3		
23-40	0.47				13						18.0			8.2		
40-46	0.22				13						15.8			8.2		
46-58	0.09				9						12.7			8.5		
58-70+	0.16				1						25.2			8.2		

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	5A3a Sum	6G1d KCl Ext. Al^{+++}	Base saturation: 5C1 NH_4OAc	
	meq/100 g									Pct.	Pct.
0-4	41.0	5.6	0.1	1.8	48.5		38.8			100+	
4-16	40.1	5.2	0.3	1.0	46.6		34.6			100+	
16-23	39.2	6.8	0.2	0.8	47.0		35.3			100+	
23-40	36.1	6.9	0.3	0.6	43.9		32.2			100+	
40-46	30.0	9.6	0.5	0.5	40.6		27.8			100+	
46-58	23.7	10.2	0.9	0.4	35.2		23.1			100+	
58-70+											

Depth (In.)	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Mica	KaoHn.
	X-ray			
0-4	xxxx			x
4-16				
16-23				
23-40				
40-46				
46-58				
58-70+	xxxx			x

1/ Apparent coarse fragments dispersed readily. Hence the characterization sample was ground whole and all chemical and physical data are on a whole soil basis.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

ZACA SILTY CLAY LOAM
S65Calif-27-5

Location: Monterey County, California. About 11 miles NNE of King City or 6 miles NE of main ranch headquarters, Montgomery Ranch, about 1.4 mile (air) N. from Pinalito VABM, 1400 feet NE of a reservoir. Date of Sampling: May 18, 1965.
Description by: Lewis C. Leifer. Collectors: W. D. Nettleton, B. R. Brasher, C. J. Weisel, R. D. Waggoner, F. J. Pecarich. Site selection by T. D. Cook.
Classification: Vertic Haploxeroll, fine, montmorillonitic, thermic. (Regosolic Chestnut).
Vegetation: Range, annual bromes, bur clover, wild oats, foxtail, fiddleneck and little stipa. Climate: Precipitation 14 inches; mean annual temperature 60°F., January mean 50°F., July mean 67°F. Parent Material: Soft calcareous sandstone and shale, Plio-Pleistocene non-marine. Topography: Round, rolling hills locally slightly convex, 13 percent North-facing slope near crest, upper 1/3. Elevation: 1300 feet. Drainage: Well drained, permeability moderately slow, runoff medium. Soil Moisture: Slightly moist, about wilting point throughout.
Remarks: Field pH by Truog Kit. Paired sample is Linne silty clay loam, S65Calif-27-4-1 through 6. Surface is somewhat compacted to a depth of 4 inches by cattle trampling. Faint overall coarse prismatic structure throughout A horizons. This member of pair slightly finer textured.

HORIZON	DESCRIPTION
A11 RSL 65475	0 to 4 inches, dark gray (10YR 4/1) heavy silty clay loam, very dark gray (10YR 3/1) moist; moderate medium and coarse subangular blocky structure; friable, very sticky and plastic; many plentiful fine and very fine roots; few very fine interstitial and few very fine tubular pores; moderately alkaline (pH 8.0), strongly effervescent with disseminated lime; gradual smooth boundary.
A12 RSL 65476	4 to 16 inches, dark gray (10YR 4/1) heavy silty clay loam, very dark gray (10YR 3/1) moist; moderate medium subangular blocky structure; very hard, friable, very sticky and plastic; plentiful very fine roots; common very fine interstitial and common very fine tubular pores; moderately alkaline (pH 8.0), strongly effervescent with disseminated lime; gradual smooth boundary.
A13 RSL 65477	16 to 23 inches, grayish brown (10YR 5/2) heavy silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; hard, friable, very sticky and plastic; plentiful very fine roots; common very fine interstitial and common very fine and few fine tubular pores; moderately alkaline (pH 8.0), violently effervescent with disseminated lime and many fine filaments of lime; diffuse wavy boundary.
	Note: 20 percent of the A13 horizon consists of gopher holes filled with fine granular A material.
A14ca RSL 65478	23 to 40 inches, grayish brown (10YR 5/2) heavy silty clay loam, very dark grayish brown, rubbed, (2.5Y 3/2) moist; weak medium angular blocky structure with faint suggestion of weak coarse structure; hard, friable, very sticky and plastic; few very fine roots; many very fine interstitial and few medium tubular pores; moderately alkaline (pH 8.0), violently effervescent with disseminated lime and very many soft fine filaments of lime, horizon is much broken due to gopher activity. About 1/2 of this horizon represents holes filled with A1 material; clear irregular boundary.
C1ca RSL 65479	40 to 46 inches, pale brown (10YR 6/3) silty clay loam, brown (10YR 5/3) moist; moderate medium angular blocky, structure which represents weak rock structure; slightly hard, friable, sticky and plastic; no roots; common fine tubular pores; moderately alkaline (pH 8.0), violently effervescent with disseminated lime and many soft fine filaments of lime; clear wavy boundary.
C2 RSL 65480	46 to 58 inches, very pale brown (10YR 7/3 and 7/4) soft brown sandstone, light yellowish brown (2.5Y 6/4) moist; thick lime deposits on some rock joints; many large gopher holes filled with A horizon soil material; abrupt smooth boundary.
C3 RSL 65481	58 to 70 inches, light brownish gray (2.5Y 6/2) shale, olive (5Y 5/4) moist; rubs down to silty clay; thin lime coating on rock joints, some joints with shiny clay films.

OIL SURVEY LABORATORY Riverside, California

SOIL TYPE Waukena loam variant **LOCATION** Merced County, Calif.

SOIL FAMILY: Typic Natrixeroll, fine-loamy, mixed, thermic

SOIL NOS. S55Calif. 24-3 **LAB. NOS.** 55289-296

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2 1/	TEXTURAL CLASS
0- 6	A_1	0.3	0.9	1.4	10.2	19.7	48.5	19.0	52.0	24.5	0	1
6-14	B_1	0.2	0.9	1.3	10.2	20.1	44.8	22.5	50.7	22.7	0	1
14-23	B_{21}	0.2	0.8	1.1	8.8	21.9	38.1	29.1	48.3	19.0	0	cl
23-31	B_{22}	0.2	0.7	1.2	8.2	19.6	37.4	32.7	45.1	18.7	0	cl
31-38	B_{31ca}	0.3	0.9	0.9	7.4	18.4	38.3	33.8	43.5	19.5	0	cl
38-43	B_{32ca}	2.3	1.8	1.0	7.6	16.6	41.6	29.1	39.9	24.7	0	cl
43-57	B_{33ca}	3.6	3.9	2.1	8.5	20.2	40.9	20.8	48.1	19.9	2	1
57-68	C	0.8	0.6	0.4	7.8	31.0	45.0	14.4	60.0	23.3	4	1

pH 8C1b SATURATED PASTE 1:1	pH 8C1a 1:5	pH 8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	ORGANIC MATTER 6B1a NITROGEN %	ORGANIC MATTER C/N	4A3a Bulk Density g./cc.	8A1a Elec. Conduc. EC×10³ MILLIMHOS PER CM @25°C	6E1b $CaCO_3$ equivalent %	6F1a GYPSUM me./100g. SOIL	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	MOISTURE TENSIONS 4B2 1/3 ATMOS. %	MOISTURE TENSIONS 4B2 15 ATMOS. %
7.9		8.6	1.95	0.192	10.2	1.37	1.0	2	0			10.8
8.2		9.1	1.22	0.112	10.9	1.33	3.2	2	0			12.5
8.6		9.8	0.47	0.049	9.6	1.45	6.9	6	0			17.8
8.9		9.9	0.30	0.033	9.1	1.44	8.7	7	0			18.8
9.0		10.0	0.23	0.027		1.40	9.2	6	0			20.2
9.0		9.9	0.09			1.65	11.4	30	0			12.8
8.9		10.0	0.08			1.65	8.9	15	0			10.7
8.5		9.8	0.04			1.75	8.6	1	0			8.01

5A2a CATION EXCHANGE CAPACITY (+(Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	5D1 EXCH. Na %	SATURATION EXTRACT SOLUBLE 6P1a Na	6Q1a K	6W1a 6O1a Ca+Mg	6J1a 6J1a HCO_3+CO_3	6K1a	8A MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →						← milliequivalents per liter →					
24.6	23.4	8.8		1.0	1.4	4.1	5.0	0.1	4.7	7.6	0.8	44.3
23.8	20.5	9.3		4.6	1.3	19.3	28.7	0.5	3.3	8.8	19.7	42.1
22.3	17.4	7.4		11.0	0.9	49.3	65.0	0.1	1.7	6.4	46.3	75.3
23.4	16.2	6.9		3.2	0.7	13.7	84.0	0.2	1.2	5.9	56.6	92.6
26.7	15.0	6.6		5.8	0.7	21.7	88.0	0.2	0.9	6.6	60.5	102.3
15.8	13.5	7.5		10.5	0.3	66.5	101.0	0.04	1.6	4.4	77.8	65.4
15.8	13.7	4.7		10.6	0.3	67.1	85.0	0.1	1.4	4.5	60.0	64.0
16.3	8.4	6.7		7.1	0.2	43.6	80.0	0.1	5.9	3.9	62.9	2.0

1/ Percent of the whole soil

WAUKENA LOAM variant 1/
S55Calif-24-3

Location: Merced County, California. In San Luis SCD, southwest corner of Delta Road and Henry Miller Road, 100 feet south and 100 feet west of corner. NE1/4 NE1/4 NE1/4 sec. 4, T. 10 S., R. 11 E. Date of Sampling: April 21, 1955. Description by: R. C. Huff. Collectors: Ralph E. Nelson, Richard C. Huff, Rudolph Ulrich.

Classification: Typic Natrixeroll, fine-loamy, mixed, thermic.

Vegetation: Probably has been cultivated in the past. Cover now consists of native annual grasses and occasional salt-tolerant species. Climate: Approximately 8½ inches rainfall with dry summers and cool, moist winters. Parent Material: Mixed alluvium, mainly granitic, which is underlain by stratified sediments. Relief: Slightly undulating upper edge of basin rim. Slope 0-2 percent. Elevation: 100 feet. Drainage: Surface drainage is slow, internal drainage is slow.

Remarks: Many roots in surface foot, few roots below 31 inches.

HORIZON		DESCRIPTION
A_1	0- 6"	Gray brown (10YR 5/2, very dark brown 2/2 moist) loam. Moderate medium subangular blocky. Hard, friable, nonsticky and nonplastic. The soil reacts slightly to HCl. The pH is above 8. This grades abruptly and smoothly into:
B_1	6-14"	Gray brown (10YR 5/2, very dark brown 2/2 moist) light clay loam. Moderate medium and fine subangular blocky. Very hard, firm, slightly plastic and nonsticky. The soil reacts slightly to HCl. The pH is above 8. This grades clearly and with a smooth lower boundary into:
B_{21}	14-23"	Light brownish gray to grayish brown (2.5Y 6/2 and 5/2, very dark grayish brown 4/2 moist, with darker (2.5Y 3/2) faces) clay. Moderate medium prismatic and moderate medium angular blocky. Very hard, very firm, plastic and slightly sticky. The soil reacts slightly with HCl. The pH is above 8. This grades clearly and with a wavy lower boundary into:
B_{22}	23-31"	Light brownish gray (2.5Y 6/2, dark grayish brown 4/2 moist) clay. Moderate fine subangular blocky. Very hard, very firm, plastic and slightly sticky. The soil reacts to HCl. There are conspicuous seams of lime throughout this horizon. The pH is above 8. Grades abruptly and with a wavy lower boundary into·
B_{31ca}	31-38"	Pale olive (5Y 6/3, olive 4/3 moist) clay. Moderate medium and fine subangular blocky. Very hard, very firm, plastic and slightly sticky. The soil effervesces with HCl. The pH is above 8. This grades clearly and smoothly into:
B_{32ca}	38-43"	Pale olive and white (5Y 6/3 and 8/2, olive and light gray 4/3 and 7/2 moist) clay. Weak fine subangular blocky. Very hard, very firm, plastic and slightly sticky. The soil effervesces with HCl. The pH is above 8. This grades abruptly and smoothly into:
B_{33ca}	43-57"	Pale olive and white (5Y 6/3 and 10YR 8/1, olive 5Y 4/3 moist) light clay. Weak medium subangular blocky. Very hard, firm, plastic and slightly sticky. The soil reacts violently to HCl and has many pinkish lime concretions, 5 to 10 mm. in diameter. The pH is above 8. This grades abruptly and smoothly into:
C	57-68"	Pale yellow (5Y 7/3, olive 5/3 moist) variable textured, stratified sediments. The texture ranges from sandy loam to clay loam. Massive. Hard, firm, slightly plastic and slightly sticky. There are many iron and manganese streaks throughout this horizon. The pH is above 8.

1/ The Waukena series is in a fine-loamy, mixed, thermic family of Typic Natrixeralfs. This pedon has a mollic epipedon.

SOIL SURVEY LABORATORY Lincoln, Nebraska

SOIL TYPE Aiken loam **LOCATION** Amador County, Calif rnia

SOIL FAMILY: Xeric Haplohumult, clayey, kaolinitic, mesic.

SOIL NOS. S59Calif-3-12 **LAB. NOS.** 11356 - 11363

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	3A1 * 2A2 > 2	TEXTURAL CLASS
0- 9	A1	5.6a	7.5a	5.5a	11.3a	12.0a	37.0	21.1	31.2	24.2	9	1
9-20	A3	4.9a	5.4a	4.4a	10.7a	12.4a	39.4	22.8	33.7	24.5	10	1
20-29	B11t	2.5a	3.9a	3.5a	9.1a	11.5a	40.5	29.0	31.4	26.1	10	c1
29-40	B12t	2.4a	2.9a	2.5a	6.3a	8.6a	38.5	38.8	25.7	25.3	11	c1
40-54	B21t	2.0c	3.3c	3.2c	8.0c	8.9c	35.2	39.4	23.3	25.6	7	c1
54-69	B22t	1.4b	3.5b	3.3b	7.8b	7.7b	32.0	44.3	21.1	23.2	20	c
69-92	B23t	1.1c	2.4c	2.4b	6.9b	8.0b	35.7	43.5	22.9	25.0	23	c
92-100	B3t	1.2b	2.4b	2.5b	6.9b	8.4b	36.4	42.2	22.7	26.4	29	c

pH 8C1a 1:1	pH 8C1a 1:5	pH 8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C.	6C1a Free iron as % Fe_2O_3	4A3a Bulk Density g/cc	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
5.9	6.1	6.2	4.98	0.179	28			5.0	0.98			18.5
6.0	6.4	6.4	2.11	0.090	23			5.2	0.92			19.1
5.9	6.0	6.2	1.02	0.052	20			5.5	0.99			19.2
6.0	6.2	6.4	0.48					6.2				20.1
5.3	5.6	5.8	0.09					6.2	1.33			23.2
5.4	5.8	6.0	0.14					6.7	1.35			23.0
6.0	6.4	6.6	0.18					6.4	1.36			21.1
5.2	5.5	5.6	0.09					6.3	1.26			24.2

5A3a1/ CATION EXCHANGE CAPACITY (Sum)	EXTRACTABLE CATIONS 6H2b Ca	6G2b Mg	6H2a H	6P2a Na	5B1a 6Q2a K	BASE SAT. % 5C3	Clay mineralogy (<0.002 mm.) Mont.	Verm.	Mixed layer Mica-Verm.	Mica	% Kaolin DTA 7A3	% Gibb. DTA 7A3
		milliequivalents per 100g. soil ⟶					⟵	X-ray 7A2		⟶		
34.4	6.2	1.5	25.8	<0.1	0.9	25		xx			20	17
26.0	5.8	0.8	18.6	<0.1	0.8	28						
19.4	4.5	1.0	13.2	<0.1	0.7	32		xx			22	20
16.3	3.2	1.9	10.4	<0.1	0.8	36						
9.9	0.5	0.4	8.7	0.1	0.2	12		x			45	10
10.4	1.2	0.6	7.8	0.1	0.7	25						
13.0	2.2	1.8	8.0	<0.1	1.0	38						
9.4	0.4	<0.1	8.8	<0.1	0.2	6					55	tr.

a. Many (>50 percent) Fe? nodules
b. Few (5 - 25 percent) Fe? nodules
c. Common (25 - 50 percent) nodules
* 2 mm. - 3/4" fraction
1/ In acid soils CEC (NH_4OAc) is almost always lower than either CEC (Na) or CEC (sum).
based on CEC (sum)

AIKEN LOAM
S59Calif-3-1

Location: On the Allen Ranch on the road east of Fiddletown to Highway 88, 100 yards west of the cattle chute and 100 feet south of the road in the SW corner of the NE1/4 of sec. 33, T. 8 N., R. 13 E., Amador County, Calif.
Date of Sampling: June 19, 1959 Description by: Grant Kennedy.
Collectors: Grant Kennedy, Reuben Nelson, Bob Sketchley
Vegetation: Ponderosa pine, incense cedar, sweet birch, bracken fern
Climate: Mean annual rainfall - 43 inches
Parent Material: Andesitic tuff-breccia.
Relief: Broad, gently sloping ridgetop with a plane or slightly concave slope of 8 percent, facing north
Elevation: 3,685 feet
Drainage: Well drained; slow runoff; moderate over moderately slow permeability
Remarks: This is a Reddish-Brown Lateritic soil with a good stand of timber. Samples were taken for the Bureau of Public Roads of horizons I, 6, and 8 (A1, B22t, and B3t). Soil was moist when described.
Classification: Xeric Haplohumult, clayey, kaolinitic, mesic.

HORIZON		DESCRIPTION
O1	1- 0"	Partially decomposed forest litter.
A1 LSL No. 11356	0- 9"	Dark brown (7.5YR 4/4) loam, darker brown (7.5YR 3/3) when moist; strong very fine and fine granular structure; soft, very friable; abundant very fine and fine, few medium and coarse roots; many very fine, fine, medium, few coarse pores; many very fine, few fine shot*; medium acid (pH 6.0); gradual smooth boundary.
A3 LSL No. 11357	9-20"	Reddish brown (5YR 4/4) loam, dark reddish brown (5YR 3/3) when moist; moderate very fine and fine granular structure; otherwise similar to overlying horizon except slightly plastic when wet; clear smooth boundary.
B11t LSL No. 11358	20-29"	Yellowish red (5YR 5/6) clay loam, yellowish red (5YR 3/6) when moist; massive; slightly hard, friable, slightly plastic and slightly sticky; abundant very fine, fine and medium, few coarse roots; many very fine, fine and medium pores; thin continuous clay films, mainly in pores; common very fine, few fine shot*; medium acid (pH 6.0); gradual smooth boundary.
B12t LSL No. 11359	29-40"	Yellowish red (5YR 5/6) heavy clay loam, dark red (2.5YR 3/6) when moist; massive; slightly hard, firm, plastic and slightly sticky; plentiful very fine and fine, few medium and coarse roots; many very fine, fine, and medium pores; thin continuous clay films in pores and bridges; common very fine, few fine shot*; medium acid (pH 6.0); gradual smooth boundary.
B21t LSL No. 11360	40-54"	Yellowish red (5YR 5/6) clay, dark red (2.5YR 3/6) when moist; massive; hard, firm, plastic and sticky; occasional very fine to coarse root; many very fine, few fine pores; moderately thick continuous clay films in pores and bridges; common very fine shot*; medium acid (pH 6.0); diffuse smooth boundary.
B22t LSL No. 11361	54-69"	Similar to horizon above except strongly acid (pH 5.5); clear irregular boundary.
B23t LSL No. 11362	69-92"	Light brown (7.5YR 6/4) clay, reddish brown (5YR 4/4) when moist; massive; hard, firm, plastic and slightly sticky; occasional roots; common very fine, few fine pores; thin, continuous clay films in pores and bridges; very strongly acid (pH 5.0); gradual smooth boundary.
B3t LSL No. 11363	92-100"	Light brown (7.5YR 6/4) clay loam, reddish brown (5YR 4/4) when moist; massive; hard, very firm, slightly plastic and slightly sticky; occasional root; common very fine and fine pores; few thin continuous clay films in pores and along fracture planes; very strongly acid (pH 4.8).

* Shot are magnetic when dry. Below 69 inches shot are hard to discern but about half the soil mass is attracted by a magnet.

CONSECUTIVE PEDON NUMBER C 68118 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES SITES SOIL NO. S68 CALI. 29-31 SAMPLE NO. 8 883-8 891 NEVADA COUNTY AREA

SOIL FAMILY XERIC HAPLOHUMULT CLAYEY,KAOLINITIC,MESIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION <2 MM SAND 2-.05	SILT .05-.002	CLAY LT .002	SANDS VCS 2-1	CS 1-.5	MS .5-.25	FS .25-.10	VFS .1-.05	SILTS CSI .05-.02	FSI .02-.002	CLAYS CO. 2U	FINE LT .2U	CARBO NATE 3A1A	INT. II .2-.02	COARSE FRAGMENTS PCT. OF WHOLE SOIL I 75-20	II 20-5	III 5-2
			PERCENT OF LESS THAN 2MM														PCT. OF LT 75		
8 883	0- 18	A11	22.0	45.2	32.8	2.7	5.3	3.0	5.9	5.1	14.0	31.2				22.5	--A	--	--
8 884	18- 53	A12	20.3	45.1	34.6	1.8	4.1	3.1	5.9	5.4	14.6	30.5				23.5	6A	--	4 2
8 885	53- 79	A3	20.8	43.4	35.8	1.5	3.7	3.0	6.0	6.6	13.2	30.2				23.2	6A	--	6Z N
8 886	79-100	B21T	18.8	38.5	42.7	0.9	3.0	2.9	5.8	6.2	11.6	26.9				21.0	3A	--	3Z N
8 887	100-130	B22T	19.7	34.9	45.4	1.5	3.1	2.8	6.2	6.1	11.7	23.2				21.6	TRA	--	TR TR
8 888	130-165	B23T	24.1	32.8	43.1	1.3	3.8	3.6	7.9	7.5	10.8	22.0				23.2	2A	--	2Z N
8 889	165-190	B31	27.3	31.4	41.3	1.0	3.9	4.4	9.8	8.2	10.6	20.8				24.6	--A	--	-- --
8 890	190-215	B32	34.0	29.9	36.1	1.9	6.8	5.7	10.9	8.7	10.2	19.7				25.4	--A	--	-- --
8 891	0- 18	A11															3A	--	3Z N

SAMPLE NO.	DEPTH CM.	ORG.MATTER CARBON 6A1A	NITROGEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B	2-20 6E1B	SESQUIOXIDES DI-CIT FE 6C2B	DI-CIT AL 6G7A	EXT PYROP FE 6C5A	EXT PYROP AL 6G5A	ATTERBERG LIMIT LL 4F2	PL 4F1	BULK DENSITY 1/3 BAR 4A1F	EST. 1/3 BAR 4A1F	DRY 4A1H	CM 3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2	EXTNSBLTY LEF 4D1	LE 4D1
		PERCENT		PERCENT		PERCENT				PCT.	NO.40	GRAMS PER CC				PERCENT			PERCENT	
8 883	0- 18	6.00	0.249			9.2	1.4			63	47		0.90	0.94	1.00		33.7	23.5	1.5	1.5
8 884	18- 53	1.72	0.085			9.8	1.2					0.95			0.98			21.1		
8 885	53- 79	1.07				9.9	1.1			46	33	1.00			0.98			20.9		
8 886	79-100	0.51				9.9	1.0					1.00			0.99			20.3		
8 887	100-130	0.38				10.5	0.9			56	20	1.10			1.00			21.3		
8 888	130-165	0.30				12.6	1.1			59	47		1.17	1.24	0.99		41.7	24.3	2.0	1.9
8 889	165-190	0.22				12.6	1.1					1.17			1.00			26.2		
8 890	190-215					12.4	1.2			59	49		1.17	1.22	1.00		40.9	24.8	1.4	1.4
8 891	0- 18	7.44	0.284									0.90			0.99			23.9		

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6O2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	EXT. ACI-DITY 6H2A	KCL EXT. AL 6G1E	CEC SUM 5A3A	CEC NH4-OAC 5A6A	BASE SATURATION SUM+ ACI-DITY	SUM+ AL	NH4-OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA-CL2 8C1E
		MEQ/100G									PERCENT					
8 883	0- 18	9.9	2.7	0.1	1.0	13.7	22.1		35.8	31.8	38		43		5.9	5.3
8 884	18- 53	3.4	1.5	0.1	1.0	6.0	14.0		20.0	17.4	30		34		5.9	5.1
8 885	53- 79	2.8	1.8	0.1	0.6	5.3			5.3	17.7	100+		30		5.7	5.1
8 886	79-100	2.1	2.3	TR	0.6	5.0		0.3	5.0	13.3	100+	94	38		5.5	4.9
8 887	100-130	2.8	2.0	0.1	0.5	5.4		0.3	5.4	11.2	100+	95	48		5.4	4.9
8 888	130-165	2.9	1.8	0.1	0.4	5.2		0.2	5.2	13.0	100+	96	40		5.2	4.7
8 889	165-190	3.1	2.1	0.1	0.4	5.7		0.2	5.7	12.4	100+	97	46		5.2	4.6
8 890	190-215	2.9	2.2	TR	0.4	5.5		0.7	5.5	18.9	100+	89	29		5.1	4.5
8 891	0- 18														5.9	5.3

CLAY MINERALOGY

SAMPLE NO	DEPTH CM.	<0.002 MM X RAY I 7A2E	II 7A2E	III 7A2E	IV 7A2E	DTA 7A3	7A3	L.T. 0.0002 MM X RAY I 7A2E	II 7A2E	III 7A2E
		PERCENT								
8 883	0- 18	KK 3	VR 1	MI 1						
8 884	18- 53									
8 885	53- 79	KK 3	VR 1							
8 886	79-100									
8 887	100-130									
8 888	130-165	KK 3								
8 889	165-190									
8 890	190-215	KK 3								
8 891	0- 18									

MINERAL CODE	RELATIVE AMOUNT
KK KAOLINIT	1 TRACE
VR VERMICLT	2 SMALL
MI MICA	3 MODERATE
	4 ABUNDANT
	5 DOMINANT
	6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.

SITES LOAM
S68Calif-29-31

Location: Nevada County, California; 600 feet east of center of sec. 4, T. 15 N., R. 9 E., 150 feet west of Colfax Highway, 40 feet south of Dalmatian Way, 5½ miles southeast of Grass Valley, California. Date of Sampling: September 5, 1968.
Description by: G. Staidl and L. A. Brittan. Collectors: L. A. Brittan, G. Staidl, T. M. Ryan, C. B. Goudey, G. M. Kennedy.
Classification: Xeric Haplohumult, clayey, kaolinitic, mesic.
Vegetation: Not cultivated. Mixed coniferous forest, ponderosa pine, sugar pine, Douglas fir, incense cedar, black oak, bracken fern, bear clover. Climate: Average annual precipitation is 55 inches. Mean annual temperature is about 56°F. Parent Material: Metabasic rock and diabase. Topography: Mountainous upland, moderately steep, convex slope 25 percent, NNE aspect near toe of slope. Elevation: 2,640 feet. Drainage: Well drained; runoff is medium; permeability is moderate over slow. Soil Moisture: Essentially dry to 31 inches. Very slightly moist 31 to 85 inches.
Remarks: Erosion at this site appeared to be slight. pH taken by Hellige method. Companion profile is S68Calif-29-32. The B21t horizon contains 3 percent by weight fragments 3 to 4 inches in diameter. The B22t horizon contains 25 percent by weight fragments 3 to 7 inches in diameter. The A3, B21t, B22t and B32 horizons were sampled for California Division of Highways.

HORIZON	DESCRIPTION
O1	4 to 2½ inches, litter, twigs, leaves.
O2	2½ to 0 inches, partially decomposed organic matter.
	(0-18 cm.)
A11	0 to 7 inches, reddish brown (5YR 4/3) loam, dark reddish brown (5YR 3/3) moist; strong
RSL	fine subangular blocky parting to strong fine and medium crumb structure; slightly hard,
68883	friable, slightly sticky, plastic; many very fine and fine random and many medium and coarse horizontal and oblique roots; many very fine interstitial pores; slightly acid (pH 6.3); clear smooth boundary.
	(18-53 cm.)
A12	7 to 21 inches, yellowish red (5YR 4/6) heavy loam, dark red (2.5YR 3/6) moist;
RSL	moderate fine and medium subangular blocky parting to strong fine and medium crumb
68884	structure; slightly hard, friable, slightly sticky, plastic; many very fine and fine random and many medium and coarse horizontal and oblique roots; many very fine interstitial pores; medium acid (pH 6.0); clear smooth boundary.
	(53-79 cm.)
A3	21 to 31 inches, yellowish red (5YR 4/6) clay loam, dark red (2.5YR 3/6) moist; moderate
RSL	medium subangular blocky parting to strong fine crumb structure; slightly hard, friable,
68885	sticky, plastic; many very fine and fine random and many medium and coarse horizontal and oblique roots; many very fine interstitial pores; medium acid (pH 6.0); clear wavy boundary.
	(79-100 cm.)
B21t	31 to 40 inches, red (2.5YR 4/6) clay loam, dark red (2.5YR 3/6) moist; moderate medium
RSL	subangular blocky structure; slightly hard, friable, sticky, plastic; common very fine
68886	and fine and few medium and coarse oblique roots; common very fine tubular and interstitial pores; few thin clay films on faces of peds and lining pores; 5 percent by volume rock fragments 1 to 4 inches in diameter; medium acid (pH 5.8); clear smooth boundary.
	(100-130 cm.)
B22t	40 to 52 inches, red (2.5YR 4/6) clay, dark red (2.5YR 3/6) moist; moderate medium and
RSL	coarse subangular blocky structure; hard, firm, sticky, plastic; common very fine and
68887	fine, few medium and coarse oblique roots; common very fine tubular pores; many thin clay films on faces of peds and many moderately thick clay films line pores; 2 to 5 percent by volume rock fragments 1 to 4 inches in diameter; strongly acid (pH 5.5); clear wavy boundary.
	(130-165 cm.)
B23t	52 to 64 inches, red (2.5YR 5/6) clay, red (2.5YR 4/6) moist; moderate medium and coarse
RSL	subangular blocky structure; hard, firm, sticky, plastic; few very fine random and very
68888	few medium vertical roots; common very fine tubular pores; many thin clay films on faces of peds and many moderately thick clay films line pores; 10 to 15 percent by volume rock fragments 2 to 7 inches in diameter; strongly acid (pH 5.5); gradual smooth boundary.
	(165-190 cm.)
B31	64 to 75 inches, red (2.5YR 5/6) clay, red (2.5YR 4/6) moist; weak coarse subangular blocky
RSL	structure; slightly hard, friable, slightly sticky, plastic; few very fine random roots;
68889	many very fine tubular pores; many thin clay films, red (2.5YR 4/8 moist)on faces of peds and many moderately thick clay films line pores; strongly acid (pH 5.5); gradual wavy boundary.
	(190-215 cm.)
B32	75 to 85 inches, yellowish red (5YR 5/8) clay loam, red (2.5YR 4/6) moist; massive;
RSL	slightly hard, friable, slightly sticky, plastic; very few very fine random roots; many
68890	very fine tubular pores; many thin red (2.5YR 4/8 dry and moist) clay films line pores; strongly acid (pH 5.5).

CONSECUTIVE PEDON NUMBER C 68119 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES SITES SOIL NO. S68 CALI. 29-32 SAMPLE NO. 8 892-8 901 NEVADA COUNTY AREA

SOIL FAMILY XERIC HAPLOHUMULT CLAYEY,KAOLINITIC,MESIC RIVERSIDE SOIL SURVEY LABORATORY

SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 1A2A

SAMPLE NO.	DEPTH CM.	HORZ.	TOTAL FRACTION 2- .05 SAND	.05- .002 SILT	LT .002 CLAY	SANDS VCS 2-1	CS 1- .5	MS .5- .25	FS .25- .10	VFS .1- .05	SILTS CSI .05- .02	FSI .02- .002	CLAYS CO. 2- .2U	FINE LT .2U	CARBO NATE 3A1A.02	INT. II .2- WHOLE SOIL	COARSE FRAGMENTS I 75- 20 PCT.	II 20-5 OF	III 5-2 PCT. OF LT 75
			PERCENT OF LESS THAN 2MM																
8 892	0- 18	A1	23.2	39.4	37.4	1.6	4.2	3.3	7.4	6.7	13.7	25.7	30.2	7.2		24.9	13A	--	13Z	N
8 893	18- 36	B1	19.3	35.3	45.4	0.9	2.8	2.9	6.6	6.1	11.4	23.9				21.5	5A	--	5Z	N
8 894	36- 46	B21T	17.8	31.1	51.1	1.3	2.8	2.6	5.9	5.2	9.6	21.5				18.4	5A	--	5Z	N
8 895	46- 84	B22T	18.6	30.8	50.6	0.9	2.8	2.8	6.2	5.9	10.1	20.7	36.3	14.3		19.8	6*	--	1Z	N
8 896	84-120	B31	22.1	28.2	49.7	0.5	2.7	3.9	8.6	6.4	9.0	19.2				20.3	7*	--	--	--
8 897	120-155	B32	26.8	32.8	40.4	0.6	3.4	4.5	10.2	8.1	10.2	22.6				24.0	6*	--	--	--
8 898	155-185	C 1	26.7	34.7	38.6	0.4	2.4	4.3	11.3	8.3	10.7	24.0				25.4	--A	--	--	--
8 899	185-205	C 2	32.7	33.2	34.1	1.3	6.0	6.5	11.6	7.3	11.6	21.6				25.3	--A	--	--	--
8 900	205-235	C 3	36.0	33.2	30.8	1.6	7.6	7.6	12.6	6.6	10.3	22.9				23.4	--A	--	--	--
8 901	0- 18	A1															3A	--	3Z	N

SAMPLE NO.	DEPTH CM.	ORG.MATTER CAR- BON 6A1A -PERCENT-	NITRO GEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B -PERCENT-	2-20 6E1B	SESQUIOXIDES DI-CIT FE 6C2B	EXT AL 6G7A	PYROP FE 6C5A	EXT AL 6G5A	ATTERBERG L L 4F2 PCT.	I M I T PL 4F1 NO.40	EST. 1/3 BAR 4A1F GRAMS	BULK DENSITY 1/3 BAR 4A1F PER CC	DRY 4A1H	CM 3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2 -PERCENT-	EXTNSBLTY LEF 4D1	LE 4D1 -PERCENT-
8 892	0- 18	6.69	0.260			8.3	1.5	0.4	0.7	60	44		0.94	0.97	0.95		37.9	23.9	1.1	1.0
8 893	18- 36	2.16	0.103			9.7	1.2						1.00	1.07	0.98		40.2	24.1	2.3	2.2
8 894	36- 46	1.39				11.1	1.3			53	35		1.06	1.14	0.98		40.6	25.5	2.5	2.4
8 895	46- 84	0.84				10.5	1.3						1.11	1.20	0.98		42.1	26.7	2.6	2.6
8 896	84-120	0.85				13.2	1.3						1.08	1.15	0.97		49.1	28.7	2.1	2.0
8 897	120-155	0.42				12.6	1.2						1.18	1.25	0.97		42.4	27.7	1.9	1.9
8 898	155-185	0.37				12.9	1.3			65	52		1.01	1.05	1.00		54.2	27.4	1.3	1.3
8 899	185-205	0.20				12.6	1.5						1.05	1.10	1.00		49.7	27.0	1.6	1.6
8 900	205-235					12.5	1.4	0.1	0.2	62	54		1.00	1.05	1.00		54.5	25.8	1.6	1.6
8 901	0- 18	7.43	0.276									0.94			0.99			22.4		

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6D2D	NA 5B4A 6P2A	K 5B4A 6D2A	SUM	EXT. ACI- DITY 6H2A	KCL EXT. AL 6G1E	C E C SUM 5A3A	NH4- OAC 5A6A	BASE SATURATION SUM+ ACI- DITY	SUM+ AL	NH4- OAC 5C1	PH NAF 2 MIN 8C1D	H2O 1/1 8C1A	CA- CL2 8C1E
		MEQ/100G									PERCENT					
8 892	0- 18	12.1	3.6	TR	1.1	16.8	29.4		46.2	33.9	36		50		5.8	5.3
8 893	18- 36	3.4	3.2	TR	0.7	7.3	10.9	0.3	18.2	20.2	40	96	36		5.4	4.8
8 894	36- 46	3.1	3.7	TR	1.0	7.8	12.6	0.2	20.4	17.9	38	98	44		5.2	4.8
8 895	46- 84	2.7	3.2	TR	1.0	6.9		0.2	6.9	20.6	100+	97	34		5.3	4.8
8 896	84-120	2.4	2.0	TR	0.8	5.2	16.7	0.5	21.9	17.2	24	91	31		5.2	4.6
8 897	120-155	1.3	1.3	TR	0.6	3.2	17.7	1.4	20.9	14.6	15	70	22		5.2	4.5
8 898	155-185	1.0	1.0	0.1	0.5	2.6	17.5	2.9	20.1	14.8	13	47	18		5.2	4.4
8 899	185-205	0.6	0.6	TR	0.4	1.6	17.7	2.7	19.3	20.2	9	38	8		5.2	4.4
8 900	205-235	0.6	0.6	0.1	0.3	1.6	18.7	2.6	20.3	16.4	8	38	10		5.2	4.4
8 901	0- 18														5.8	5.3

CLAY MINERALOGY

SAMPLE NO	DEPTH CM.	LESS THAN 0.002 MM X RAY 7A2E I	7A2E II	7A2E III	7A2E IV	DTA 7A3 -PERCENT-	7A3	C.T. 0.0002 MM X RAY I	7A2E II	7A2E III	MINERAL CODE	RELATIVE AMOUNT
8 892	0- 18	KK 3									KK KAOLINIT	1 TRACE
8 893	18- 36											2 SMALL
8 894	36- 46	KK 3										3 MODERATE
8 895	46- 84											4 ABUNDANT
8 896	84-120											5 DOMINANT
8 897	120-155											6 INDETER.
8 898	155-185	KK 3										
8 899	185-205											
8 900	205-235	KK 3										
8 901	0- 18											

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.
N=NOT DETERMINED.
Z=NOT ALL FRACTIONS SEPERATED. ADJACENT FRACTIONS INCLUDED HERE.
*=THE 75-250MM FRACTION IS INCLUDED.

SITES LOAM
S68Calif-29-32

Location: Nevada County, California; 2,300 feet south and 1,000 feet west of NE corner of sec. 4, T. 15 N., R.9E., 5 miles ESE of Grass Valley, California; 1,350 feet due north of You Bet-Red Dog Road. Date of Sampling: September 5, 1968.
Description by: L. A. Brittan and G. Staidl. Collectors: L. A. Brittan, G. Staidl, C. B. Goudey, T. M. Ryan, G. M. Kennedy.
Classification: Xeric Haplohumult, clayey, kaolinitic, mesic.
Vegetation: Mixed coniferous forest, ponderosa pine, incense cedar, black oak, bear clover. Not cultivated. Climate: Mean annual precipitation is 56 inches. Mean annual temperature is 56°F. Parent Material: Diabase and metabasic rock. Topography: Strongly sloping, concave slope, 14 percent with NE aspect near crest of slope. Elevation: 2,720 feet. Drainage: Well drained; runoff is medium; permeability is moderate over moderately slow. Soil Moisture: Dry to 14 inches. Very slightly moist 14 to 81 inches.
Remarks: pH taken by Hellige method. Depth to the B2t horizon varies from 14 to 40 inches. This pedon is almost one full pH unit more acid than S68Calif-29-31, and there are more rock fragments in the C1 and C2 horizons.

HORIZON	DESCRIPTION
	Colors are for dry soil unless otherwise indicated.
O1	2-0 inches (5-0 cm.), undecomposed oak leaves and pine needles.
A1 RSL No. 68892	0-7 inches (0-18 cm.), reddish brown (5YR 4/4) heavy clay loam, dark reddish brown (5YR 3/4) moist; moderate medium subangular blocks breaking to strong fine and medium crumbs; slightly hard (dry), friable (moist), slightly sticky and plastic (wet); many very fine and fine random and many medium and coarse horizontal and oblique roots; many very fine interstitial, few very fine tubular pores; 5 percent gravel by volume; clear wavy boundary.
B1t RSL No. 68893	7-14 inches (18-36 cm.), yellowish red (5YR 4/6) light clay, dark red (2.5YR 3/6) moist; weak medium subangular blocks breaking to weak fine crumbs; slightly hard (dry), friable (moist), sticky and plastic (wet); common very fine and fine random and many medium and coarse horizontal and oblique roots; many very fine interstitial and common very fine tubular pores; 2 percent gravel by volume; clear wavy boundary.
B21t RSL No. 68894	14-18 inches (36-46 cm.), red (2.5YR 4/6) light clay, dark red (2.5YR 3/6) moist; weak medium subangular blocks breaking to weak fine crumbs; slightly hard (dry), friable (moist), sticky and very plastic (wet); common very fine and fine random and many medium and coarse horizontal roots; many very fine interstitial and common very fine tubular pores; many thin clay skins line pores; 2 percent gravel by volume; clear wavy boundary.
B22t RSL No. 68895	18-33 inches (46-84 cm.), red (2.5YR 4/6) light clay, dark red (2.5YR 3/6) moist; weak medium and coarse angular blocky structure; hard (dry), friable (moist), sticky and plastic (wet); few very fine and fine vertical and common medium and coarse horizontal and oblique roots; common very fine interstitial and few very fine and fine tubular pores; many thin clay skins on faces of peds and continuous moderately thick clay skins line pores; less than 1 percent gravel, 2 percent weathered cobbles by volume; gradual wavy boundary.
B31t RSL No. 68896	33-48 inches (84-120 cm.), yellowish red (5YR 5/8) light clay, red (2.5YR 4/6) moist; weak medium and coarse angular blocky structure; hard (dry), friable (moist), sticky and plastic (wet); few very fine and fine vertical and common medium horizontal and oblique roots; common very fine interstitial and few very fine and fine tubular pores; many thin clay skins on faces of peds and continuous moderately thick clay skins line pores; 3 percent cobbles by volume; gradual wavy boundary.
B32t RSL No. 68897	48-61 inches (120-155 cm.), yellowish red (5YR 5/8) clay loam, red (2.5YR 5/8) moist; weak medium and coarse angular blocky structure; hard (dry), friable (moist), sticky and plastic (wet); few very fine and fine vertical and common medium horizontal and oblique roots; few very fine tubular and interstitial pores;many thin clay skins on faces of peds and continuous moderately thick clay skins line pores; 3 percent cobbles by volume; clear wavy boundary.
C1 RSL No. 68898	61-72 inches (155-185 cm.), yellowish red (5YR 5/8) loam, red (2.5YR 4/6) moist; massive; slightly hard (dry), friable (moist), slightly sticky and plastic (wet); few very fine, fine and medium vertical roots; few very fine tubular pores; continuous moderately thick red (2.5YR 4/6) dry, 4/8 moist) clay skins line pores; 20 percent by volume of soft weathered rock fragments 1 to 8 cm. in diameter, gradual wavy boundary.
C2 RSL No. 68899	72-81 inches (185-205 cm.), yellowish red (5YR 5/8) light loam, red (2.5YR 4/6) moist; massive; slightly hard (dry), friable (moist), slightly sticky and slightly plastic (wet); few very fine, fine and medium vertical roots; few very fine tubular pores; many moderately thick red (2.5YR 4/8 dry and moist) clay skins line pores; 50 to 60 percent by volume weathered rock fragments greater than 5 cm. in diameter; gradual wavy boundary.
C3 RSL No. 68900	81-92 inches (205-235 cm.), yellowish red (5YR 5/8) light loam with many medium distinct reddish yellow (7.5YR 6/8) and common fine light gray (10YR 7/2) mottles, red (2.5YR 4/6), strong brown (7.5YR 5/8) and light gray (10YR 7/2) moist; massive; slightly hard (dry), friable (moist), slightly sticky and slightly plastic (wet); many moderately thick red (2.5YR 4/8 dry and moist) clay skins line pores and joint planes in the saprolite; 60 percent rock fragments greater than 5 cm. in diameter.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Goldridge fine sandy loam **LOCATION** Sonoma County, California

SOIL FAMILY: Typic Haploxerult, fine-loamy, mixed, mesic.

SOIL NOS. S61Calif-49-5 **LAB. NOS.** 61414 - 61422

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2	
0- 7	A11	0.2	0.5	0.5	41.8	26.0	22.1	8.9	77.4	10.3	0	fs1
7-17	A12	0.0	0.2	0.4	41.2	26.2	22.9	9.1	78.0	10.8	0	fs1
17-30	A2	0.0	0.2	0.3	41.6	26.7	21.2	10.0	77.8	10.5	0	fs1
30-35	B1t	0.0	0.2	0.2	30.4	24.0	21.6	23.6	61.5	13.8	0	sc1
35-50	B21t	0.0	0.0	0.1	17.5	22.2	22.9	37.3	45.9	16.5	0	c1
50-67	B23t	0.0	0.0	0.0	19.1	23.3	24.9	32.7	47.8	19.4	0	c1
67-82	B31t	0.0	0.1	0.1	31.4	17.3	25.3	25.8	53.5	20.0	0	sc1
82-92	B32t	0.0	0.1	0.2	39.7	13.6	24.8	21.6	58.1	19.0	0	sc1
92+	B33	0.0	0.1	0.2	45.0	11.5	25.7	17.5	62.1	19.0	0	fs1

pH		ORGANIC MATTER						4B2
8C1a H_2O 1:1	8C1c KCl 1:1	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	Bulk Density 4A3a g/cc		Ext. Iron 6C1b % Fe	Soil Water 15 atmos. Pct.
7.0	6.5	1.27	0.102	12			0.3	3.8
6.3	4.9	0.17	0.024		1.54		0.3	3.3
6.0	4.7	0.14	0.017				0.3	3.7
5.2	4.0	0.14					0.8	10.0
4.7	3.7	0.13			1.63		1.6	17.3
4.5	3.6	0.06			1.51		1.5	16.7
4.5	3.6	0.04			1.57		1.3	13.7
4.5	3.5	0.03			1.47		1.2	12.8
4.5	3.6	0.01			1.47		1.2	11.5

5A2a	EXTRACTABLE CATIONS 5B1a					BASE SAT. %	Sum of		MOISTURE AT SATURATION
CATION EXCHANGE CAPACITY	6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K	5C3	Cations 5A3a		
(+ Na)	milliequivalents per 100g. soil ⟶						eq/100g.		%
9.4	7.3	0.8	2.3	0.1	0.5	79	11.0		
4.5	1.4	0.4	2.1	0.1	0.9	57	4.9		
4.7	1.6	0.4	1.9	0.1	0.3	55	4.3		
9.9	3.0	0.8	4.9	0.1	0.5	47	9.3		
15.7	2.1	2.1	11.4	0.1	0.5	30	16.2		
15.7	0.7	2.5	12.9	0.2	0.2	22	16.5		
14.3	0.9	2.0	10.2	0.1	0.1	23	13.3		
13.8	0.4	2.4	11.6	0.2	0.1	21	14.7		
13.1	0.2	2.1	10.4	0.2	0.1	20	13.0		

GOLDRIDGE FINE SANDY LOAM
S61Calif-49-5

Location: Sonoma County, California. 300 feet northeast of Springhill School - 4 tree rows east and 4 tree rows north - (LeBallister Ranch) northeast corner of SE1/4, section 4, T. 6 N., R. 9 W.
Date of Sampling: June 22, 1961.
Collectors: Reuben Nelson, Leo C. Klameth, V. C. Miller, G. Lambert, J. H. Kashiwagi, F. Graham.
Classification: **Typic Haploxerult, fine-loamy, mixed, mesic.**
Vegetation: Natural mixed conifers and hardwoods. Use: Apple orchard. Climate: Subhumid mesothermal. Annual precipitation 40 inches, mean January temperature 45.6°F., mean July temperature 65.8°F., mean annual temperature 56.8°F. Parent Material: Soft sedimentary rock - Merced formation. Elevation: About 262 feet. Relief: Gently sloping upland on a 5 percent south facing slope. Drainage: Moderately well drained, medium runoff, moderate to moderately slow permeability. Biological Activity: Worm casts found 17-30 inches.
Remarks: Dead roots found throughout B31t, B32t, B33 horizons on fracture planes, but no live roots below 50 inches.

HORIZON	DESCRIPTION
A11 * RSL No. 61414	0 to 7 inches, light brownish gray (10YR 6/2) fine sandy loam, brown (10YR 4/3) when moist; massive; soft when dry, very friable when moist, nonsticky and nonplastic when wet; abundant very fine and fine roots; many very fine and fine tubular and interstitial pores; slightly acid, pH 6.5; abrupt, smooth boundary.
A12 RSL No. 61415	7 to 17 inches, pale brown (10YR 6/3) fine sandy loam, dark brown (10YR 4/3) when moist; massive; soft when dry, friable when moist, nonsticky and nonplastic when wet; abundant very fine and fine roots; many fine tubular and interstitial pores; medium acid, pH 6.0; abrupt, wavy boundary.
A2 RSL No. 61416	17 to 30 inches, very pale brown (10YR 7/3) (very fine) sandy loam, yellowish brown (10YR 5/4) when moist; massive; soft when dry, very friable when moist, nonsticky and nonplastic when wet; abundant very fine and fine roots; many fine tubular and interstitial pores; strongly acid, pH 5.5; worm casts throughout horizon; abrupt, wavy boundary.
B1t RSL No. 61417	30 to 35 inches, very pale brown (10YR 7/4) (very fine) sandy clay loam, yellowish brown (10YR 5/4) when moist; massive breaking to weak subangular blocky structure; hard when dry, friable when moist; slightly sticky and slightly plastic when wet; plentiful very fine and fine roots; common fine and medium tubular and interstitial pores; few thin clay bridges between sand grains; very strongly acid, pH 5.0; clear, wavy boundary.
B21t * RSL No. 61418	35 to 50 inches, mixed, very pale brown (10YR 7/4) and yellowish brown (10YR 5/6) clay with common medium distinct brownish yellow (10YR 6/8) mottles when dry, yellowish brown (10YR 5/4) when moist and mottles are indistinct; moderate coarse prismatic structure; very hard when dry, firm when moist, very sticky and very plastic when wet; plentiful very fine and fine roots; common fine and medium tubular pores; continuous thick clay films along ped faces; shot size (manganese) concretions scattered throughout horizon; very strongly acid, pH 5.0; clear, wavy boundary.
B23t RSL No. 61419	50 to 67 inches, very pale brown (10YR 7/4) clay with many medium distinct brownish yellow (10YR 6/8) and light gray (10YR 7/1) mottles when dry, yellowish brown (10YR 5/4) with many medium distinct brownish yellow (10YR 6/8) and gray (10YR 5/1) mottles when moist; massive breaking to weak prismatic structure; hard when dry, friable when moist, sticky and plastic when wet; no roots; common fine and medium tubular pores; continuous thick clay films along ped faces; very strongly acid, pH 5.0; gradual, smooth boundary.
B31t RSL No. 61420	67 to 82 inches, very pale brown (10YR 7/4) silty clay loam with many medium distinct brownish yellow (10YR 6/8), light gray (10YR 7/1), and pale yellow (2.5Y 7/4) mottles when dry, yellowish brown (10YR 5/6 and 5/8) with many medium distinct, light gray (10YR 7/1) and very pale brown (10YR 7/3) mottles when moist, colors are variegated; massive; hard when dry, firm when moist, sticky and plastic when wet; abundant very fine and fine roots along fracture planes; common fine tubular pores; continuous thick clay films in pores and on fracture planes; very strongly acid, pH 5.0; diffuse, wavy boundary.
B32t * RSL No. 61421	82 to 92 inches, very pale brown (10YR 7/4) sandy clay loam with many medium distinct brownish yellow (10YR 6/8), light gray (10YR 7/1) and pale yellow (2.5Y 7/4) mottles when dry, yellowish brown (10YR 5/6 and 5/8) with many medium distinct light gray (10YR 7/1) and very pale brown (10YR 7/4) mottles when moist, the colors are variegated; massive; slightly hard when dry, firm when moist, slightly sticky and slightly plastic when wet; no roots; common very fine and fine tubular pores; continuous thick clay films in pores and along fracture planes; very strongly acid, pH 5.0; diffuse, wavy boundary.
B33 RSL No. 61422	92 to 100 inches plus, light gray (10YR 7/2) and brownish yellow (10YR 6/8) sandy clay loam when dry; yellowish brown (10YR 5/8) and very pale brown (10YR 7/3) when moist; (manganese) specks of dark brown (10YR 3/3) and very dark brown (10YR 3/2); massive; slightly hard when dry, firm when moist, slightly sticky and slightly plastic when wet; no roots; common very fine and fine tubular pores; continuous thick clay films in pores and along fracture planes; very strongly acid, pH 5.0.

* Horizons sampled for B.P.R.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Goldridge fin sandy loam **LOCATION** Sonoma County, California

SOIL FAMILY: Typic Haploxerult, fine-loamy, mixed, mesic.

SOIL NOS. S61Calif-49-6 **LAB. NOS.** 61423 - 61430

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0- 7	Ap	0.2	0.7	1.1	49.0	18.6	20.9	9.5	72.5	11.4	1	fs1
7-20	A1	0.1	0.4	0.6	46.4	19.3	21.0	12.2	71.4	11.9	0	fs1
20-24	A2	0.0	0.3	0.5	46.5	18.9	21.3	12.5	71.1	12.4	0	fs1
24-28	B1	0.1	0.3	0.4	43.9	16.5	20.9	17.9	64.8	13.5	0	fs1
28-41	B21t	0.0	0.2	0.4	37.8	11.1	17.1	33.4	50.5	12.7	0	sc1
41-57	B22t	0.0	0.0	0.2	38.5	12.9	19.5	28.9	54.2	14.9	0	sc1
57-73	B31	0.0	0.2	0.2	38.3	16.6	23.1	21.6	60.9	16.0	0	sc1
73+	B32	0.0	0.2	0.2	38.1	18.1	25.3	18.1	62.9	17.4	0	fs1

8C1a pH H_2O 1:1	8C1c pH KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	Bulk Density 4A3a g/cc	Ext. Iron 6C1b % Fe	4B2 Soil Water 15 atmos. Pct.
5.0	4.3	1.48	0.109	14		0.3	4.2
5.2	4.0	0.52	0.048	11	1.43	0.3	4.7
5.1	4.0	0.20	0.023		1.56	0.3	4.5
5.0	3.9	0.18	0.024		1.6	0.4	6.5
4.6	3.7	0.20	0.030		1.65	1.0	14.0
4.5	3.6	0.06			1.60	0.8	13.5
4.5	3.6	0.03			1.52	0.7	11.8
4.5	3.6	0.01			1.50	0.6	11.6

5A2a CATION EXCHANGE CAPACITY (+ Na)	EXTRACTABLE CATIONS 5B1a 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K	BASE SAT. % 5C3	Sum of Cations 5A3a	MOISTURE AT SATURATION
	milliequivalents per 100g. soil →						meq/100g.	%
9.8	2.0	0.5	6.8	0.2	0.6	33	10.1	
7.4	1.3	0.3	5.2	0.1	0.3	28	7.2	
5.7	1.3	0.5	3.5	0.1	0.2	38	5.6	
7.3	1.7	0.9	3.4	0.1	0.2	46	6.3	
13.7	2.2	1.9	9.6	0.2	0.2	32	14.1	
13.5	0.9	2.1	10.2	0.2	0.1	24	13.5	
12.8	0.7	1.8	10.0	0.2	0.1	22	12.8	
12.6	0.6	1.9	10.3	0.2	0.1	21	13.1	

GOLDRIDGE FINE SANDY LOAM
S61Calif-49-6

Location: Sonoma County, California. Stanley Ross Ranch, northeast corner of NW1/4, SW1/4, section 11, T. 6 N., R. 9 W., 2 rows in from Elphic Road and 2 rows from young orchard. Date of Sampling: June 22, 1961.
Collectors: Reuben Nelson, Leo C. Klameth, V. C. Miller, G. Lambert, J. H. Kashiwagi, F. Graham.
Classification: **Typic Haploxerult, fine-loamy, mixed, mesic.**
Vegetation: Natural mixed conifers and hardwoods. Use: Apple orchard. Climate: Subhumid mesothermal, annual precipitation 40 inches, mean January temperature 45.6°F., mean July temperature 65.8°F., mean annual temperature 56.8°F. Parent Material: Soft sedimentary rock - Merced formation. Elevation: 350 feet. Relief: Gently sloping upland on a 5 percent south facing slope. Drainage: Moderately well drained, medium runoff, moderate to moderate slow permeability. Biological Activity: 7-28 inches concentration of medium and coarse roots and worm casts found below plow layer to about 2 feet.

HORIZON	DESCRIPTION
Ap * RSL No. 61423	0 to 7 inches, light brownish gray (10YR 6/2) loamy fine sand, yellowish brown (10YR 5/4) when moist; compound structure due to cultivation, composed of single grains with mixed clods; soft when dry, very friable when moist, nonsticky and nonplastic when wet; abundant very fine and fine roots; common very fine and fine tubular and interstitial pores; strongly acid, pH 5.5; clear, wavy boundary.
A1 RSL No. 61424	7 to 20 inches, light brownish gray (10YR 6/2) loamy fine sand, dark yellowish brown (10YR 4/4) when moist, essentially massive in place but breaks out to weak medium subangular blocks; slightly hard when dry; friable when moist; nonsticky and nonplastic when wet; few medium and coarse roots, abundant very fine and fine roots; many very fine and fine tubular and interstitial pores; a few thin light colored coatings are present in pores; strongly acid, pH 5.5; clear, wavy boundary. There is noticeable mixing and speckling of A2 in this horizon.
A2 RSL No. 61425	20 to 24 inches, light brownish gray (2.5Y 6/2) loamy fine sand, yellowish brown (10YR 5/6) when moist; massive; slightly hard when dry, friable when moist; nonsticky and nonplastic when wet; plentiful very fine and fine roots; many very fine and fine tubular and interstitial pores; a few thin light colored coatings in pores; strongly acid, pH 5.3; clear, wavy boundary.
B1 RSL No. 61426	24 to 28 inches, light gray (10YR 7/2) very fine sandy clay loam, yellowish brown (10YR 5/6) when moist; massive breaking to weak subangular blocks; hard when dry, firm when moist, slightly sticky and slightly plastic when wet; abundant very fine and fine roots; many very fine and fine tubular and interstitial pores; many thin clay films in pores; very strongly acid, pH 5.0; clear, wavy boundary; soil in this horizon is somewhat erratic in texture and consistence with weak nodules that have finer texture and are more firm in consistence; heavy concentration of moderate and coarse live apple roots which are horizontally oriented.
B21t * RSL No. 61427	28 to 41 inches, pale yellow (2.5Y 7/4) fine sandy loam with common fine, distinct olive yellow (2.5Y 6/8) mottles when dry, yellowish brown (10YR 5/6) with mottles of brown (7.5YR 5/4) and light gray (2.5Y 7/2) when moist; massive breaking to moderate subangular blocks; hard when dry, firm when moist, sticky and plastic when wet; plentiful fine and few medium roots; many very fine and fine tubular pores; continuous thick clay films in pores, numerous horizontal fracture planes lined with heavy clay; very strongly acid, pH 5.0; gradual, irregular boundary.
B22t * RSL No. 61428	41 to 57 inches, mixed very pale brown and light yellowish brown (10YR 7/4 and 6/4) clay, with common fine distinct gray (10YR 6/1) mottles, when dry, light brownish gray (10YR 6/2) with gray (10YR 5/1) and yellowish brown (10YR 5/4) mottles when moist; massive; hard when dry, firm when moist, sticky and plastic when wet; few fine roots; plentiful very fine and fine tubular pores; many fine dead roots located in fracture planes; continuous thick clay films in pores; fracture planes are lined with heavy clay; very strongly acid, pH 5.0; diffuse, wavy boundary.
B31 * RSL No. 61429	57 to 73 inches, very pale brown (10YR 8/4) very fine sandy clay loam with common fine distinct light yellowish brown (10YR 6/4) and brownish yellow mottles (10YR 6/8) when dry, light yellowish brown (10YR 6/4) with brown (10YR 5/3) and yellowish brown (10YR 5/6) mottles when moist; massive; slightly hard when dry, firm when moist, nonsticky and slightly plastic when wet; no roots; plentiful very fine and fine tubular pores; continuous thick clay films in pores; old root channels heavily impregnated with clay; very strongly acid, pH 5.0; diffuse, wavy boundary.
B32 RSL No. 61430	73 to 83 inches +, pale yellow (2.5Y 8/4) very fine sandy clay with common fine distinct mottles of yellow (2.5Y 7/6) when dry, pale yellow (2.5Y 7/4) with mottles of yellowish brown when moist; massive; slightly hard when dry, firm when moist, slightly sticky and plastic when wet; some dead roots; plentiful very fine and fine tubular pores; continuous thick clay films in pores; clay films found on fracture planes; very strongly acid, pH 4.5.

* Horizons sampled for B.P.R.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Haploxerult, fine-loamy, mixed, mesic
SOIL Josephine gravelly silt loam · SOIL Nos. S60Calif-3-24 LOCATION Amador County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 60128 - 60133

Depth (cm)	Horizon	1B1b Size class and particle diameter (mm) 3A1 — Total: Sand (2-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Sand: Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Silt: (0.05-0.02)	Int. III (0.02-0.002)	Int. II (0.2-0.02)	2-0.1			Coarse fragments 1A2a: > 2 Pct. of whole soil	2-19 Pct. of <76mm	19-76 Pct. of <76mm
		Pct. of <2 mm																
0-5	A1	38.8	47.5	13.7	4.8	6.9	3.2	11.2	12.7	19.0	28.5	39.7	16.1			33		
5-23	A3	36.8	47.6	15.6	3.6	6.0	2.8	10.8	13.6	19.4	28.2	40.8	23.2			11		
23-56	B1t	26.4	43.7	29.9	1.2	3.9	2.3	8.2	10.8	15.3	28.4	32.1	15.6			16		
56-94	B2t	19.5	42.1	38.4	1.2	4.0	2.3	5.9	6.1	12.1	30.0	22.1	13.4			8		
94-120	B3t	19.5	45.7	34.8	1.8	4.0	2.0	5.5	6.2	11.6	34.1	21.5	13.3			6		
120-175	C1	a/44.2	47.6	8.2	a/4.0	a/4.2	a/5.5	a/11.3	a/9.2	15.2	32.4	31.3	35.0			2		

Depth (cm)	6A1a Organic carbon b/ Pct.	6B1a Nitrogen Pct.	C/N	6C1b Ext. iron as Fe Pct.	Carbonate as $CaCO_3$: 6E1b <2 mm Pct.	3A1a <0.002 mm Pct.	Bulk density: 4A1f 1/3 bar g/cc	4A1h Oven dry g/cc	g/cc	3B2 Cm	Water content: 4B1c 1/3 bar Pct.	4B2 15 bar Pct.	4C1 1/3 to 15 bar cm/cm			pH: 8C1b Saturated paste	8C1a H_2O 1:1	8C1c 1N KCl 1:1
0-5	4.22	0.140	30	5.3								10.5					6.0	4.9
5-23	1.71	0.068	25	5.8								9.1					5.7	4.5
23-56	0.75	0.041	18	7.5								13.7					5.1	4.1
56-94	0.48	0.028	17	10.4								18.0					5.0	4.1
94-120	0.31	0.024		10.4								17.0					5.0	3.9
120-175	0.22			8.3								8.6					4.8	3.9

Depth (cm)	Extractable bases 5B1a: 6N2b Ca	6O2c Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. acidity	Cation exch. capacity: 5A2a NaOAc	5A3a Sum of cations		6G1e KCl ext. Al +++	Ratios to clay 8D1: CEC / Na OAc	Ext. iron	15 bar water			Base saturation: 5C3 Sum of cations Pct.	Pct.
	meq/100g																
0-5	9.1	2.9	0.1	0.5	12.6	14.7		23.9			1.74	0.39	0.77			46	
5-23	2.6	2.2	0.1	0.4	5.3	8.7		16.9			1.08	0.37	0.58			38	
23-56	0.6	2.8	0.1	0.4	3.9	7.4		11.7			0.39	0.25	0.46			35	
56-94	0.4	2.7	0.1	0.3	3.5	8.2		11.7			0.30	0.27	0.47			30	
94-120	0.5	2.1	<0.1	0.2	2.8	8.4		11.4			0.33	0.30	0.49			25	
120-175	0.3	1.5	0.1	<0.1	1.9	6.1		9.1			1.11	1.00	1.05			24	

Depth (cm)	c/ Clay fraction mineralogy 3A1: 7A2 X-ray d/	7A3 DTA Pct.
0-5		
5-23	MT3, VR3	KK52, GI1
23-56		
56-94	VR2	KK40, GI1
94-120	VR2	KK40, GI1
120-175		

a/ Sand consists of partially decomposed rock that breaks down quite easily to smaller aggregates under slight to moderate pressure

b/ 14.6 kg of organic carbon per square meter to a depth of 1 meter

c/ Mineral code
- MT = montmorillonite
- VR = vermiculite
- KK = kaolinite
- GI = gibbsite

d/ Approximate weight fraction (X-ray)
- 3 = one-fifth to one-third
- 2 = one-twentieth to one-fifth

JOSEPHINE GRAVELLY SILT LOAM
S60Calif-3-24

Location: Amador County, California. 1/2 mile west of Shake Ridge Road, crossing over Rancheria Creek, 150 feet north of Shake Ridge Road, 3.8 miles west of junction of Charleston, Volcano Road and Shake Ridge Road. 0.35 mile north of the SE corner of sec. 24, T. 7 N., R. 11 E.
Date of Sampling: May 4, 1960.
Description by: Grant Kennedy. Collectors: Grant Kennedy, Reuben Nelson, Robert Sketchley, Clifford Henry, Paul Nazar, Jack McClelland.
Classification: Typic Haploxerult, fine-loamy, mixed, mesic.
Vegetation: Ponderosa pine (Pinus ponderosa), sugar pine (Pinus lambertiana), black oak (Quercus velutina), mountain misery (Chamaebatia foliolosa), manzanita (Arctostaphylos sp.), toyon (Photinia arbutifolia).
Climate: Mean annual rainfall 33 inches; average temperatures (Tiger Creek Station): January - 40° F.; July - 70° F.; mean annual - 55° F. Parent Material: Metasedimentary rocks of the Calaveras formation (schists with vertical cleavage). Topography: Steep uplands on a north-facing slope of 25 percent.
Elevation: 2,050 feet. Drainage: Well drained; moderate runoff; moderate permeability.
Remarks: Field estimates of the volume of gravel for the B2t, B3t, and C1 horizons are given in the profile description.

HORIZON	DESCRIPTION
	Colors are for the dr · soil unless otherwise indicated.
O1	1-0 inch (3-0 cm.), organic layer consisting of fresh needles, litter, and decomposing litter.
A1 RSL No. 60128	0-2 inches (0-5 cm.), brown (10YR 4/3) gravelly loam, dark brown (7.5YR 3/2) when moist; weak fine subangular blocky structure; slightly hard (dry), friable (moist), slightly sticky and slightly plastic (wet); abundant very fine, few fine and medium roots; many very fine, few fine interstitial and tubular pores; abrupt smooth boundary.
A3 RSL No. 60129	2-9 inches (5-23 cm.), brown (7.5YR 5/4) gravelly light loam, dark brown (7.5YR 4/4) when moist; slightly hard (dry), friable (moist), slightly sticky and slightly plastic (wet); abundant very fine, few fine and medium roots; many very fine tubular and interstitial pores; few fine and medium tubular pores; clear smooth boundary.
B1t RSL No. 60130	9-22 inches (23-56 cm.), brown (7.5YR 5/5) light clay loam, reddish brown (5YR 4/5) when moist; moderate medium subangular blocky structure; hard (dry), friable (moist), sticky and plastic (wet); abundant very fine, few fine to very coarse roots; pores as above; thin, nearly continuous clay skins in pores; gradual irregular boundary because of presence of a few partially disintegrated stones and bedrock.
B2t RSL No. 60131	22-37 inches (56-94 cm.), brown (7.5YR 5/5) heavy silty clay loam, strong brown (7.5YR 4/6) when moist; moderate medium subangular blocky structure; very hard (dry), firm (moist), sticky and plastic (wet); few fine to coarse roots; many very fine interstitial and tubular pores, few fine and medium tubular pores; moderately thick continuous clay skins on ped faces and in many pores; about 25 percent by volume of weathered soft rocks; gradual irregular boundary.
B3t RSL No. 60132	37-47 inches (94-120 cm.), yellowish brown (10YR 5/6) silty clay loam, dark yellowish brown (10YR 4/6) when moist; moderate medium subangular blocky structure; very hard (dry), firm (moist), slightly sticky and slightly plastic (wet); few very fine to large roots; many very fine interstitial pores, few very fine, common fine tubular pores; clay skins as above but thin; about 35 percent by volume of weathered soft rocks; clear irregular boundary.
C1 RSL No. 60133	47-68 inches (120-175 cm.), brownish yellow, yellowish red, and gray (10YR 6/6, 5YR 5/6, and N 6/) decomposing rock, brownish yellow, red, and dark gray (10YR 6/6, 2.5YR 4/6, and N 4/) when moist; massive; extremely hard (dry), very firm (moist); very few roots; few very fine tubular, common fine interstitial pores; moderately thick, continuous clay skins along fracture faces.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Mariposa silt loam (taxadjunct) **LOCATION** Amador County, California

SOIL FAMILY: Typic Haploxerult, fine-loamy, mixed, mesic

SOIL NOS. S 60Calif-3-25 **LAB. NOS.** 60108 - 60113

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)								3A1	2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2 1/	
0- 1	A11	3.9	5.7	4.4	10.4	11.5	55.5	8.6	43.5	29.9	20	sil
1- 4	A12	3.2	5.2	4.1	8.9	11.6	55.7	11.3	41.3	31.7	12	sil
4- 8	B1t	2.0	3.8	3.0	6.7	9.2	56.1	19.2	33.8	35.8	8	sil
8-15	B2t	0.9	3.8	2.6	6.3	8.1	58.2	20.1	32.2	38.2	25	sil
15-23	B3t	1.0	3.2	2.1	5.5	7.2	64.6	16.4	31.1	44.3	9	sil
23-36+	C1	0.7	3.5	3.1	7.7	9.0	67.5	8.5	38.3	43.1	11	sil

8C1a pH H_2O 1:1	8C1c pH KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	4A3a Bulk Density g/cc	$CaCO_3$ equivalent %	6C1b "Free" Fe_2O_3 %	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
5.4	4.4	3.77	0.131	28.8				2.5			7.6
5.6	4.4	1.97	0.063	31.3		1.30*		2.7			6.9
5.3	4.0	1.07	0.052	20.6		1.2		2.9			9.7
5.0	3.6	0.57	0.031	18.4		1.33		2.8			10.0
4.8	3.3	0.30				1.4		2.2			9.2
4.7	3.2	0.07						1.3			5.5

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K	5B1a BASE SAT. % 5C3	Clay mineralogy (<0.002 mm.) Mont.	Verm.	Mixed layer Mica-Verm.	Mica	% Kaolin DTA 7A3	% Gibb. DTA 7A3
	milliequivalents per 100g. soil →						← X-ray 7A2 →					
18.1	5.7	1.3	11.2	0.1	0.4	40						
11.4	2.7	0.6	6.3	0.1	0.3	37	-	xxx	x	xx	45	-
11.2	1.6	0.7	7.4	0.1	0.4	27						
10.8	0.7	0.5	7.4	0.1	0.2	17	-	xx	x	-	35	tr
13.4	0.3	0.6	10.3	0.1	0.1	10						
11.0	0.4	0.2	8.4	0.1	<0.1	8	-	xx	x	-	40	-

* Single determination

1/ Percent of the whole soil

\- = looked for but not found
tr = detected, very small amounts
x = detected, small amounts
xx = moderate amounts
xxx = large amounts
xxxx = predominant amounts

MARIPOSA SILT LOAM (taxadjunct) 1/
S60Calif-3-25

Date of sampling: May 5, 1960.
Location: 0.1mile NW of the center of the SE1/4 sec. 34, T. 8 N., R. 12 E., 25 feet N of Fiddletown-Silver Lake Road; 3.5 miles W of Fiddletown-Silver Lake Road junction with Shake Ridge Road; 0.2 mile E of Fiddletown-Silver Lake Road junction with Ponderosa Way, Amador County, California.
Classification: Typic Haploxerult, fine-loamy, mixed, mesic.
Collectors: Grant Kennedy, Reuben Nelson, Robert Sketchley, Clifford Henry, Paul Nazar, Jack McClelland Description by: Grant Kennedy.
Vegetation: Manzanita locally but some ponderosa pine and black oak occur nearby
Climate: Mean annual precipitation 37", average temperature (Tiger Creek Station): January - 40° F.; July - 70° F.; mean annual - 55° F.
Parent Material: Schists of the Calaveras formation with vertical cleavage
Relief: Sloping uplands near a ridge crest, on a south-facing slope of 7 percent.
Elevation: 2,900 feet
Drainage: Well drained; moderate runoff; moderate permeability
Remarks: This is a weakly developed Red-Yellow Podzolic soil. Gravel content increases somewhat with depth. Roots are mainly horizontal. Few stones and rock outcrops. The soil was moist when described.

HORIZON		DESCRIPTION
O1	1½- 0"	Loose leaf litter, partially decomposed in the lower portion.
NOT sampled		
A11	0- 1"	Pale brown (10YR 6/3) silt loam with about 10 percent gravel and cobbles, dark brown (7.5YR 4/3) when moist; massive; soft,
RSL No. 60108		friable, slightly sticky and slightly plastic; plentiful very fine roots; many very fine interstitial and tubular pores, few fine tubular pores; medium acid (pH 6.0); abrupt smooth boundary.
A12	1- 4"	Light yellowish brown (10YR 6/4) silt loam, dark brown (7.5YR 4/4) when moist; massive; soft, friable, slightly
RSL No. 60109		sticky and slightly plastic; plentiful very fine, few fine roots; many very fine interstitial and tubular, few fine and medium tubular pores; medium acid (pH 6.0); abrupt smooth boundary.
B1t	4- 8"	Pink (7.5YR 7/4) heavy silt loam, yellowish red (5YR 5/6) when moist; massive; slightly hard, firm, slightly sticky and
RSL No. 60110		plastic; plentiful very fine and fine, few medium and coarse roots; many very fine interstitial and tubular, few fine and medium tubular pores; thin discontinuous clay films in some pores; strongly acid (pH 5.5); gradual smooth boundary.
B2t	8-15"	Similar to above except light silty clay loam texture; few very fine and fine roots; common very fine, few fine tubular
RSL No. 60111		pores; thin continuous clay films in pores; strongly acid (pH 5.5); gradual smooth boundary.
B3t	15-23"	Pink (7.5YR 7/4) silt loam, reddish yellow (5YR 6/6) when moist; massive; slightly hard, firm, slightly sticky and
RSL No. 60112		slightly plastic; occasional roots; common very fine, very few fine tubular pores; thin continuous clay films in a few pores; strongly acid (pH 5.5); clear, somewhat irregular boundary.
C1	23-36"+	Very pale brown (10YR 7/3) decomposing schist with strong brown (7.5YR 5/6) stains along fracture planes, light brownish
RSL No. 60113		gray (10YR 6/2) and strong brown (7.5YR 5/6) when moist; some vertical strata are firm or very firm, others extremely firm or rock-like; very few roots; few fracture planes evident; (ground-up rock) very strongly acid (pH 5.0).

1/ The Mariposa series is in a fine-loamy, mixed, mesic family of Ruptic-Lithic-Xerochreptic Haploxerults. This pedon has a continuous argillic horizon and has no lithic contact within 20 inches.

OIL SURVEY LABORATORY Riverside, California

OIL TYPE Red Bluff gravelly loam (taxadjunct) **LOCATION** Amador County, California

SOIL FAMILY: Typic Haploxerult, clayey, mixed, thermic

S59Calif-3-9 **LAB. NOS.** 59314 - 59319

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 1B1b VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 >2 1/	TEXTURAL CLASS
0-3	A_{11}	4.3	12.3	10.5	17.5	7.2	32.2	16.0	32.4	16.4	18	l-fsl
3-7	A_{12}	3.9	11.3	11.1	18.5	7.9	29.5	17.8	34.0	14.0	17	fsl
7-11	B_1	3.0	10.3	10.2	16.9	7.0	27.1	25.5	30.7	13.1	10	fsl
11-19	B_{21}	2.2	5.5	4.5	7.9	3.9	17.3	58.7	15.6	10.1	3	c
19-27	B_{22}	1.3	4.4	3.9	7.2	3.6	17.2	62.4	15.3	9.7	2	c
27-40	D	3.8	6.6	6.4	11.1	5.1	19.9	47.1	20.2	11.2	26	c

pH 8C1a H_2O 1:1	pH 8C1c KCl 1:1	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6C1b "Free" Fe_2O_3 %	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
6.5	5.7	3.58	0.248	14.4	3.1						9.1
6.1	5.1	1.04	0.089	11.7	3.5						6.3
5.3	4.1	0.73	0.072	10.1	3.6						8.2
4.0	3.2	0.54	0.065	8.3	2.8						18.9
3.6	2.9	0.30	0.047	6.4	2.0						21.7
3.8	3.0	0.19	--		3.0						15.3

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 6N2b Ca	6O2c Mg	6H2a H	6P2a Na	6Q2a K (milliequivalents per 100g. soil)	5B1a BASE SAT. % 5C3	Clay mineralogy (<0.002 mm.) Mont.	Verm.	Mixed layer Mica-Verm.	Mica (X-ray 7A2)	% Kaolin DTA 7A3	% Gibb. DTA 7A3
18.4	11.5	2.3	5.6	0.2	0.9	73						
11.8	5.4	1.9	4.7	0.1	0.9	64						
14.4	4.2	2.5	6.3	0.2	0.9	55						
26.5	2.8	3.5	19.3	0.1	0.8	27	xxx	-	-	-	40	-
30.3	2.3	4.0	23.8	0.1	0.2	22						
22.9	3.0	2.8	16.8	0.1	0.2	27	xxxx	-	-	-	40	-

1/ Percent of whole soil

- = looked for but not found
tr = detected, very small amounts
x = detected, small amounts
xx = moderate amounts
xxx = large amounts
xxxx = predominant amounts

RED BLUFF GRAVELLY LOAM (taxadjunct) 1/
S59Calif-3-9

Collectors: Grant Kennedy, Reuben Nelson, Bob Sketchley.
Date of Sampling: June 16, 1959. Description by: Grant Kennedy.
Location: Amador County, California on Meiss Road, 1/2 mile from intersection with Highway 104, 20 feet east of road, SW1/4 of SW1/4 of Sec. 9, T6N, R9E.
Elevation: 250 feet.
Relief: On an old terrace with a plane slope of 8 percent, facing west.
Drainage: Well drained; moderate runoff; moderate over slow permeability.
Parent Material: Mixed gravels of uncertain age resting unconformably on the Ione formation.
Climate: Rainfall about 18 inches.
Vegetation: Blue oak with wild oats and soft chess.
Remarks: This is a medial developed Noncalcic Brown soil with about 10 percent by volume of cobbles and gravels in the B horizons. The B_{22} may be formed in the Ione formation as well as the D and probably should be B_{22u}.
Classification: Typic Haploxerult, clayey, mixed, thermic.

HORIZON		DESCRIPTION
A_{11}	0-3"	Reddish brown (5YR 4/3) gravelly loam, near gravelly fine sandy loam, dark reddish brown (5YR 3/3) when moist; massive; hard when dry, friable when moist, nonsticky and nonplastic when wet; abundant very fine roots; many very fine, common fine, few medium pores; slightly acid, pH 6.5; abrupt, smooth lower boundary.
A_{12}	3-7"	Reddish brown (5YR 4/5) gravelly fine sandy loam, near gravelly loam, dark reddish brown (5YR 3/4) when moist; massive; hard when dry, friable when moist, slightly plastic and slightly sticky when wet; abundant very fine and fine, few medium and coarse roots, many very fine, common fine, few medium and coarse pores; occasional thin discontinuous clay film; slightly acid, pH 6.1; clear, smooth lower boundary.
B_1	7-11"	Yellowish red (5YR 4/6) loam near clay loam, dark reddish brown (2.5Y 3/5) when moist; massive, hard when dry, friable when moist, slightly sticky and slightly plastic when wet; plentiful very fine and fine, few medium and coarse roots; many very fine, common fine, few medium and coarse pores; thin continuous clay films in pores; very strongly acid, pH 5.3; clear, smooth lower boundary.
B_{21}	11-19"	Red (2.5YR 4/6) clay, dark red (10R 3/6) when moist; massive; hard when dry, firm when moist, sticky and plastic when wet; few very fine, fine and medium roots; common very fine, few fine, medium and coarse pores; moderately thick, continuous clay films in pores and in bridges; extremely acid, pH 4.0; gradual, smooth lower boundary.
B_{22}	19-27"	Weak red (10R 4/4) clay with common streaks of pale brown (10YR 6/3), dark red (10R 3/6) and brown (10YR 5/3) when moist; massive; very hard when dry, very firm when moist, sticky and plastic when wet; few fine and medium roots; common very fine, few fine, medium and coarse pores; thick continuous clay films in pores and bridges; extremely acid, pH 3.6; gradual, smooth lower boundary.
D	27-40"	Pale brown (10YR 6/3) gravelly clay with dark red (10R 3/6) coatings, brown (10YR 5/3) with dark red (10R 3/6) when moist; massive; very hard when dry, extremely firm when moist, sticky and plastic when wet; occasional roots; few very fine and fine pores; common thick clay films in pores and along fracture planes; extremely acid, pH 3.8.

1/ The Red Bluff series is in a fine, kaolinitic, thermic family of Ultic Palexeralfs. This pedon has a somewhat loer base saturation in the argillic horizon than is prescribed for the series and has less clay in the lower part.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Chromoxerert, fine, montmorillonitic, mesic
SOIL Montague clay SOIL Nos. S66Calif-47-7 LOCATION Siskiyou County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 66371 - 66375

Depth (In.)	Horizon	1B1b Size class and particle diameter (mm) Total: Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	3A1 Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	1/ Coarse fragments 1A2a: >= 2	2 - 19	19 - 76
		Pct. of < 2 mm														Pct.	Pct. of < 76mm	
0-4	Ap	23.2	29.8	47.0	1.5	2.8	3.5	8.3	7.1	10.0	19.8	21.6	16.1		47	7	4	3
4-16	A12	23.1	27.9	49.0	1.6	2.9	4.0	8.1	6.5	9.4	18.5	20.3	16.6		49	6	5	1
16-24	A13	22.3	28.1	49.6	2.0	3.0	3.6	7.7	6.0	9.9	18.2	20.2	16.3		50	4	4	-
24-30	C1cam	55.1	28.2	16.7	14.2	13.5	7.3	11.7	8.4	10.7	17.5	25.5	46.7	2	15			
30-36	C2cam	61.7	25.7	12.6	19.8	15.4	7.4	11.5	7.6	10.3	15.4	23.9	54.1	3	10			

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Bulk density: 4A1f 1/3 bar	4A1h Oven dry		3B2 C'	Water content:	4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH: 8C1a H_2O 1:1		
	Pct.	Pct.		Pct.	Pct.	g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.	in./in.			
0-4	0.63	0.059	11	0.6		1.16	1.57		0.97		38.2	23.3	0.107	0.103	6.6		
4-16	0.51	0.050	10	0.5		1.30	1.75		0.97		34.0	27.2	0.104	0.100	6.7		
16-24	0.42	0.046	9	0.6	tr.	1.28	1.70		0.98		32.4	26.5	0.098	0.096	7.2		
24-30	0.53			0.1	31	1.12	1.18		1.00		40.5	26.5	0.019	0.019	8.1		
30-36	0.56			0.1	40	1.26	1.27		1.00		31.8	23.8	0.002	0.002	8.3		

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1a NH_4OAc	5A3a Sum	6G1d KCl Ext. Al^{+++}	Base saturation: 5C1 NH_4OAc	5C3 Sum
	meq/100 g									Pct	Pct.
0-4	17.8	19.8	0.2	2.6	40.4	2.9	40.1	43.3		100	93
4-16	18.0	17.0	0.2	1.0	36.2	2.5	41.8	38.7		87	93
16-24	18.0	17.5	0.4	1.2	37.1	1.9	41.5	39.0		89	95
24-30	20.0	13.9	0.3	0.7		-	27.7	34.9		100+	100
30-36	18.7	10.6	0.3	0.6		-	22.1	30.2		100+	100

Depth (In.)	Clay mineralogy (<0.002 mm) 7A: Mont.	Verm.	Mica	Kaolin
	X-ray			
0-4	xxxx			
4-16				
16-24				
24-30	xxxx			
30-36				

1/ From characterization sample (5 kg.). Samples 66374 and 66375 were crushed and >2 mm. fractions were not determined.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

MONTAGUE CLAY
S66Calif-47-7

Location: Siskiyou County, California. A pit located just north of where the Montague ditch crosses the County Airport Road on the Lipert Ranch. Pit site located between power poles #30 and 7/25, 47 paces north and 48 paces west from pole #30. Section 29, T46N, R5W. Date of Sampling: May 26, 1966.
Description by: S. B. Johnson. Collectors: K. W. Flach, S. B. Johnson and D. Lucas.
Classification: Typic Chromoxerert, fine, montmorillonitic, mesic.
Vegetation: Cultivated. Summer fallow at time of description and sampling. Climate: The average annual precipitation is approximately 13 inches with some in the form of snow. The mean January temperature is 34°F., the mean July temperature is 73°F., and the mean annual temperature is 52°F. Parent Material: Alluvium from basic igneous rock of the Western Cascade Series formation. The alluvium was deposited over semi-consolidated tuff and a hardpan formed in the surface layers of the tuff. The dominant mineral is montmorillonitic clay. Topography: The site is located on a nearby level valley bottom. There is very faint undulation of the land surface. Slope 1 percent or less. Elevation: 2680 feet plus or minus 10 feet. Drainage: Well drained, slow permeability, hardpan very slow, runoff slow to ponded. Soil Moisture: 0 to 4 inches about 70 percent of field capacity and 4 to 24 inches at field capacity.
Remarks: Reactions were determined by the Truog soil reaction test. This was the only Montague soil sampled, therefore, there is no paired sample. This soil varies mainly in depth and color. Soil depth to the duripan ranges from 20 to 60 inches with an average depth of about 24 to 26 inches. Soil colors are normally in the 10YR hues and range from black to dark brown (2/1, 2/2, 3/2, 3/3) moist and very dark gray to brown (3/1, 4/1, 4/2, 4/3, 5/3) dry. Slickensides and pressure faces are common in the lower horizons and middle horizons. Depth of cracking ranges from 8 to 20 inches. Under irrigation the soil produces good alfalfa hay and seed, plus excellent irrigated pastures. Coarse fragments are negligible in most areas of the Montague soil. Gravel occurs throughout the soil in places and cobbles and stones may be found near rock outcroppings. A gravelly phase hasn't been mapped to date. The pan ranges in thickness from 6 inches to a foot or two and is strongly cemented to nearly indurated.

HORIZON	DESCRIPTION
Ap RSL 66371	0 to 4 inches, dark gray (10YR 4/1) clay, very dark gray (10YR 3/1) moist; strong coarse angular blocky breaking to strong medium angular blocky structure; very hard, firm, very sticky, very plastic; few fine and very fine roots; few fine tubular pores; neutral (pH 6.6); abrupt smooth boundary.
A12 RSL 66372	4 to 16 inches, brown (10YR 5/3) rubbed, very dark grayish brown (10YR 3/2) ped faces, clay, dark brown (10YR 3/3) moist and rubbed, with very dark grayish brown (10YR 3/2) moist ped faces; strong medium prismatic structure; very hard, firm, very sticky and very plastic; few very fine and fine roots; few fine tubular pores; slickensides intersecting; neutral (pH 6.7); gradual smooth boundary.
A13 RSL 66373	16 to 24 inches, same colors as A12, clay; moderate medium prismatic structure; very hard, firm, very sticky and very plastic; few fine and very fine roots; few fine tubular pores; slickensides intersecting; neutral (pH 7.2); abrupt smooth boundary.
C1cam RSL 66374	24 to 30 inches, strongly lime cemented petrocalcic horizon, violent effervescence with dilute acid. Silica occurs in thin discontinuous seams; moderately alkaline (pH 8.1); abrupt smooth boundary.
C2cam RSL 66375	30 to 36 inches, strongly lime cemented petrocalcic horizon; moderately alkaline (pH 8.3).

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Chromoxerert, fine, montmorillonitic, thermic.
SOIL Altamont clay SOIL Nos. S58Calif-1-3 LOCATION Alameda County, California

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 591013 - 591018

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt (0.05–0.02)	Silt: Int III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	Coarse fragments 1A2a: 2A2 > 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76mm	
0-7	A11	15.1	34.2	50.7	0.1	1.0	2.1	5.1	6.8	12.3	21.9	22.1	8.3			<1		
7-19	A12	14.2	35.4	50.4	0.1	0.9	1.8	4.7	6.7	12.0	23.4	21.7	7.5			<1		
19-28	A13	14.0	36.6	49.4	0.2	1.0	1.9	4.6	6.3	12.0	24.6	21.1	7.7			<1		
28-37	A14ca	13.0	39.4	47.6	0.2	1.0	1.7	4.1	6.0	12.3	27.1	20.9	7.0			<1		
37-50	Cca	11.4	41.8	46.8	0.4	0.9	1.5	3.4	5.2	12.0	29.8	19.2	6.2			<1		
50+	Dr	7.3	60.3	32.4	1.1	1.3	1.0	1.7	2.2	11.7	48.6	15.0	5.1			<1		

Depth (In.)	6A1a Organic carbon	6B2a Nitrogen	C/N	6C2b Ext. Iron as Fe	6E1e Carbonate as $CaCO_3$		Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven dry		3B2	Water content	4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility LEf	4D1 Extensibility LE	pH: 8C1a H_2O 1:1		
	Pct.	Pct.		Pct.	Pct		g/cc	g/cc	g/cc	Cm	Pct	Pct.	Pct.	Pct.	Pct			
0-7	1.23	0.148	8													6.5		
7-19	0.79	0.108	7		1											6.8		
19-28	0.63	0.095	7		2											7.8		
28-37	0.50	0.087	6		3											7.8		
37-50	0.34				4											8.0		
50+	0.14				8											8.0		

Depth (In.)	Extractable bases 5A1: 6N2b Ca	6O2b Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1b NH_4OAc	5A3a Sum		6G1e KCl Ext. Al^{+++}	CEC 100 g clay						Base saturation 5C3 Sum	
	meq/100 g																Pct.	Pct
0-7	25.5	10.0	0.2	0.9		3.3	36.4	39.9			71.8						92	
7-19	27.8	9.2	0.3	0.8		2.2	37.0	40.3			73.4						94	
19-28	*		0.5	0.6			33.7				68.2							
28-37	*		0.7	0.6			31.9				67.0							
37-50	*		0.9	0.6			30.3				64.7							
50+	*		1.0	0.4			26.8				82.7							

Depth (In.)	Clay mineralogy (<0.002 mm.) 3A1: Mont.	Verm.	Mica 7A2 X-ray	Kaolin.

* Calcareous

ALTAMONT CLAY
S58Calif-1-3

Location: 750 feet east and 2250 feet south of northwest corner of Section 19 in SE1/4, SW1/4, NW1/4, Section 19, R. 3 E., T. 2 S., Dyer Ranch, Alameda County, California.
Date of Sampling: November 12, 1958.
Description by: R. Ulrich. Collectors: R. E. Nelson, Larry Welch, Robert Mitchel, Lynn Whittig, R. Ulrich.
Classification: Typic Chromoxerert, fine, montmorillonitic, thermic.
Vegetation: Annual bromes (soft chess and ripgut mostly), mouse barley, bur clover, mustard. Present use is annual grass range; may have been cultivated sometime in past. Climate: Rainfall is 13-14 inches (estimated); mean annual soil temperature about 60° F. Distinct summer-dry, winter-moist Mediterranean type climate. Parent Material: Interbedded calcareous fine grained sandstone and shale. Lime content is variable, but it usually is weak or slightly calcareous although thin seams of limestone and other strongly calcareous sediments are often present. Slope: 25 percent (estimated), west facing, plane surface. Elevation: About 1100 feet. Drainage: Well drained with slow surface runoff when dry and deeply cracked and medium runoff when moist and expanded during the rainy season. Internal drainage is variable ranging from very rapid when dry and deeply cracked during the dry season and for some interval after the start of the rainy season to slow internal drainage when moist and essentially massive following expansion during the rainy season.

HORIZON	DESCRIPTION
A11 BSL No. 591013	0 to 7 inches, dark brown (10YR 4/2.5) clay, darker brown (10YR 3/2.5) moist, drying 10YR 5/2 or lighter in the very thin immediate surface crust; strong coarse prismatic and strong coarse and medium blocky; very hard to extremely hard, very firm to extremely firm, very plastic, sticky; numerous fine roots which tend to concentrate along structure planes and facings, roots appear flattened or compressed; few extremely fine and very fine tubular pores; noncalcareous to dilute acid; reaction not determined in field, see lab data; structure facings have very dark brown to black carbonaceous films and mats on them in places; clear smooth lower boundary.
A12 BSL No. 591014	7 to 19 inches, dark brown (10YR 3.5/3) clay, darker brown (10YR 3/3) moist, moderate coarse prismatic and moderate coarse blocky; very hard, very firm, very plastic, sticky; few fine roots, mostly along structural planes; few extremely fine and very fine tubular pores; noncalcareous but may have a few whitish lime films on surface of peds in lower portion; many slickensides; clear smooth lower boundary.
A13 BSL No. 591015	19 to 28 inches, similar colored clay with few fine whitish soft to slightly hard lime segregations and films; moderate coarse prismatic and moderate coarse and medium blocky; very hard, very firm, very plastic, sticky; few fine roots; concentrated mainly along structure facings; few extremely fine and very fine tubular pores; slightly calcareous, the lime mostly disseminated; many slickensides; clear smooth lower boundary.
A14ca BSL No. 591016	28 to 37 inches, finely mottled dark brown and dark yellowish brown (10YR 4/3 and 4/4) clay, darker brown and darker yellowish brown (10YR 3/3 and 4/3) moist, with few fine whitish soft to slightly hard lime segregations and films; weak coarse prismatic and moderate medium blocky; very hard, very firm, very plastic, sticky; few fine roots mostly along structure faces; few extremely fine and very fine tubular pores; slightly to moderately calcareous, the lime mostly disseminated; few soft fine 10YR 5/6 and 5/8 iron oxide segregations; few small embedded shale fragments; many slickensides; clear smooth lower boundary.
Cca BSL No. 591017	37 to 50 inches, yellowish brown (10YR 5/4) clay, dark yellowish brown (10YR 4/4) moist, with many embedded soft to slightly hard whitish lime segregations and nodules; weak medium blocky; very hard, very firm, plastic, sticky; few fine roots, mostly along structure faces; few extremely fine and very fine tubular pores; moderately calcareous, with much disseminated as well as segregated lime; few small embedded shale fragments; few slickensides; clear smooth lower boundary.
Dr. BSL No. 591018	50 inches +, olive (5Y 5/3) highly fractured fine grained sandstone and shale, darker olive (5Y 4/3) moist, and light olive brown (2.5Y 5/4) silty clay loam, olive brown (2.5Y 4/4) moist; increasingly shaly and undecomposed with depth; shale fragments appear very slightly calcareous, with much softly to somewhat hardened whitish lime segregations, nodules, and films in upper portion; progressively less disseminated and segregated lime with depth.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Chromoxerert, fine, montmorillonitic, thermic.
SOIL Altamont clay SOIL Nos. S58Calif-1-4 LOCATION Alameda County, California

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 591019 - 591024

Depth (In.)	Horizon	1B1b Total Sand (2-0 05)	Total Silt (0.05-0.002)	Total Clay (< 0 002)	Sand: Very coarse (2-1)	Sand: Coarse (1-0.5)	Sand: Medium (0.5-0.25)	Sand: Fine (0.25-0.1)	Sand: Very fine (0.1-0.05)	Silt: 0.05-0.02	Silt: Int. III (0.02-0.002)	Int. II (0.2-0.02)	(2-0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	Coarse fragments 1A2a: 2A2 > 2	2 - 19	19 - 76
		Pct. of < 2 mm														Pct.	Pct. of < 76mm	
0-7	A11	18.9	30.7	50.4	0.1	0.5	2.2	7.1	9.0	11.5	19.2	24.8	9.9			<1		
7-18	A12	18.6	30.8	50.6	0.2	0.6	2.0	7.1	8.7	11.4	19.4	24.6	9.9			<1		
18-26	A13	20.8	31.5	47.7	0.5	0.9	2.4	7.5	9.5	12.1	19.4	26.4	11.3			<1		
26-37	A14ca	20.3	37.7	42.0	0.7	1.0	2.3	7.4	8.9	20.7	17.0	34.1	11.4			<1		
37-47	ACca	23.3	34.9	41.8	0.3	0.7	2.6	8.7	11.0	13.3	21.6	29.7	12.3			<1		
47+	Dr	62.5	27.9	9.6	5.7	7.0	5.2	20.2	24.4	13.7	14.2	51.6	38.1			<1		

Depth (In.)	6A1a Organic carbon	6B2a Nitrogen	C/N	6C2b Ext. Iron as Fe	6E1e Carbonate as $CaCO_3$	Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven dry	Bulk density	3B2	Water content	4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility LEf	4D1 Extensibility LE	pH: 8C1a H_2O 1:1		
	Pct.	Pct.		Pct.	Pct.	g/cc	g/cc	g/cc	Cm	Pct.	Pct.	Pct.	Pct.	Pct			
0-7	0.84	0.124	7												6.4		
7-18	0.68	0.098	7												6.9		
18-26	0.47	0.083	6		2										8.0		
26-37	0.31				3										8.0		
37-47	0.18				1										8.0		
47+	0.10				12										8.2		

Depth (In.)	Extractable bases 5A1: 6N2b Ca	6O2b Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1b NH_4OAc	5A3a Sum	6G1e KCl Ext. Al^{+++}	CEC 100 g clay	Base saturation: 5C3 Sum	
	meq/100 g										Pct.	Pct.
0-7	17.7	16.3	0.4	0.8		4.0	36.8	39.3		73.0	90	
7-18	18.8	16.7	1.0	0.8		2.4	37.6	39.6		74.3	94	
18-26	*		4.4	0.6			34.0			71.3		
26-37	*		6.3	0.5			32.7			77.8		
37-47	*		8.0	0.5			30.7			73.4		
47+	*		4.5	0.1			6.8			70.8		

Depth (In.)	Clay mineralogy (<0.002 mm.) 3A1: Mont.	Verm.	Mica 7A2 X-ray	Kaolin.	

* Calcareous

ALTAMONT CLAY
S58Calif-1-4

Location: 700 feet east and 2600 feet south of northwest corner of Section 24 in SE1/4, NW 1/4, Section 24, R. 3 E., T. 2 S., Flynn Ranch, Alameda County, California. On the north side of Altamont Pass Road. Date of Sampling: November 12, 1958.
Description by: R. Ulrich. Collectors: R. E. Nelson, Larry Welch, Robert Mitchel, R. Ulrich.
Classification: Typic Chromoxerert, fine, montmorillonitic, thermic.
Vegetation: Annual bromes (soft chess and ripgut mostly), wild oats, mouse barley, turkey mullein, and tar weed. Present use is annual grass range; may have been cultivated sometime in the past. Climate: Rainfall is 11-12 inches (estimated); mean annual soil temperature about 60° F. Distinct summer-dry, winter-moist Mediterranean type climate. Parent Material: Interbedded calcareous fine grained sandstone and shale. Lime content is mainly weak or slight although thin seams of limestone and other strongly calcareous sediments are often present. Slope: 6-7 percent (estimated), south facing, slightly concave. Elevation: About 450 feet. Drainage: Well drained with slow surface runoff when dry and deeply cracked and slow to medium runoff when moist and expanded during the rainy season. Internal drainage is variable varying from very rapid when dry and deeply cracked during the dry season and for some interval after the start of the rainy season to slow internal drainage when moist and essentially massive following expansion during the rainy season.

HORIZON	DESCRIPTION
A11 BSL No. 591019	0 to 7 inches, dark brown (10YR 3.5/3) clay, darker brown (10YR 3/3) moist, drying to 10YR 5/2 or lighter in the very thin immediate surface crust; strong coarse prismatic and strong coarse and medium angular blocky; very hard, very firm, very plastic, sticky; numerous fine roots tending to concentrate along structure planes and facings, roots appear flattened or compressed; few extremely fine and very fine tubular pores; noncalcareous to dilute acid; reaction not determined in field, see lab data; structure facings have very dark brown to black carbonaceous films and mats on them in places; clear smooth lower boundary.
A12 BSL No. 591020	7 to 18 inches, similar colored clay; strong coarse prismatic and strong coarse angular blocky; very hard, very firm, very plastic, sticky; few fine roots, mostly along structure planes and flattened or compressed; few extremely fine and very fine tubular pores; non-calcareous in most of mass with few white films or small soft white lime segregations in lowest portion of horizon; many slickensides especially in lower portion; clear smooth lower boundary.
A13 BSL No. 591021	18 to 26 inches, similar colored clay with some dark yellowish brown (10YR 3.5/4) mottles, darker yellowish brown (10YR 3/4) moist, and common fine soft to hardened whitish lime segregations and lime films; moderate coarse prismatic and moderate medium blocky; very hard, very firm, very plastic, sticky; few fine roots, mostly along structure faces; few extremely fine and very fine tubular pores; matrix is slightly calcareous, with the lime segregations, nodules, and films strongly calcareous; many slickensides; clear wavy lower boundary.
A14ca BSL No. 591022	26 to 37 inches, dark yellowish brown (10YR 4/4) clay, darker yellowish brown (10YR 3/4) moist, with fine mottlings of 10YR 3.5/3 dry and 3/3 moist and many fine soft to hardened whitish lime segregations, nodules, and films; moderately coarse prismatic and moderate medium blocky; very hard, very firm, very plastic, sticky; few fine roots, mostly along structure planes; few extremely fine and very fine tubular pores; matrix is slightly calcareous, with the lime segregations strongly calcareous; many slickensides; clear smooth lower boundary.
ACca BSL No. 591023	37 to 47 inches, yellowish brown (10YR 5/4) heavy silty clay loam, dark yellowish brown (10YR 4/4) moist, with a few fine soft whitish lime segregations and nodules; weak medium and fine subangular blocky; hard, firm, plastic, slightly sticky; very few fine roots; few extremely fine and very fine tubular pores; matrix is very slightly to slightly calcareous with strong reaction in lime segregations; few slickensides; abrupt smooth lower boundary.
Dr BSL No. 591024	47 inches +, pale olive (5Y 6/3 and 6/4) fine grained sandstone, olive (5Y 5/3 and 5/4) moist, and pale yellow (5Y 8/3 and 8/4) arenaceous limestone, (5Y 7/3 and 7/4) moist, in thin interbedded strata, the sandstone is very weakly calcareous, and the limestone is strongly calcareous; the parent rock is somewhat shattered and fractured but mainly abrupt and continuous beneath this profile.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Chromoxerert, fine, montmorillonitic, thermic
SOIL Canay clay (crusty surface) SOIL Nos. S67Calif-33-1 LOCATION Riverside,County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 6716 - 6724

Depth (cm.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand (Pct. of < 2 mm) Very coarse (2–1)	Sand Coarse (1–0.5)	Sand Medium (0.5–0.25)	Sand Fine (0.25–0.1)	Sand Very fine (0.1–0.05)	Silt 0.05–0.02	Silt Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non carbonate clay	1/ Coarse fragments 1A2a >2 Pct.	2 – 19 Pct. of < 76 mm	19 – 76 Pct. of < 76 mm
0-5	A11	12.8	40.3	46.9	1.5	2.0	1.7	3.2	4.4	23.1	17.2	29.3	8.4	0	47	3	1	2
5-18	A12	12.7	37.9	49.4	1.5	2.0	1.4	2.9	4.9	20.6	17.3	27.2	7.8	0	49	3	2	1
18-36	A13	13.3	38.5	48.2	1.8	2.0	1.3	2.6	5.6	20.6	17.9	27.7	7.7	0	48	5	4	1
36-58	A14	12.7	37.8	49.5	1.3	1.8	1.2	2.7	5.7	19.8	18.0	27.1	7.0	0	50	4	4	-
58-79	A15	12.1	38.4	49.5	1.4	1.9	1.2	2.4	5.2	20.4	18.0	27.0	6.9	0	50	5	4	1
79-110	A16	12.2	38.0	49.8	1.3	1.7	1.1	2.6	5.5	19.0	19.0	25.9	6.7	0	50	2	2	-
110-140	AC	11.1	40.2	48.7	1.0	1.7	1.2	2.9	4.3	16.3	23.9	22.2	6.8	0	49	2	2	-
140-160	C1	51.7	29.5	18.8	1.2	5.6	9.6	23.7	11.6	12.8	16.7	35.9	40.1	0	19	1	1	-
160-225+	C2	69.1	22.9	8.0	0.5	3.5	8.8	40.4	15.9	10.9	12.0	48.7	53.2	0	8	-	-	-

Depth (cm.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6C2b Ext. Iron as Fe Pct.	6E1b Carbonate as $CaCO_3$ Pct.	Bulk density 4A1f 1/3 bar g/cc	4A1h Oven dry g/cc	g/cc	3B2 Cm	Water content Pct.	4B1c 1/3 bar Pct	4B2 15 bar Pct.	4D1 Extensibility LEf Pct	4D1 Extensibility LE Pct.	pH 8C1b Saturated Paste	8C1a H_2O 1:1	8C1a H_2O 1:10
0-5	1.20	0.114	11		-							19.4			7.2		7.9
5-18	0.80	0.074	11		-	1.35	1.83		0.98		29.7	19.4	10.7	10.4	7.3		8.3
18-36	0.57	0.048	12		tr.	1.40	1.84		0.97		27.9	19.7	9.5	9.2	7.7		8.9
36-58	0.50	0.043	12		tr.	1.45	1.95		0.98		27.9	20.2	10.4	10.1	7.7		8.8
58-79	0.50	0.040	12		1	1.45	1.89		0.97		28.3	20.8	9.2	9.0	7.7		8.9
79-110	0.39	0.034	11		1	1.45	1.92		0.99		29.0	21.6	9.8	9.7	7.6		8.8
110-140	0.28	0.026	11		1	1.34	1.81		0.99		34.2	25.0	10.5	10.4	7.6		8.7
140-160	0.17				-	1.40	1.68		0.99		27.5	21.1	6.3	6.2	7.3		8.5
160-225+	0.15				-	1.43	1.62		1.00		28.5	16.0	4.2	4.2	7.1		8.0

Depth (cm.)	Extractable bases 5B1a 6N2e Ca	6O2d Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation exch Capacity 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 8A1 6N1b Ca	6O1b Mg	6P1a Na	6Q1a K		6I1a CO_3	6J1a HCO_3	6K1a Cl	6L1b SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0-5	29.7	12.4	0.5	2.4				42.3										
5-18	31.0	11.6	0.9	1.3				43.3										
18-36	40.7	10.4	1.4	1.0				42.9										
36-58	45.9	10.8	2.3	1.0				44.3	3.1	1.3	4.2	0.1		-	2.9	3.2	2.7	0.87
58-79	41.0	10.2	3.4	1.0				44.0	4.3	1.1	7.5	0.2		-	2.8	9.0	3.5	1.52
79-110	43.2	10.4	4.3	0.9				45.6	8.5	2.7	13.0	0.2		-	2.9	17.5	6.3	2.59
110-140	44.7	11.4	5.2	0.8				52.2	10.5	4.0	15.6	0.8		-	2.3	19.3	8.3	2.94
140-160	39.4	11.0	4.6	0.5				52.5	8.0	2.5	14.8	0.5		-	2.1	17.7	6.9*	2.66
160-225+	31.0	8.5	4.0	0.4				42.7	4.7	1.2	11.4	0.2		-	1.3	13.7	4.1	2.08

Depth (cm.)	8A Water at Saturation Pct.	Exch. bases 5B3b Ca	5B3b Mg	5B1b Na	5D2 Exchangeable Na Pct.	SAR	Gypsum Pct.	Clay mineralogy (<0.002 mm) 3A1 Mont.	Verm.	Mica 7A2	Kaolin.	
		meq./100 g.						X-ray				
0-5								XXXX		tr.	tr.	
5-18												
18-36												
36-58	75.4											
58-79	75.3							XXXX			tr.	
79-110	76.4											
110-140	85.8											
140-160	66.1											
160-225+	58.3							XXXX			tr.	

1/ Coarse fragments from characterization sample (5 kg.).

* Indicator destroyed indicating nitrites.

CAPAY CLAY (Crusty surface)

S67Calif-33-1

Location: Riverside County, California, Section 19, T. 4 S., R. 5 W., SBBM on aerial photo AXM 13K-2.
Date of Sampling: May 5, 1967. Description by: B. R. Brasher.
Classification: Typic Chromoxerert, fine, montmorillonitic, thermic.
Topography: Plane slope, 5 percent, midslope position, aspect ENE.
Collectors: F. F. Peterson, K. W. Flach, W. D. Nettleton and B. R. Brasher.

HORIZON	DESCRIPTION
A11 RSL No. 6716	0 to 5 cm., grayish brown (10YR 5/2) clay, very dark grayish brown (10YR 3/2) moist; moderate, medium subangular blocky structure, common, inclined pressure faces; hard, friable, sticky, plastic; plentiful fine and very fine roots; many fine interstitial exped pores and many fine vesicular inped pores; clear, smooth boundary.
A12 RSL No. 6717	5 to 18 cm., dark grayish brown (10YR 4/2) clay, dark brown (10YR 3/3) moist; moderate, coarse, prismatic, breaking to moderate coarse subangular blocky, common, inclined pressure faces; very hard, firm, sticky, plastic; plentiful fine and very fine roots; common very fine inped pores; clear smooth boundary.
A13 RSL No. 6718	18 to 36 cm., dark grayish brown (10YR 4/2) clay, dark brown (10YR 3/2) moist; moderate, coarse, prismatic breaking to moderate medium, subangular blocky, common, inclined pressure faces; very hard, firm, sticky, plastic; plentiful fine and very fine roots; common very fine inped pores; clear, smooth boundary.
A14 RSL No. 6719	36 to 58 cm., grayish brown (10YR 4/2) clay, very dark grayish brown (10YR 3/2) moist; strong, medium, angular blocky, common intersecting slickensides from 1 to 10 cm. long on ped surfaces; very hard, very firm, sticky, plastic; plentiful fine and very fine mostly exped roots; common fine and very fine inped pores; arbitrary boundary for sampling purposes.
A15 RSL No. 6720	58 to 79 cm., dark grayish brown (10YR 4/2) clay, dark brown (10YR 3/2) moist; strong, medium, angular blocky, common intersecting slickensides from 1 to 10 cm. long on ped surfaces; very hard, very firm, sticky, plastic; plentiful very fine roots; common fine and very fine inped pores; gradual wavy boundary.
A16 RSL No. 6721	79 to 110 cm., dark grayish brown (10YR 4/2) clay, with common medium, distinct olive gray (5Y 5/2) mottles, dark brown (10YR 3/3) and olive (5Y 5/3) moist; strong coarse angular blocky breaking to strong medium angular blocky, many intersecting slickensides from 1 to 10 cm. long on ped surfaces; very hard, very firm, sticky, plastic; common very fine and micro roots concentrated on ped surfaces; common fine and very fine inped pores; diffuse, smooth boundary.
AC RSL No. 6722	110 to 140 cm., dark grayish brown (10YR 4/2) clay with many, medium, distinct, olive (5Y 5/3) mottles, dark brown (10YR 3/3) and olive gray (5Y 5/2) moist; moderate, coarse, angular blocky, common intersecting slickensides from 1 to 10 cm. long on ped surfaces; parallelpipeds present; very hard, very firm, sticky, plastic; very few fine and micro fine roots; few very fine pores; gradual, wavy boundary.
C1 RSL No. 6723	140 to 160 cm., light brownish gray (2.5Y 6/2) clay loam with dark brown (10YR 4/3) tongues of clay and a few 1/8-inch thick dark reddish brown (5YR 3/3) clay loam lamallae, light yellowish brown (2.5Y 6/4), dark yellowish brown (10YR 4/4), and dark reddish brown (5YR 3/3) moist; massive to weak angular blocky; slightly hard, firm, slightly sticky, slightly plastic; very few micro roots; many very fine pores; gradual, wavy boundary.
C2 RSL No. 6724	160 to 225 cm. +, olive (5Y 5/3) sandy loam with a few 1/8-inch thick dark reddish brown (5YR 3/3) clay loam lamallae, olive gray (5Y 5/2) and dark reddish brown (5Y 3/3) moist; massive; slightly hard, friable, nonsticky, nonplastic; very few fine and very fine pores; clear, smooth boundary.

Remarks: Moist when described. Cracks, 3 to 10 mm. in width and 15 to 20 cm. apart, extend from surface downward into the A16 horizon. Self mulching apparently stops at the top of the A16 horizon. Vegetative and rock cover is considerably more sparse than on the smooth surface Porterville. This pedon is located about 200 feet south of S67Calif-33-2.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Chromoxerert, fine, montmorillonitic, thermic

SOIL Capay clay (smooth surface) taxadjunct SOIL Nos. S67Calif-33-2 LOCATION Riverside County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 6725 - 6735

Depth (cm)	Horizon	1B1b Total Sand (2-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Sand (Pct. of <2 mm): Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Silt (Pct. of <2 mm): (0.05-0.02)	Int. III (0.02-0.002)	Int. II (0.2-0.02)	2-0.2			Coarse fragments 1A2a: > 2 Pct. of whole soil	2-19 Pct. of <76mm	19-76 Pct. of <76mm
0-10	A11	22.9	50.0	27.1	2.4	3.4	2.4	5.2	9.5	32.9	17.1	45.2	13.4			23	11	12
10-25	A12	19.2	43.5	37.3	1.9	3.2	2.1	4.0	8.0	27.2	16.3	37.3	11.2			31	7	24
25-36	A13	20.1	39.7	40.2	2.2	3.5	2.0	4.1	8.3	23.4	16.3	33.9	11.8			10	9	1
36-61	A14	18.4	41.4	40.2	2.2	2.9	1.8	4.0	7.5	23.8	17.6	33.5	10.9			5	5	-
61-84	C1ca	19.4	39.1	41.5	2.6	2.8	1.9	4.1	8.0	21.3	17.8	31.7	11.4			6	6	-
84-135	C2	15.0	40.6	44.4	1.4	2.0	1.4	3.1	7.1	19.5	21.1	28.5	7.9			2	2	-
135-150	C3	8.4	44.3	47.3	0.9	1.6	0.8	1.9	3.2	18.9	25.4	23.3	5.2			-	-	-
150-170	C4	7.6	45.0	47.4	0.5	0.9	0.6	1.9	3.7	14.2	30.8	19.1	3.9			-	-	-
170-185	C5	20.8	44.3	34.9	0.7	1.7	2.6	8.7	7.1	12.3	32.0	24.7	13.7			1	1	-
185-225	IIC6	66.1	23.2	10.7	4.0	8.2	13.9	29.9	10.1	8.8	14.4	33.6	56.0			4	4	-
225-260	IIIC7	2.1	57.4	40.5	0.1	0.3	0.3	0.7	0.7	4.1	53.3	5.3	1.4			-	-	-

Depth (cm)	6A1a Organic carbon a/ Pct.	6B1a Nitrogen Pct.	C/N	6C2b Ext. iron as Fe Pct.	Carbonate as $CaCO_3$: 6E1b <2 mm Pct.	3A1a <0.002 mm Pct.	Bulk density: 4A1f 1/3 bar g/cc	4A1h Oven dry g/cc	g/cc	3B2 Cm	Water content: 4B1c 1/3 bar Pct.	4B2 15 bar Pct.	4C1 1/3 to 15 bar cm/cm	4D1 Extensibility COLEf cm/cm	4D1 Extensibility COLE cm/cm	pH: 8C1b Saturated paste	8C1c 1N KCl 1:1	8C1a H_2O 1:1
0-10	1.85	0.171	11		-		1.32	1.55		0.87	22.1	12.2		0.055	0.047	7.1		7.8
10-25	0.78	0.080	10		-		1.46	1.85		0.80	26.2	15.3		0.082	0.064	6.8		7.8
25-36	0.59	0.052	11		tr.		1.55	1.91		0.94	23.3	16.7		0.072	0.067	7.5		8.9
36-61	0.59	0.036	16		4		1.54	1.93		0.97	24.2	16.2		0.078	0.077	7.9		9.3
61-84	0.40	0.028	14		5		1.56	1.91		0.96	24.0	17.4		0.070	0.067	8.0		9.3
84-135	0.32				4		1.52	1.87		0.99	25.3	19.9		0.072	0.071	7.8		9.0
135-150	0.23				2		1.44	1.82		1.00	28.8	23.5		0.081	0.081	7.6		8.7
150-170	0.22				1		1.28	1.76		1.00	38.7	29.3		0.112	0.112	7.6		8.7
170-185	0.13				tr.		1.22	1.64		1.00	39.7	26.3		0.104	0.104	7.4		8.7
185-225	0.10				-		1.53	1.69		0.98	20.6	13.9		0.034	0.033	7.2		8.2
225-260	0.13				-		1.26	1.82		1.00	40.9	37.1		0.130	0.130	7.1		8.1

Depth (cm)	Extractable bases: 6N2e Ca	6O2d Mg	6P2a Na	5B1a 6Q2a K	6H2a Ext. acidity	5A1a CEC NH_4OAc	5D2 Exchangeable Sodium Pct.	5E Sodium adsorption ratio	8A Water at satur. ratio Pct.	Water extract from saturated paste 8A1: 6N1b Ca	6O1b Mg	6P1a Na	6Q1a K	6I1a CO_3	6J1a HCO_3	6K1a Cl	6L1b SO_4	8A1a Electrical conductivity mmho/cm
	meq/100 g									meq/liter								
0-10	16.8	5.6	0.4	1.9		24.6												
10-25	20.2	8.6	0.8	1.2		30.8												
25-36	28.6	8.4	1.6	0.8		32.2												
36-61	29.8	7.8	2.8	0.6		30.6		6	63.6	1.0	0.4	4.6	0.1	-	3.8	1.4	1.7	0.68
61-84	31.5	7.8	4.0	0.6		30.7		8	70.9	1.3	0.4	6.9	0.1	-	3.1	3.3	3.9	1.01
84-135	34.2	9.1	5.9	0.6		36.7		9	80.2	6.0	2.1	17.4	0.2	-	2.0	20.4	10.3	3.17
135-150	42.1	12.8	8.1	0.8		47.9		7	88.9	23.5	8.8	27.2	0.5	-	1.8	23.9	44.2	5.51
150-170	51.2	14.1	8.6	0.8		53.0		7	93.3	26.2	9.6	30.8	0.3	-	1.9	23.6	48.8	5.65
170-185	47.5	15.2	8.8	0.9		58.8		7	85.4	26.2	9.7	30.8	0.3	-	1.7	21.6	52.9	5.77
185-225	22.3	9.1	5.0	0.3		35.7		9	51.2	4.1	1.7	16.1	0.1	-	1.3	13.0	11.3	2.53
225-260	42.2	17.0	10.8	1.1		66.2		9	110.7	7.0	3.4	19.9	0.2	-	0.9	16.8	15.3 b/	3.17

Depth (cm)	Ratios to clay 8D1: CEC NH_4OAc	Ext. iron	15 bar water	Salt Pct.	6F1a Gypsum Pct.	c/ Clay fraction mineralogy 3A1: 7A2 X-ray d/	7A3 DTA Pct.
0-10	0.91		0.45			MT4, MI3, KK1	
10-25	0.83		0.41				
25-36	0.80		0.42				
36-61	0.76		0.42			MT5, MI2, KK1	
61-84	0.74		0.42				
84-135	0.83		0.45			MT5, MI2, KK1	
135-150	1.01		0.50		tr.		
150-170	1.12		0.62		tr.		
170-185	1.68		0.75		tr.		
185-225	3.34		1.30			MT5, KK1	
225-260	1.63		0.92				

a/ 8.8 kg of organic carbon per square meter to a depth of 1 meter

b/ Indicator destroyed indicating nitrites

c/ Mineral code
- MT = montmorillonite
- MI = mica
- KK = kaolinite

d/ Approximate weight fraction (X-ray)
- 5 = more than half
- 4 = one-third to half
- 3 = one-fifth to one-third
- 2 = one-twentieth to one-fifth
- 1 = less than one-twentieth

CAPAY CLAY (Smooth surface) (taxadjunct) 1/
S67Calif-33-2

Location: Riverside County, California. Sec. 19, T. 4 S., R. 5 W., SBBM on aerial photo AXM 13K-2.
Date of Sampling: May 5, 1967.
Description by: B. R. Brasher. Collectors: B. R. Brasher, F. F. Peterson, K. W. Flach, and W. D. Nettleton.
Classification: Typic Chromoxerert, fine, montmorillonitic, thermic.
Vegetation: Red brome, soft chess, sawtooth goldenbush, bunchgrass, wild mustard, needlegrass, and occasional bunches of wild buckwheat. Climate: Average annual precipitation 12 inches; average annual temperature 64° F. Parent Material: Soft marine sandstone and shale. Topography: East northeast-facing, 5 percent slope, rolling uplands. Elevation: 1,770 feet. Drainage: Well drained. Remarks: Moist when described. A crack, 1 cm. in width, begins in the C1 and extends downward to near the bottom of the C2. Many 1-2 cm.^{2} ped surfaces are either slickensides or pressure faces. Rocks may be concentrated on the surface (1 to 5 cm. in diameter) especially when this soil occurs adjacent to the crusty surface Capay. This pedon is located about 200 feet north of S67Calif-33-1.

HORIZON	DESCRIPTION
A11 RSL No. 6725	0-4 in., (0-10 cm.), dark brown (10YR 4/3) light clay loam, dark brown (10YR 3/2) moist; moderate, medium, subangular blocky structure; hard (dry), friable (moist), slightly sticky and slightly plastic (wet); plentiful fine and very fine roots; common fine and many very fine pores; 13 percent gravel by volume; clear, smooth boundary.
A12 RSL No. 6726	4-10 in., (10-25 cm.), dark brown (10YR 4/3) gravelly heavy silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium prisms breaking to moderate medium and fine subangular blocks; few pressure faces; slightly hard (dry), friable (moist), sticky and plastic (wet); few fine and plentiful very fine roots; common very fine and micro pores; 20 percent gravel by volume; clear, smooth boundary.
A13 RSL No. 6727	10-14 in., (25-36 cm.), dark brown (10YR 4/3) light clay, dark reddish brown (5YR 3/2) moist; moderate, medium, angular blocky structure; few pressure faces; slightly hard (dry), friable (moist), sticky and plastic (wet); plentiful fine and micro roots; common very fine and micro pores; 6 percent gravel by volume; gradual, wavy boundary.
A14 RSL No. 6728	14-24 in., (36-61 cm.), dark yellowish brown (10YR 4/4) silty clay, dark reddish brown (5YR 3/3) moist; weak medium, prisms breaking to moderate, medium, angular blocks; few horizontal and vertical nonintersecting slickensides; hard (dry), firm (moist), sticky and plastic (wet); plentiful fine and micro roots; common very fine and micro pores; strongly effervescent; 3 percent gravel by volume; gradual, wavy boundary.
C1ca RSL No. 6729	24-33 in., (61-84 cm.), dark brown (10YR 4/3) light clay, with common, fine distinct dark brown (7.5YR 3/2) mottles, dark brown (7.5YR 3/2) and dark reddish brown (5YR 3/4) moist; moderate coarse prisms breaking to moderate coarse angular blocks; few intersecting slickensides inclined 10 to 60° from horizontal; very hard (dry), very firm (moist), sticky and plastic (wet); few very fine and micro roots; common very fine and micro pores; strongly effervescent; 4 percent gravel by volume; gradual, wavy boundary.
C2 RSL No. 6730	33-53 in., (84-135 cm.), dark brown (10YR 4/3) silty clay with few to common fine distinct dark brown (7.5YR 3/2) mottles, brown (7.5YR 3/2) and dark reddish brown (5YR 3/4) moist; moderate very coarse blocks breaking to moderate coarse angular blocks; few intersecting slickensides inclined 10 to 60° from horizontal; hard (dry), firm (moist), sticky and plastic (wet); few very fine and micro roots; few to common very fine and micro pores; strongly effervescent; 1 percent gravel by volume; gradual, wavy boundary.
C3 RSL No. 6731	53-59 in., (135-150 cm.), dark brown (7.5YR 4/2) silty clay with few to common fine distinct olive (5Y 5/4) mottles, dark reddish brown (5YR 3/4) and olive (5Y 5/4) moist; moderate, coarse, angular blocky structure; few intersecting slickensides inclined 10 to 60° from horizontal; hard (dry), firm (moist), sticky and plastic (wet); few and common very fine and micro pores; strongly effervescent; clear, irregular boundary.
C4 RSL No. 6732	59-66 in., (150-170 cm.), olive (5Y 4/3) silty clay with many, distinct brown (7.5YR 4/4) mottles or concentrations of C3 material, olive (5Y 5/4) and dark yellowish brown (10YR 4/4) moist; moderate medium to coarse angular blocky structure; few intersecting slickensides inclined 10 to 60° from horizontal on ped faces ranging in size from 2 to 10 cm.; hard (dry), firm (moist), sticky and plastic (wet); common very fine and micro pores, slightly effervescent; clear, smooth boundary.
C5 RSL No. 6733	66-73 in., (170-185 cm.), pale olive (5Y 6/3) clay loam with many fine and medium distinct dark brown (10YR 4/3) and pale yellow (5Y 7/3) mottles, olive (5Y 5/4), dark yellowish brown (10YR 3/4) and pale yellow (5Y 7/3) moist; moderate, medium blocks breaking to fine angular blocks; few pressure faces; hard (dry), firm (moist), slightly sticky and slightly plastic (wet); few very fine and micro pores; slightly effervescent; clear smooth boundary.
IIC6 RSL No. 6734	73-88 in., (185-225 cm.), light yellowish brown (10YR 6/4) fine sandy loam mixed with pale yellow (5Y 6/4) sandy loam and containing strong brown (7.5YR 5/6) 3 mm. to 16 mm. thick coarse sand and fine gravel strata and olive (5Y 5/4) clay tongues, brownish yellow (10YR 6/6) mixed with pale yellow (5Y 6/4) and containing strong brown (7.5YR 5/8) strata and olive (5Y 5/4) clay tongues moist; massive; slightly hard (dry), friable (moist), nonsticky and nonplastic (wet); common very fine and micro pores; noneffervescent; 2 percent gravel by volume; abrupt smooth boundary.
IIIC7 RSL No. 6735	88-103 in., (225-260 cm.), olive (5Y 5/3) silty clay, olive gray (5Y 4/2) moist; a few fine streaks less than 3 mm. dark brown (7.5YR 4/3) are contained in the horizon; moderate coarse angular blocks breaking to fine angular blocks; common intersecting slickensides on ped faces; hard (dry), firm (moist), very sticky and very plastic (wet); few fine and micro pores; noneffervescent.

1/ The Capay series is in a fine, montmorillonitic, thermic family of Typic Chromoxererts. This pedon is in the same family but its dark reddish brown surface horizon is redder than typical for the series.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Chromoxerert, fine, montmorillonitic, thermic
SOIL Capay clay SOIL Nos. S64Calif-48-2 LOCATION Solano County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64418 - 64426

Depth (in.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt (0.05–0.02)	Silt: Int. III (0.02–0.002)	Int II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Noncarbonate clay	Coarse fragments 1A2a: ≥ 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76 mm	
0-5	Ap	4.3	42.0	53.7	0.1	0.2	0.4	1.2	2.4	11.7	30.3	14.9	1.9			0		
5-21	A12	3.2	42.0	54.8	0.1	0.1	0.2	0.9	1.9	10.2	31.8	12.7	1.3			0		
21-32	A13	3.8	45.5	50.7	0.3	0.3	0.2	0.9	2.1	11.5	34.0	14.2	1.7			0		
32-40	AC	3.5	51.3	45.2	tr.	0.1	0.1	1.0	2.3	11.9	39.4	14.9	1.2			0		
40-50	C1	7.0	55.1	37.9	tr.	0.1	0.1	3.2	3.6	15.5	39.6	21.3	3.4			0		
50-62	C2	7.8	54.0	38.2	tr.	tr.	0.2	2.8	4.8	14.7	39.3	21.4	3.0			0		
62-81	C3	25.9	38.1	36.0	0.3	2.1	6.1	11.1	6.3	12.0	26.1	23.7	19.6			0		
81-88	C4	59.1	16.8	24.1	0.1	2.8	21.7	29.2	5.3	6.3	10.5	21.6	53.8			0		
88-102	IIC5	82.3	4.3	13.4	tr.	3.2	44.7	32.0	2.4	1.9	2.4	12.2	79.9			0		

Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven dry	Bulk density: g/cc	3B2 Cm	Water content: Pct.	Water content: 4B1c 1/3 bar	Water content: 4B2 15 bar	4D1 Extensibility COLEf	4D1 Extensibility COLE	pH: 8C1b Saturated Paste	pH: 8C1a H_2O 1:1	pH: 8C1a H_2O 1:10
	Pct.	Pct.		Pct.	Pct.	g/cc	g/cc			Pct.	Pct.	Pct.	in./in.	in./in.			
0-5	1.09	0.103	11	1.9	-							19.5					
5-21	0.79	0.078	10	1.9	tr.	1.51	1.95		1.00		26.0	19.7	0.090	0.090		7.1	7.7
21-32	0.52	0.057	9	2.1	1	1.49	1.89		1.00		25.9	20.4	0.083	0.083		7.9	8.6
32-40	0.30			2.1	tr.							19.0				8.4	9.1
40-50	0.24			2.0	tr.	1.52	1.78		1.00		24.9	19.1	0.054	0.054		8.3	9.1
50-62	0.23			1.9	-							18.3				8.3	9.0
62-81	0.11			1.4	1	1.62	1.81		1.00		21.5	16.6	0.038	0.038		8.2	8.9
81-88	0.09			1.0	1							10.7				8.2	9.2
88-102	0.07			0.6	-							6.3				8.3	8.9
																8.1	8.1

Depth (in.)	Extractable bases 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	5B1a Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A2a NaOAc	Cation Exch. Capacity: 5A1a NH_4OAc	Water extract from saturated paste 6N1b Ca	6O1b Mg	6P1a Na	6Q1a K		8A1 6I1a CO_3	6J1a HCO_3	6K1a Cl	6L1a SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0-5	19.7	19.8	1.2	0.7	41.4		43.0		1.1	1.0	2.6	0.1		-	1.8	0.8		0.48
5-21	25.4	17.3	1.6	0.5	44.8		42.4		0.8	0.8	3.6	0.1		-	3.2	0.2		0.50
21-32	25.6	18.2	3.6	0.4	47.8		42.5		0.8	0.6	9.3	0.1		-	3.4	0.6		0.78
32-40	23.3	14.8	4.4	0.4	42.9		40.1		2.8	0.6	8.5	0.2		-	3.4	0.6	5.9	1.08
40-50	19.8	13.4	5.1	0.3	38.6		37.6		1.1	1.1	11.0	0.2		-	3.6	0.6	7.6	1.22
50-62	18.8	13.0	5.9	0.3	38.0		36.9		1.9	2.1	15.2	0.3		-	2.7	0.4	15.6	1.79
62-81	18.5	11.2	5.2	0.3	35.2		33.3		3.0	2.0	17.9	0.3		-	2.2	0.6	19.8	2.18
81-88	16.3	7.8	3.3	0.3	27.7		22.6		1.2	1.6	15.9	0.3		-	2.6	0.9	16.3	1.94
88-102	5.4	4.1	1.7	0.2	11.4		12.5		2.6	0.6	8.5	0.4		-	1.6	0.6	7.9	1.04

Depth (in.)	8A Water at Saturation	Exch. bases 5B3b Ca	5B3b Mg	5B1b Na	5D2 Exchangeable Na	5E SAR	Gypsum	Atterberg limits: Plastic limit	Liquid limit	Plastic index
	Pct.	meq./100 g.			Pct.		Pct.	Pct. of <0.4 mm.		
0-5	53.9			1.1	3	3				
5-21	53.7			1.4	3	4		28	49	21
21-32	55.0			3.1	7	11				
32-40	54.7			4.0	10	7				
40-50	59.8			4.4	12	10				
50-62	56.4			5.0	14	11				
62-81	52.3			4.3	13	11		14	45	31
81-88	43.1			2.6	12	13				
88-102	37.0			1.4	11	7				

CAPAY CLAY
S64Cal-48-2

Location: A pit in milo field 2½ miles NE of Elmira on Hawkins Road, 200 feet east and 50 feet north of the SW corner of Sec. 16, T6N, R1E, MDB&M, Solano County, California. Date of Sampling: October 6, 1964.
Description by: Grant Kennedy, Wells Andrews, Sam Johnson. Collectors: Reuben Nelson, Benny Brasher, Grant Kennedy, Wells Andrews, Leland Bates, Sam Johnson.
Classification: Typic Chromoxerert, fine, montmorillonitic, thermic. 1/
Vegetation: Cultivated - milo stubble. Climate: Average annual precipitation - 20 inches. Mean annual temperature - 60 degrees F. Parent Material: Alluvium from sedimentary rocks of the Coast Ranges. Topography: Nearly level basin or basin rim with a slope of less than 1 percent. Elevation: 47 feet. Drainage: Very slow runoff, slow permeability, and imperfect drainage. The water table was deeper than 102 inches. Soil Moisture: Dry to 12 inches and moist from 12 to 108 inches.
Remarks: Field pH determined by Hellige-Truog method; Paired profile No. 64 Cal 57-13 (1-5); Diagnostic horizon and features: Mollic epipedon, extensive vertical cracking, prominent and distinct slickensides in the lower A horizons.

HORIZON	DESCRIPTION
Ap RSL 64418	0 to 5 inches, dark grayish brown (10YR 4/2) clay, very dark grayish brown (10YR 3/2) when moist; 1 to 2 inches of strong medium granular over strong coarse prismatic structure; very firm, sticky, very plastic; abundant very fine and fine random roots; common micro tubular pores; slightly acid (pH 6.5); clear and smooth boundary.
A12 RSL 64419	5 to 21 inches, dark gray (10YR 4/1) clay, very dark grayish brown (10YR 3/2) with few, fine, prominent strong brown (7.5YR 5/6) mottles when moist; strong very coarse prismatic structure; very hard, very firm, sticky, very plastic; abundant very fine and few fine random roots; common micro tubular pores; neutral (pH 7.0); strongly effervescent fine soft masses of line in lower four inches; clear and wavy boundary.
A13 RSL 64420	21 to 32 inches, brown (10YR 5/3) clay, dark brown (10YR 3/3) moist; strong coarse prismatic structure; very hard, very firm, sticky, very plastic; abundant micro and very fine random roots; common micro tubular pores; moderately alkaline (pH 8.0); strongly effervescent fine soft masses of lime; prominent slickensides; clear and wavy boundary.
AC RSL 64421	32 to 40 inches, brown (10YR 5/3) clay, dark yellowish brown (10YR 4/4) with dark brown (10YR 3/3) ped faces when moist; moderate medium prismatic structure; hard, firm, sticky, very plastic; few micro and very fine random roots; many micro tubular pores; moderately alkaline (pH 8.0); slightly effervescent fine soft masses of line; distinct slickensides; gradual and smooth boundary.
C1 RSL 64422	40 to 50 inches, pale brown (10YR 6/3) clay, dark yellowish brown (10YR 4/4) with dark brown (10YR 3/3) ped faces when moist; massive breaking to weak coarse angular blocky structure; hard, firm sticky, very plastic; very few micro and very fine random roots; many micro tubular pores; moderately alkaline (pH 8.0); very slightly effervescent fine soft masses of lime; diffuse boundary.
C2 RSL 64423	50 to 62 inches, yellowish brown (10YR 5/6) clay with few, fine, distinct strong brown (&.5YR 5/6) mottles; dark yellowish brown (10YR 4/4) with dark brown (10YR 3/3) ped faces and few, fine, faint yellowish brown (10YR 5/6) mottles when moist; massive breaking to weak fine and medium angular blocky structure; hard, firm, sticky, very plastic; no roots; many micro tubular pores; moderately alkaline (pH 8.0); very slightly effervescent fine soft masses of lime; diffuse boundary.
C3 RSL 64424	62 to 81 inches, pale brown (10YR 6/3) clay with few, fine, distinct strong brown (7.5YR 5/6) mottles; dark yellowish brown (10YR 4/4) with brown (10YR 4/3) ped faces and few, fine, faint yellowish brown (10YR 5/6) mottles when moist; massive breaking to fine and medium angular blocky structure; hard, firm, sticky, very plastic; no roots; many micro tubular pores; moderately alkaline (pH 8.0); very slightly effervescent fine soft masses of lime; common Fe and Mn concretions; clear and smooth boundary.
C4 RSL 64425	81 to 88 inches, pale brown (10YR 6/3) clay loam with common, medium, distinct reddish yellow (7.5YR 6/6) mottles; dark yellowish brown (10YR 4/4) with brown (10YR 4/3) ped faces and common, medium, distinct strong brown (7.5YR 5/6) mottles when moist; massive breaking to weak fine and medium angular block structure; hard, firm, sticky, plastic; no roots; many micro and few very fine interstitial pores; moderately alkaline (pH 8.0); very slightly effervescent fine soft masses of lime; clear and wavy boundary.
II C5 RSL 64426	88 to 102 inches, yellowish brown (10YR 5/4) loamy sand, dark yellowish brown (10YR 4/4) when moist; massive; slightly effervescent fine soft masses of lime.

1/ Mottles in this pedon resulted from rice culture and are disregarded in the classification of the pedon.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Chromoxerert, fine, montmorillonitic, thermic
SOIL Capay clay SOIL Nos. S64Calif-57-13 LOCATION Yolo County, California
SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64413 - 64417

Depth (In.)	Horizon	1B1b Total: Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Size class and particle diameter (mm) 3A1 Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	Coarse fragments 1A2a: ≥ 2 Pct.	2 – 19	19 – 76 Pct. of < 76 mm
		Pct. of < 2 mm																
0-11	Ap	8.0	46.4	45.6	0.2	0.4	0.8	3.1	3.5	12.6	33.8	18.0	4.5			0		
11-18	A12	9.4	47.7	42.9	0.1	0.4	0.8	3.4	4.7	12.4	35.3	19.3	4.7			0		
18-36	A13	7.3	41.0	51.7	tr.	0.2	0.7	2.7	3.7	10.1	30.9	15.6	3.6			0		
36-49	ACca	6.4	42.8	50.8	tr.	0.2	0.5	2.3	3.4	9.9	32.9	14.9	3.0			0		
49-65+	C1	5.0	49.0	46.0	tr.	0.2	0.4	1.8	2.6	12.1	36.9	15.9	2.4			0		

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. Iron as Fe Pct.	6E1b Carbonate as $CaCO_3$ Pct.	Bulk density: 4A1f 1/3 bar g/cc	4A1h Oven dry g/cc	g/cc	3B2 Cm	Pct.	Water content: 4B1c 1/3 bar Pct.	4B2 15 bar Pct.	4D1 Extensibility COLE in./in.	4D1 Extensibility COLE in./in.	pH: 8C1b Saturated Paste	8C1a H_2O 1:1	8C1a H_2O 1:10
0-11	1.16	0.102	11	1.7	-	1.45	1.82		1.0		24.3	16.9	0.078	0.078		7.2	7.8
11-18	0.59	0.066	9	1.8	-	1.53	1.87		1.0		23.4	17.2	0.070	0.070		7.0	7.8
18-36	0.53	0.057	9	2.1	-	1.52	1.94		1.0		25.6	19.1	0.084	0.084		7.4	8.2
36-49	0.43			2.0	tr.	1.57	1.92		1.0		24.6	19.1	0.070	0.070		8.0	8.5
49-65+	0.31			2.0	tr.	1.55	1.89		1.0		24.6	18.8	0.068	0.068		8.2	8.8

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 8A1: 6N1b Ca	6O1b Mg	6P1a Na	6Q1a K		6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0-11	13.5	19.6	1.0	0.8	34.0		33.9		0.6	1.6	2.8	0.2		-	1.5	1.2		0.44
11-18	13.4	17.7	1.2	0.4	32.7		33.4		0.3	0.8	2.1	0.1		-	0.5	1.1		0.33
18-36	17.2	20.0	2.1	0.4	39.7		42.2		0.5	0.5	2.4	0.1		-	1.0	0.7		0.34
36-49	18.5	20.0	2.9	0.5	41.9		39.8		0.6	0.6	4.8	0.1		-	2.3	0.5		0.67
49-65+	17.2	17.0	3.6	0.4	38.2		38.0		0.5	0.6	5.8	0.1		-	2.4	1.0		0.72

Depth (In.)	8A Water at Saturation Pct.	Atterberg limits (Pct. of <0.4 mm): Plastic limit	Liquid limit	Plastic index	5D2 Exchangeable Na Pct.	5E SAR	5B1b Exchangeable Na meq/100 g	Clay mineralogy (<0.002 mm) 7A1: Mont.	Verm.	Mica	Kaolin.	X-ray 7A2
0-11	49.8	24	41	17	2	3	0.8					
11-18	44.0				3	3	1.1	xxxx	-	-	xx	
18-36	50.2	24	47	23	5	3	2.0					
36-49	53.4				7	6	2.7					
49-65+	50.6	22	51	29	9	8	3.3	xxxx	-	-	xx	

\- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

CAPAY CLAY
S 64Cal-57-13

Location: Yolo County, California. A pit located 100 feet south of the NE corner of NW ¼ SW ¼ of Sec. 2, T.9N., R.1E., 10 miles west of Woodland. Photo ABB-5K-171. Date of Sampling: September 28, 1964.
Description by: C. B. Goudey. Collectors: R. E. Nelson, B. R. Brasher, G. M. Kennedy, W. F. Andrews, L. A. Bates. G. S. Staidl, C . B. Goudey.
Classification: Typic Chromoxerert, fine, montmorillonitic, thermic. 1/
Vegetation: Sudan grass. Climate: 16 inches average annual precipitation and mean annual temperature of 61°F. Parent Material: Alluvium from sedimentary rocks. Topography: Basin rim; plane; less than one percent; field was leveled (very slight cuts and fills). Elevation: 140 feet. Drainage: Runoff is slow; Permeability is slow. Soil Moisture: Profile moist throughout below 5 inches.
Remarks: (1) Truog and Thymol blue field pH determination; (2) Paired Sample No. 64 Cal. 48-2-1 through 9 ; (3) Diagnostic features- clay content greater than 30 percent, intersecting slickensides, and a Ca horizon; (4) Soil temperature-Ap-32.5°C; A12-30°C; A13-28°C; ACca-25°C; C1-23°C; (5) Mottling in A horizon is due to previous rice culture; (6) B.P.R. samples taken from the Ap, A13 and C horizons.

HORIZON	DESCRIPTION
Ap RSL 64413	0 to 11 inches, grayish brown (2.5Y 5/2) clay with common fine faint mottles of brown (7.5YR 5/4),very dark grayish brown (2.5Y 3/2) with common fine distinct mottles of brown to dark brown (7.5YR 4/4) when moist; moderate very coarse prismatic structure; hard, very firm, sticky and very plastic; plentiful micro to very fine and few fine random roots; common micro vesicular and interstitial pores; moderately alkaline (pH 8.0); clear smooth boundary.
A12 RSL 64414	11 to 18 inches, grayish brown (2.5Y 5/2) clay with common fine distinct mottles of yellowish brown (10YR 5/6), very dark grayish brown (2.5Y 3/2) with common fine distinct mottles of brown to dark brown (10YR 4/3) moist; moderate very coarse prismatic structure; very hard, very firm, sticky and very plastic; plentiful micro to very fine random roots; common micro tubular pores; mildly alkaline (pH 7.5); gradual wavy boundary.
A13 RSL 64415	18 to 36 inches, dark grayish brown (2.5Y 4/2) clay, very dark grayish brown (2.5Y 3/2) when moist; moderate very coarse prismatic structure; very hard, very firm, sticky and very plastic; few micro to very fine random roots; common micro tubular pores; many prominent intersecting slickensides; moderately alkaline (pH 8.0); clear wavy boundary.
ACca RSL 64416	36 to 49 inches, grayish brown (10YR 5/2) clay, dark grayish brown (2.5Y 4/2) with very dark grayish brown (2.5Y 3/2) when moist (probably due to organic staining along cracks); massive; very hard, very firm, sticky and very plastic; few micro to very fine random roots; common micro tubular pores; many prominent intersecting slickensides; moderately alkaline (pH 8.2), strongly effervescent, lime occurs in concretions; gradual wavy boundary.
C1 RSL 64417	49 to 64 inches, pale brown (10YR 6/3) clay, brown to dark brown (10YR 4/3); massive; very hard, very firm, sticky and plastic; few micro random roots; common micro tubular pores; many prominent intersecting slickensides; moderately alkaline (pH 8.3); effervescent disseminated lime.

1/ Mottles in this pedon resulted from rice culture and are disregarded in the classification of the pedon.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Clear Lake clay **LOCATION** Sonoma County, California

SOIL FAMILY: Typic Pelloxerert, fine, montmorillonitic, thermic.

SOIL NOS. S61Calif-49-9 **LAB. NOS.** 61446 - 61453

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	3A1 0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0- 1	Ap1	0.2	0.6	1.1	5.5	5.5	36.1	51.0	20.6	24.7	0	c
1- 7	Ap2	0.2	0.7	1.3	6.4	5.7	35.8	49.9	21.8	24.1	0	c
7-25	A11g	0.1	0.5	1.0	4.8	5.5	35.7	52.4	20.6	24.0	0	c
25-40	A12g	0.2	0.5	1.1	4.8	5.7	34.5	53.2	20.1	23.5	0	c
40-48	ACg	0.4	1.3	1.6	5.5	6.0	33.5	51.7	20.2	23.0	0	c
48-54	C1g	0.7	1.0	1.0	3.2	4.0	37.7	52.4	14.6	29.3	0	c
54-77	C2g	1.8	2.2	1.8	12.6	10.8	37.1	33.7	33.9	22.9	2	cl
77-87	C3g	0.8	1.4	1.3	22.0	19.0	27.1	28.4	49.8	13.7	1	cl-scl

8C1b SATURATED PASTE 1:1	pH 1:5	8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	SATURATION EXTRACT SOLUBLE 6P1a Na^+	6Q1a K^+	6N1a Ca^{++}	6O1a Mg^{++}	6K1a Cl^-	6I1a $CO_3^=$	8A1 6J1a HCO_3^-
						← milliequivalents per liter →						
6.0		6.9	1.30	0.094	14	1.3	0.1	1.7	2.5	1.9	-	2.3
5.8		6.9	1.04	0.083	13	0.8	0.1	0.6	0.8	0.4	-	1.3
6.3		7.3	0.68	0.054	13	1.3	<0.1	0.3	0.5	1.1	-	1.6
7.8		8.9	0.55	0.046	12	3.3	<0.1	0.6	1.0	4.1	-	9.9
8.1		9.1	0.40	0.034	12	11.8	0.1	1.7	3.7	9.1	-	4.0
8.0		8.9	0.22	0.026		19.1	0.1	3.6	8.4	19.2	-	2.9
8.0		9.0	0.06			16.5	0.2	3.3	7.1	18.7	-	0.6
8.0		9.0	0.05			4.9	0.1	1.9	3.6	10.6	-	2.7

5A2a CATION EXCHANGE CAPACITY (Na)	EXTRACTABLE CATIONS 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	5B Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	milliequivalents per 100g. soil →	5D1 EXCH. Na %	8A1a Elec. Conduc. mmhos/cm. at 25°C.	6E1b $CaCO_3$ Equivalent Pct.	Ext. Iron 6C1b % Fe	4B2 Soil water 15 atmos. Pct.	8A MOISTURE AT SATURATION %
53.6	22.3	26.0	5.6	0.4	0.7		1	0.3		0.3	22.3	73.2
53.2	19.6	20.1	6.0	0.5	0.4		1	0.2		0.3	23.2	68.5
55.0	22.2	26.1	3.4	0.9	0.4		2	0.3	tr.	0.3	23.4	72.0
53.8	26.3	30.3	-	2.6	0.4		5	0.4	1	0.3	23.9	76.6
51.5	24.5	29.5	-	1.6	0.4		3	0.6	4	0.2	22.9	75.5
47.6	21.2	27.8	-	1.3	0.5		3	0.8	4	0.4	23.3	79.7
33.0	18.2	18.4	-	2.9	0.4		9	0.5	6	0.3	15.9	50.4
29.9	18.2	15.6	-	2.3	0.4		8	0.2	4	0.3	13.9	51.5

CLEAR LAKE CLAY
S61Calif-49-9

Location: Sonoma County, California. Matteri Ranch. NW 1/4, SW1/4, section 26, T. 5 N., R. 7 W., projected. From the junction of East Washington Street with Ely Road, 4000 feet due southeast on Ely Road, thence 880 feet due southwest along Homestead Road and into pastured field, 30 feet northwest of field boundary fence (on southerly side of field). (Site spotted on photo No. CSH-1BB-163). Date of Sampling: June 26, 1961.
Collectors: Reuben Nelson, Leo C. Klameth, V. C. Miller, G. Lambert, J. H. Kashiwagi, F. Graham.
Classification: **Typic Pelloxerert, fine, montmorillonitic, thermic.**

Vegetation: Annual grasses and forbs (before cultivation). Use: Oat hay. Climate: About 25 inches rainfall, average temperature 57.5° F., January temperature 46.7° F., July temperature 66.3° F. Parent Material: Mixed alluvium. Elevation: About 43 feet. Relief: Flat basin, on 1 percent slope. Drainage: Poorly drained, slow runoff, very slow permeability. Biological Activity: No worm or rodent activity apparent at this time of year.

HORIZON	DESCRIPTION
Ap1 RSL No. 61446	0 to 1 inches, dark gray (N 4/) clay, very dark gray (10YR 3/1) when moist; very fine and fine granular structure; very hard when dry, extremely firm when moist, sticky and very plastic when wet; abundant very fine and fine roots; medium acid, pH 6.0; abrupt, wavy boundary.
Ap2 * RSL No. 61447	1 to 7 inches, very dark gray (N 3/) clay, black (10YR 2/1) with dark grayish brown (2.5Y 4/2) blotches when moist; massive; very hard when dry, extremely firm when moist, sticky and very plastic when wet; abundant very fine and fine roots; many very fine and fine tubular and interstitial pores; medium acid, pH 6.0; clear, wavy boundary.
A11g RSL No. 61448	7 to 25 inches, very dark gray (N 3/) clay with common fine distinct mottles of gray (N 6/) when dry; black (N 2/) with a few scattered blotches of dark grayish brown when moist; hard when dry, extremely firm when moist, sticky and very plastic when wet; abundant very fine and fine roots; common very fine tubular pores; neutral, pH 7.0; few slickensides; gradual, smooth boundary; few segregated lime blotches.
A12g RSL No. 61449	25 to 40 inches, dark gray (N 4/) clay with common fine distinct light gray (2.5Y 7/2) mottles when dry, black (N 2/) with common fine distinct light gray mottles of lime; massive; extremely hard when dry, extremely firm when moist, sticky and very plastic when wet; plentiful very fine roots; common very fine and fine tubular concretions; evidence of vertical cracking from surface down, streaks of lighter color in old cracks; moderately alkaline, pH 8.0; gradual, smooth boundary; lime is segregated.
ACg RSL No. 61450	40 to 48 inches, gray (N 5/) clay with many medium distinct light gray (N 7/) lime blotches, very dark gray (10YR 3/1) when moist; massive; extremely hard when dry, extremely firm when moist, sticky and very plastic when wet; few fine and very fine roots; common very fine and fine tubular pores; slickensides; segregated lime blotches; fragments of black A horizon churned in throughout; mildly alkaline, pH 7.5 - 8.0; gradual, wavy boundary.
C1g RSL No. 61451	48 to 54 inches, light olive gray (5Y 6/2) clay with many medium distinct white (5Y 8/1) lime blotches, olive gray (5Y 4/2) when moist; massive; very hard when dry, very firm when moist; sticky and very plastic when wet; few very fine and fine roots; common very fine and fine interstitial and tubular pores; slickensides; segregated lime blotches oriented horizontally; moderately alkaline, pH 8.0; clear, wavy boundary.
C2g * RSL No. 61452	54 to 77 inches, light olive gray (5Y 6/2) clay, dark grayish brown (2.5Y 4/2) when moist; massive; very hard when dry, very firm when moist, sticky and very plastic when wet; few fine and very fine roots; many fine and very fine tubular pores; slickensides numerous; common medium lime nodules, segregated; moderately alkaline, pH 8.0; clear, wavy boundary.
C3g RSL No. 61453	77 to 87 inches, light olive gray (5Y 6/2) fine sandy clay loam with common fine distinct light gray (5Y 7/1) lime blotches, olive gray (5Y 5/2) when moist; massive; very hard when dry, firm when moist, sticky and plastic when wet; common very fine and fine tubular pores; violent effervescence, lime not segregated; moderately alkaline, pH 8.0.

* Horizons sampled for B.P.R.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Clear Lake clay **LOCATION** Sonoma County, California

SOIL FAMILY: Typic Pelloxerert, fine, montmorillonitic, thermic.

SOIL NOS. S61Calif-49-10 **LAB. NOS.** 61454 - 61462

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2	
0- 2	Ap1	0.1	0.7	1.8	8.6	5.3	34.3	49.2	22.5	22.5	0	c
2- 8	Ap2	0.1	0.9	1.8	8.0	5.4	34.2	49.6	16.9	27.7	0	c
8-25	A11g	0.2	0.7	1.9	8.5	5.3	33.6	49.8	21.8	22.5	0	c
25-39	A12g	0.1	0.7	1.7	8.3	5.8	33.4	50.0	22.0	22.5	0	c
39-46	ACg	0.1	0.7	1.6	8.2	5.8	34.7	48.9	23.6	22.1	0	c
46-52	C1g	0.3	0.8	2.5	10.1	7.5	34.5	44.3	26.2	22.0	0	c
52-60	C2	0.7	2.2	6.9	23.8	10.2	27.8	28.4	37.1	14.8	0	cl
60-72	C3	1.8	5.8	16.4	36.8	9.6	15.3	14.3	35.2	7.2	4	fsl
72-84	IIC4	12.3	16.6	21.1	24.9	4.8	10.7	9.6	19.8	5.1	61	cosl-lcos

	pH		ORGANIC MATTER			SATURATION EXTRACT SOLUBLE						8A1
8C1b SATURATED PASTE 1:1	1:5	8C1a 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6P1a Na^+	6Q1a K^+	6N1a Ca^{++}	6O1a Mg^{++}	6K1a Cl^-	6I1a $CO_3^=$	6J1a HCO_3^-
						← milliequivalents per liter →						
5.6		6.6	1.02	0.079	13	1.2	0.1	1.2	1.4	1.5	-	1.4
5.3		6.7	0.98	0.086	11	0.9	-	0.4	0.8	0.3	-	2.1
5.5		6.9	0.80	0.060	13	1.5	-	0.4	0.5	0.4	-	1.2
6.5		7.5	0.79	0.052	15	4.5	-	1.2	1.3	3.9	-	1.8
7.4		8.1	0.50	0.030	17	10.4	0.1	4.1	5.4	15.1	-	2.8
7.7		8.4	0.24			12.0	0.1	5.4	6.6	20.7	-	2.1
7.8		8.7	0.07			11.1	0.1	4.9	5.8	19.2	-	1.9
7.5		7.4	0.04			8.0	0.1	1.8	2.6	11.1	-	1.0
7.3		7.1	0.05			8.3	0.1	2.0	1.9	10.6	-	1.1

5A2a	EXTRACTABLE CATIONS					5B	5D1	8A1a	6E1b	6C1b	4B2		8A
CATION EXCHANGE CAPACITY (+ Na)	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a		EXCH. Na %	Elec. Conduc. mmhos/cm. at 25° C.	$CaCO_3$ equivalent %	Ext. Iron % Fe.	Soil water 15 atmos. Pct.		MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →												
50.0	21.9	19.4	7.4	0.4	0.3		1	0.4	-	0.4	20.6		61.3
51.0	21.5	19.3	7.2	0.5	0.2		1	0.2	-	0.3	21.9		59.0
51.4	21.7	20.2	6.0	1.2	0.2		2	0.2	-	0.4	21.9		62.4
51.5	22.6	21.4	3.1	2.0	0.2		4	0.8	tr.	0.3	25.3		72.6
50.3	22.8	22.7	1.2	2.3	0.3		5	2.1	tr.	0.3	25.6		81.6
41.9	21.1	20.3	-	2.1	0.3		5	2.7	1	0.3	22.3		67.4
28.6	18.9	13.6	-	2.4	0.3		8	2.5	2	0.2	14.8		51.5
15.5	7.1	7.2	-	0.9	0.2		6	1.5	tr.	0.3	6.9		33.1
12.7	5.5	5.1	0.9	0.8	0.1		6	1.3	-	0.4	5.1		22.9

CLEAR LAKE CLAY
S61Calif-49-10

Location: Sonoma County, California. Dangers Ranch - Ely Road, 1/2 mile southeast of junction with Corona Road. NW1/4, NW1/4, section 21, T. 5 N., R. 7 W., projected. Date of Sampling: June 27, 1961.
Collectors: Reuben Nelson, Leo C. Klameth, V. C. Miller, G. Lambert, J. H. Kashiwadi, F. Graham.
Classification: **Typic Pelloxerert, fine, montmorillonitic, thermic.**

Vegetation: Annual grasses, forbs and scattered oak (before cultivation). Use: Oat hay. Climate: About 25 inches rainfall, average temperature 57.5° F., January temperature 46.7° F., July temperature 66.3° F. Parent Material: Mixed alluvium. Elevation: About 39 feet. Relief: Flat basin on 1 percent slope. Drainage: Poorly drained, slow runoff, very slow permeability. Biological Activity: No worm or rodent activitiy apparent at this time of the year.

HORIZON	DESCRIPTION
Ap1 RSL No. 61454	0 to 2 inches, dark gray (N 4/) clay, very dark gray (10YR 3/1) when moist; fine and medium granular structure; extremely hard when dry, very firm when moist, sticky and plastic when wet; abundant very fine and fine roots; medium acid, pH 6.0; clear, wavy boundary.
Ap2 * RSL No. 61455	2 to 8 inches, dark gray (N 4/) clay, very dark gray (10YR 3/1) when moist; massive breaking to coarse subangular blocks; very hard when dry, very firm when moist, sticky and plastic when wet; abundant very fine and fine roots; many fine and micro pores; medium acid, pH 6.0; clear, wavy boundary.
A11g RSL No. 61456	8 to 25 inches, dark gray (N 4/) clay, black (10YR 2/1) when moist, massive; extremely hard when dry, extremely firm when moist, sticky and plastic when wet; abundant very fine and fine roots; common very fine and fine tubular pores; slickensides; medium acid, pH 6.0; gradual, smooth boundary.
A12g RSL No. 61457	25 to 39 inches, dark gray (N 4/) clay with common fine distinct light gray (2.5Y 7/2) lime spots when dry; black (10YR 2/1) when moist, massive; extremely hard when dry, extremely firm when moist, sticky and plastic when wet; abundant very fine and fine roots; common very fine tubular pores; slickensides; quarter inch vertical cracks; part of this horizon has lime blotches; moderately alkaline, pH 8.0; gradual, smooth boundary.
ACg RSL No. 61458	39 to 46 inches, dark gray (N 4/) and gray (N 5/) clay, with common fine distinct light gray (2.5Y 7/2) lime specks when dry; black (10YR 2/1) when moist; extremely hard when dry, extremely firm when moist, very sticky and plastic when wet; plentiful very fine and micro roots; common very fine interstitial pores; slickensides; part of horizon has lime blotches; moderately alkaline, pH 8.0; gradual, smooth boundary.
C1g RSL No. 61459	46 to 52 inches, gray (N 5/) clay with common fine distinct light gray (2.5Y 7/2) lime specks when dry, very dark grayish brown (10YR 3/2) when moist; massive; very hard when dry, extremely firm when moist, very sticky and very plastic when wet; plentiful very fine and fine roots; common very fine and fine tubular pores; slickensides; occasional lime blotches; moderately alkaline, pH 8.0; gradual, smooth bounday.
C2 RSL No. 61460	52 to 60 inches, light brownish gray (2.5Y 6/2) clay, dark grayish brown (2.5Y 4/2) when moist; massive; hard when dry, extremely firm when moist, sticky and plastic when wet; few very fine roots; common very fine and fine tubular pores; slickensides, some coated with lime; large scattered lime blotches; a few shot sized (iron and manganese) concretions; moderately alkaline, pH 8.0; clear, smooth boundary.
C3 * RSL No. 61461	60 to 72 inches, mixed light gray (10YR 7/2) and white (10YR 8/2) sandy clay, light olive gray (5Y 6/2) when moist; massive; slightly hard when dry, firm when moist, slightly sticky, slightly plastic when wet; few fine tubular and common very fine and fine interstitial pores; many moderately thick clay films in pores; disseminated lime throughout horizon; weak effervescense; frequent shot sized (iron and manganese) concretions; moderately alkaline, pH 8.0; abrupt, wavy boundary.
IIC4 RSL No. 61462	72 to 84 inches, mixed light brownish gray (10YR 6/2) and white (10YR 8/2) gravelly sand (fine gravel) with common fine distinct very dark gray (10YR 3/1) (manganese) stains when dry, light yellowish brown (2.5Y 6/4) when moist; massive; loose when dry, slightly firm when moist, nonsticky and nonplastic when wet; many very fine and fine interstitial pores; intermittent very weak cementation; moderately alkaline, pH 8.0.

* Horizons sampled for B.P.R.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Diablo clay (taxadjunct) **LOCATION** San Luis Obispo Co.

SOIL FAMILY: Typic Pelloxerert, fine, montmorillonitic, thermic.

SOIL NOS. S55Cal. 40-2 **LAB. NOS.** 55455-458

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	2A2 > 2	TEXTURAL CLASS
0- 1	Ap1	2.2	1.6	1.0	4.3	2.3	31.2	57.4	13.1	23.2	5	c
1- 4	Ap2	2.7	1.2	0.9	4.1	2.4	30.3	58.4	13.6	21.9	4	c
4-20	A_{13}	1.6	1.9	1.3	4.8	2.6	29.5	58.3	14.2	21.1	4	c
20-27	AC	3.9	3.5	1.9	7.5	5.9	26.0	51.3	19.4	17.8	9	c

8C1b SATURATED PASTE 1:1	pH 8C1a 1:5	8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC x 10³ MILLIMHOS PER CM @25°C.	$CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 4B2 1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
6.4		7.3	1.69	0.101	16.7							25.3
6.3		7.5	1.39	0.092	15.1							25.1
6.6		7.9	1.23	0.077	16.0							25.6
7.0		8.4	0.96	0.069	13.9							25.3

5A2a CATION EXCHANGE CAPACITY ← Na →	EXTRACTABLE CATIONS 5B 5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	BASE SAT. % 5C3	SATURATION EXTRACT SOLUBLE Na	K	MOISTURE AT SATURATION %
	← milliequivalents per 100g. soil →						← milliequivalents per liter →		
71.3	53.4	12.5	7.2	1.2	0.4	90			
71.4	52.2	13.4	6.8	0.9	0.3	91			
72.8	48.8	19.2	5.7	0.8	0.3	92			
77.0	57.0	14.4	5.0	0.8	0.3	94			

DIABLO CLAY (taxadjunct) 1/
S55Calif-40-2

Location: About 1.31 miles N.N.E. of farm buildings on George Mello farm, San Luis Obispo County, California. On aerial photograph AXH-4F-148.

Collectors: W. M. Johnson, Rudolph Ulrich, Lewis Leifer, W. G. Harper, L. R. Wohletz, J. M. Williams. Samples taken September 7, 1955. Description by W. M. Johnson.

Classification: Typic Pelloxerert, fine, montmorillonitic, thermic.

Elevation: About 330 feet.

Vegetation: Cultivated field. In small-grain stubble at time of sampling.

Relief: Hilly, eroded, residual upland. Slope about 5 percent, plane, toward the north.

Drainage: Well drained. Runoff is medium; permeability is slow.

Parent material: Weathered shale of the San Luis Obispo formation.

Remarks: Classified as Grumusol. Depth to bedrock varies from about 24 to about 46 inches in this field. When dry, the soil surface has cracks in a polygonal pattern, 12 to 18 inches in diameter, with cracks about 1½ inches wide and 10 to 20 inches deep. pH's were measured in the field with Truog Triplex indicator.

Sample numbers: S55Cal-40-2-1 through 4.

HORIZON		DESCRIPTION
A_{p1}	0-1"	Very dark gray to dark gray (10YR 3.5/1, dry; 3/1, moist) clay. Strong coarse, medium and fine granular. Extremely hard, very firm, very plastic, very sticky. pH 6.5. Abrupt, smooth boundary.
A_{p2}	1-4"	Very dark gray (10YR 3/1, moist) clay. Moderate medium and coarse blocky. Extremely hard, very firm, very plastic, very sticky. pH 6.5. Gradual, wavy lower boundary.
A_{13}	4-20"	Very dark gray (10YR 3/1, moist) clay. Weak medium and coarse blocky with vertical cracks about 12 inches apart. Extremely hard, very firm, very plastic, very sticky. Many slickensides. (No apparent clay skins). pH 6.5 - 6.8. Gradual, wavy lower boundary.
AC	20-27"	Very dark gray (10YR 3/1, moist) clay. Weak very coarse blocky to massive, with few vertical cracks and numerous slickensides. Very firm, very plastic, very sticky. Numerous small hard fragments of shale. pH 6.5 - 6.8. Abrupt, wavy lower boundary.
D_r	27"+	Dark grayish brown (10YR 4/2, moist) shattered, hard siliceous (?) shale. Black films on the surfaces. Some clayey material in interstices in upper part.

1/ The Diablo series is in a fine, montmorillonitic, thermic family of Chromic Pelloxererts. This pedon is less than 40 inches deep and has chromas of 1 throughout.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Pelloxerert, fine, montmorillonitic, thermic

SOIL Willows clay SOIL Nos. S64Calif-57-14 LOCATION Yolo County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64548 - 64556

Depth (in.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	Coarse fragments 1A2a: ≥ 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76 mm	
0-9	Ap	2.2	42.1	55.7	tr.	0.3	0.3	0.6	1.0	8.1	34.0	9.4	1.2			0		
9-12	A12	2.1	41.4	56.5	0.1	0.3	0.2	0.6	0.9	6.9	34.5	8.1	1.2			0		
12-19	A13	2.2	42.0	55.8	0.1	0.3	0.3	0.7	0.8	5.8	36.2	7.0	1.4			0		
19-30	AC	1.6	50.0	48.4	0.2	0.3	0.2	0.3	0.6	4.0	46.0	4.8	1.0			0		
30-40	C1	4.3	55.0	40.7	0.6	1.1	0.5	0.8	1.3	5.8	49.2	7.5	3.0			0		
40-55	C2	7.9	58.2	33.9	0.6	0.9	0.4	0.8	5.2	15.5	42.7	21.2	2.7			0		
55-66	C3	4.7	51.3	44.0	0.5	1.0	0.6	0.9	1.7	3.6	47.7	5.8	3.0			0		
66-74	C4	2.3	39.9	57.8	0.1	0.4	0.4	0.6	0.8	2.1	37.8	3.2	1.5			0		
74-82	C5	7.8	48.3	43.9	0.2	0.3	0.4	2.7	4.2	8.0	40.3	14.1	3.6			0		

Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$	6E1c Clay size carbonate	Bulk density: 4A1f 1/3 bar	Bulk density: 4A1h Oven dry	3B2 Cm	Water content: 4B1c 1/3 bar	Water content: 4B2 15 bar	4D1 Extensibility COLE	4D1 Extensibility COLE	pH: 8C1b Saturated Paste	pH: 8C1a H_2O 1:1	pH: 8C1a H_2O 1:10
	Pct.	Pct.		Pct.	Pct.	Pct.	g/cc	g/cc	g/cc	Pct.	Pct.	Pct.	in./in.	in./in.			
0-9	0.55	0.066	8	1.6	tr.		1.59	2.08		1.00		24.5	18.6	0.095	0.095		8.3	9.0
9-12	0.74	0.065	11	1.6	tr.		1.58	2.06		1.00		25.6	18.7	0.092	0.092		8.3	9.2
12-19	0.63	0.062	10	1.4	2		1.54	2.02		1.00		26.7	19.3	0.094	0.094		8.6	9.6
19-30	0.36	0.049	7	1.6	2		1.41	1.81		1.00		32.5	25.6	0.087	0.087		8.9	9.9
30-40	0.28			1.7	7	tr.	1.43	1.72		1.00		31.5	22.8	0.063	0.063		9.1	9.9
40-55	0.26			1.6	4		1.51	1.61		1.00		24.3	22.8	0.022	0.022		9.0	9.9
55-66	0.30			1.8	5	tr.	1.37	1.61		1.00		32.9	24.1	0.054	0.054		8.9	9.9
66-74	0.38			1.5	1		1.34	1.69		1.00		36.1	25.8	0.081	0.081		8.7	9.7
74-82	0.23			1.6	tr.								20.8				8.6	9.5

Depth (in.)	Extractable bases: 6N2a Ca	6O2a Mg	6P2a Na	5B1a 6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 8A1: 6N1b Ca	6O1b Mg	6P1a Na	6Q1a K		6I1a CO_3	6J1a HCO_3	6K1a Cl	6L1a SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0-9	16.7	19.0	4.9	0.7	41.3		36.6		2.1	2.6	13.8	0.2		-	3.2	4.0	12.5	1.98
9-12	16.9	20.0	6.3	0.8	44.0		38.0		1.0	1.6	12.8	tr.		-	3.0	3.1	9.9	1.67
12-19	19.8	19.5	9.4	0.8	49.5		34.6		0.6	1.0	18.6	0.1		-	5.2	3.7	11.3	2.05
19-30	9.4	16.5	14.8	0.4	41.1		30.4		0.4	0.3	19.4	0.1		1.0	4.4	3.9	10.4	2.06
30-40	6.7	13.4	16.9	0.5	37.5		26.7		0.5	0.6	25.6	0.1		1.8	4.3	5.7	15.8	1.78
40-55	7.2	12.8	14.0	0.2	34.2		25.3		0.5	0.7	30.0	0.2		1.6	3.9	7.6	19.6	3.29
55-66	8.0	15.6	19.0	0.3	42.9		32.4		0.6	1.0	31.0	0.1		0.6	4.2	9.2	18.7	3.26
66-74	11.6	19.6	19.3	0.4	50.9		38.6		0.4	0.8	25.1	0.1		-	4.1	7.9	15.1	2.81
74-82	7.6	15.5	14.5	0.4	38.0		31.9		1.0	0.2	23.7	0.1		-	3.6	7.1	14.0	2.58

Depth (in.)	8A Water at Saturation	Exch. bases: 5B3b Ca	5B3b Mg	5B1b Na	5D2 Exchangeable Na	5E SAR	Gypsum	Clay mineralogy (<0.002 mm. X-ray 7A): Mont.	Verm.	Mica	Kaolin.
	Pct.	meq./100 g.			Pct.		Pct.				
0-9	63.6			4.0	10	9					
9-12	75.1			5.4	14	11					
12-19	79.1			8.0	23	21					
19-30	118.6			12.5	41	32					
30-40	118.1			13.9	52	34					
40-55	100.7			11.0	43	39					
55-66	111.1			15.5	48	35					
66-74	117.2			16.4	42	32					
74-82	94.4			12.3	39	31					

WILLOWS CLAY
S64Calif-57-14

Location: Yolo County, California. A pit located about 150 feet northeast of the southwest corner of Sec. 32, T.12N., R.1E. Area located about 3 miles north of Zamora. Photo ABB-42T-23. Date of Sampling: September 30, 1964.
Description by: George J. Staidl. Collectors: R. E. Nelson, B. R. Brasher, G. M. Kennedy, W. F. Andrews, L. A. Bates, G. J. Staidl, C. B. Goudey.
Classification: Typic Pelloxerert, fine, montmorillonitic, thermic.
Vegetation: Fallow at the time of sampling. Climate: Average annual precipitation is 15 inches; mean annual temperature 62°F. Parent Material: Fine textured alluvium from sedimentary rocks. Topography: Basin; plane; less than one percent slope. Elevation: 28 feet above sea level. Drainage: Runoff is slow; permeability is slow; drainage class is poorly drained altered to somewhat poorly drained; ground water table was at 66 inches. Soil Moisture: The profile was moist below 4 inches.
Remarks: (1) Thymol blue used in field pH determinations. (2) Paired Sample No. 64 Cal. 57-15. (3) Diagnostic horizon - Mollic epipedon. (4) More than 30 percent clay; soil too wet to observe slickensides. (5) Soil temperature at about 10"-27°C; 16"-22.5°C.; 25"-22.0°C.; 35"-21.5°C.; 48"-21.0°C.; 60"-21.0°C.; 70"-20.5°C.; 78"-20.5°C. (6) Soil temperature taken in C5 horizon or at 78 inches was taken in the water. (7) The A12 horizon 9-12 inches is probably a plow pan. (8) The A13 (12-19 inches) and AC (19-30 inches) horizons have some fine manganese shot.

HORIZON	DESCRIPTION
Ap RSL 64557	0 to 9 inches, gray (5Y 5/1) clay with common fine distinct mottles of brown to dark brown (7.5YR 4/4),very dark gray (5Y 3/1) and olive gray (5Y 4/2) with common fine distinct mottles of brown to dark brown (10YR 4/3) moist; moderate coarse prismatic structure; hard, extremely firm, sticky and very plastic; very few, very fine and fine random roots; common micro tubular pores; moderately alkaline (pH 8.3); clear wavy boundary.
A12 RSL 64558	9 to 12 inches, gray (5Y 5/1) clay with few, fine distinct yellowish brown (10YR 5/8) mottles, very dark gray (5Y 3/1) and olive gray (5Y 4/2) with few fine distinct brown to dark brown (10YR 4/3) mottles moist; moderate coarse prismatic structure; hard, extremely firm, sticky and very plastic; very few, very fine to fine random roots; common micro tubular pores; very slightly effervescent disseminated lime; strongly alkaline (pH 8.6); clear wavy boundary.
A13 RSL 64559	12 to 19 inches, gray (5Y 5/1) clay with few,fine distinct yellowish brown (10YR 5/8) mottles, olive gray (5Y 4/2) with few, fine distinct brown to dark brown (10YR 4/3) mottles moist; massive; extremely hard, very firm, sticky and very plastic; very few, very fine to fine random roots; common micro tubular pores; strongly effervescent disseminated and segregated lime in soft masses; strongly alkaline (pH 8.8); gradual wavy boundary.
AC RSL 64560	19 to 30 inches, light olive gray (5Y 6/2) clay, with common fine distinct yellowish brown (10YR 5/6) mottles, dark grayish brown (2.5Y 4/2) with common fine distinct dark yellowish brown (10YR 4/4) mottles moist; massive; extremely hard, very firm, sticky and plastic; very few, very fine to fine random roots; common micro and few very fine tubular pores; strongly effervescent disseminated lime, strongly alkaline (pH 8.8); gradual wavy boundary.
C1 RSL 64561	30 to 40 inches, mottled light olive gray (5Y 6/2), light yellowish brown (2.5Y 6/4), and yellowish brown (10YR 5/6) clay, mottled olive gray (5Y 5/2), olive (5Y 4/3), and dark grayish brown (2.5Y 4/2) moist; massive; very hard, very firm, sticky and very plastic; common micro and few very fine tubular pores; strongly effervescent disseminated lime; strongly alkaline (pH 8.8); diffuse boundary.
C2 RSL 64562	40 to 55 inches, mottled olive gray (5Y 5/2), light yellowish brown (2.5Y 6/4) and strong brown (7.5YR 5/8) clay, mottled olive (5Y 4/4), dark grayish brown (2.5Y 4/2) and brown to dark brown (10YR 4/3) moist; massive; hard, firm, sticky and very plastic; common micro and few very fine tubular pores; strongly effervescent disseminated lime; strongly alkaline (pH 8.8); gradual irregular boundary.
C3 RSL 64563	55 to 66 inches, mottled pale olive (5Y 6/4), light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/6) clay, mottled dark grayish brown (2.5Y 4/2) and brown to dark brown (7.5YR 4/4) moist; massive; hard, firm, sticky and very plastic; many micro and few fine tubular pores; strongly effervescent disseminated lime; strongly alkaline (pH 8.8); clear wavy boundary.
C4 RSL 64564	66 to 74 inches, light gray to gray (5Y 6/1) clay, with many fine prominent yellowish brown (10YR 5/6) mottles, dark greenish gray (5GY 4/1) with many fine prominent dark reddish brown (2.5YR 3/4) mottles moist; massive; hard, friable, sticky and very plastic; many micro and few fine tubular pores; strongly effervescent disseminated and segregated lime in soft masses; strongly alkaline (pH 8.6); clear irregular boundary.
C5 RSL 64565	74 to 82 inches, light olive gray (5Y 6/2) clay, with many fine and medium prominent yellowish brown (10YR 5/8) mottles, olive gray (5Y 5/2) with many fine and medium prominent dark yellowish brown (10YR 4/4) mottles moist; massive; hard, firm, sticky and very plastic; many micro and few fine tubular pores; strongly effervescent disseminated and segregated lime in soft masses; strongly alkaline (pH 8.6).

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Typic Pelloxerert, very-fine, montmorillonitic, thermic

SOIL Willows clay (taxadjunct) SOIL Nos. S64Calif-57-15 LOCATION Yolo County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 64557 - 64563

Depth (in.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt: 0.05–0.02	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	1A2a Coarse fragments ≥ 2 Pct.	2 – 19 Pct. of ≤ 76 mm	19 – 76 Pct. of ≤ 76 mm
		Pct. of ≤2 mm																
0–4	Ap	1.0	36.3	62.7	0.1	0.1	0.1	0.3	0.4	2.8	33.5	3.5	0.6			0		
4–13	A12	1.0	34.3	64.7	tr.	0.1	0.1	0.4	0.4	2.1	32.2	2.7	0.6			0		
13–28	A13	1.6	35.2	63.2	tr.	0.2	0.3	0.6	0.5	2.1	33.1	2.9	1.1			0		
28–38	A14	1.9	36.5	61.6	tr.	0.3	0.3	0.6	0.7	2.6	33.9	3.6	1.2			0		
38–48	AC	1.8	38.2	60.0	0.1	0.3	0.3	0.5	0.6	3.4	34.8	4.3	1.2			0		
48–61	C1	2.2	40.1	57.7	0.1	0.4	0.3	0.6	0.8	4.9	35.2	6.0	1.4			0		
61–72	C2	3.3	41.0	55.7	0.5	0.6	0.4	0.6	1.2	6.4	34.6	7.9	2.1			0		

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. Iron as Fe Pct.	6E1b Carbonate as $CaCO_3$ Pct.	Bulk density 4A1f 1/3 bar g/cc	Bulk density 4A1h Oven dry g/cc	Bulk density g/cc	3B2 cm	Water content Pct.	Water content 4B1c 1/3 bar Pct.	4B2 15 bar Pct.	4D1 Extensibility COLE in./in.	4D1 Extensibility COLE in./in.	pH 8C1b Saturated Paste	pH 8C1a H_2O 1:1	pH 8C1a H_2O 1:10
0–4	1.92	0.162	12	1.9	-							21.3				6.6	7.1
4–13	1.34	0.121	11	1.9	-	1.44	1.90		1.00		28.5	21.5	0.099	0.099		6.7	7.6
13–28	0.86	0.077	11	1.7	1	1.54	2.00		1.00		26.6	21.0	0.091	0.091		8.4	9.5
28–38	0.73	0.067	11	1.7	1	1.45	1.94		1.00		28.5	21.3	0.103	0.103		8.7	9.7
38–48	0.61	0.059	10	1.8	1	1.45	1.93		1.00		27.8	21.7	0.100	0.100		8.5	9.7
48–61	0.48			1.6	2	1.49	1.94		1.00		27.8	20.1	0.092	0.092		8.8	9.7
61–72	0.40			1.6	2	1.53	1.97		1.00		25.5	19.3	0.089	0.089		8.6	9.6

Depth (in.)	Extractable bases 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	5B1a Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 6N1b Ca	6O1b Mg	6P1a Na	6Q1a K	6I1a CO_3	6J1a HCO_3	6K1a Cl	6L1a SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter								mmho/cm
0–4	17.1	24.6	1.1	1.4	44.2		47.3		2.6	4.7	3.4	0.4	-	1.4	3.0	5.8	1.04
4–13	17.2	25.0	1.2	0.9	44.3		46.9		0.9	1.4	2.6	0.1	-	1.0	0.8	2.7	0.50
13–28	16.9	28.7	6.0	0.5	52.1		42.4		0.3	0.9	9.9	0.1	-	6.1	0.5	2.8	0.96
28–38	15.0	27.7	8.9	0.5	52.1		40.1		0.4	0.8	13.1	tr.	0.6	5.2	1.4	5.7*	1.34
38–48	14.8	27.1	9.4	0.5	51.8		38.2		0.6	0.7	13.0	0.1	0.8	5.1	1.0	6.0*	1.35
48–61	12.4	26.2	7.5	0.5	46.6		37.6		0.5	0.6	13.4	tr.	-	5.1	2.8	5.2*	1.36
61–72	12.5	25.7	8.2	0.5	46.9		35.4		0.4	0.6	13.8	tr.	-	4.2	2.3	6.6	1.46

Depth (in.)	8A Water at Saturation Pct.	Atterberg limits Plastic limit	Atterberg limits Liquid limit	Atterberg limits Plastic index	5D2 Exchangeable Na Pct.	5E SAR	5B1b Exchangeable Na meq/100 g	Clay mineralogy (<0.002 mm.) 7A2 Mont.	Verm.	Mica	Kaolin.	X-ray 7A2
		Pct. of <0.4 mm.										
0–4	73.9	30	68	38	2	2	0.8					
4–13	72.7				2	2	1.0					
13–28	71.4	24	65	41	12	13	5.3	xxxx	-	tr.	xx	
28–38	86.3				19	17	7.8					
38–48	89.9				21	16	8.2					
48–61	80.9				17	18	6.4					
61–72	82.4	21	66	45	20	19	7.1	xxxx		tr.	xx	

* Nitrites detected

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

WILLOWS CLAY (taxadjunct) 1/
S64Calif-57-15

Location: Yolo County, California. A pit located in the center of southwest ¼ of Sec. 31. T.1ON., R.2E., 3 1/4 miles east of Woodland. Photo ABB-41T-68. Date of Sampling: October 2, 1964.
Description by: C. B. Goudey Collectors: R. E. Nelson, B. R. Brasher, G. M. Kennedy, W. F. Andrews, L. A. Bates, G. J. Staidl, C. B. Goudey.
Classification: Typic Pelloxerert, very-fine, montmorillonitic, thermic.
Vegetation: Safflower stubble. Climate: 17.3 inches average annual precipitation and mean annual temperature of 61°F. Parent Material: Mixed fine alluvium. Topography: Basin; plane; less than one percent. Elevation: 24 feet. Drainage: Runoff-slow; permeability-slow: altered drainage class (Soil formed under poor drainage, presently imperfectly drained). Soil Moisture: Profile was moist throughout below 13 inches.
Remarks: (1) Truog and Thymol Blue field pH determinations. (2) Paired profile 64 Cal. 57-14. (3) Diagnostic features -- Mollic epipedon; natric horizon; profile more than 30 percent clay; many prominent intersecting slickensides. (4) Soil temperature-Ap-19°C, A12-20°C, A13-20°C, A14-19.7°C, AC-19.5°C, C1-19°C, C2-19°C. (5) BPR samples taken from the Ap, A13, and C2 horizons. (6) Very few pores in upper portion of A12 horizon. It has the appearance of a plow pan. (7) The C1 and C2 horizons were too moist to show structure in place but break out in the structure described.

HORIZON	DESCRIPTION
Ap RSL 64548	0 to 4 inches, gray (5Y 5/1) clay with many fine distinct strong brown (7.5YR 5/6) mottles, very dark gray (5Y 3/1) with many fine distinct yellowish brown 10YR 5/6) mottles when moist; granular structure; extremely hard, very firm, sticky and very plastic; plentiful micro and very fine roots; many micro tubular pores; neutral (pH 7.0); abrupt smooth boundary.
A12 RSL 64549	4 to 13 inches, gray (5Y 5/1) clay with many fine distinct strong brown (7.5YR 5/6) mottles, very dark gray (5Y 3/1) with many fine distinct yellowish brown (10YR 5/6) mottles when moist; strong very coarse prismatic structure; extremely hard. very firm, sticky and very plastic; abundant micro and very fine exped and plentiful micro inped roots; few micro tubular pores; many prominent intersecting slickensides; mildly alkaline (pH 7.5); clear smooth boundary.
A13 RSL 64550	13 to 28 inches, olive gray (5Y 4/2) clay, very dark gray (5Y 3/1) when moist; strong very coarse prismatic structure; very hard, very firm, sticky and very plastic; plentiful micro roots; many micro and common very fine tubular pores; many prominent intersecting slickensides; slightly effervescent segregated lime in soft masses; strongly alkaline (pH 8.8); diffuse boundary.
A14 RSL 64551	28 to 38 inches, olive gray (5Y 4/2) clay, very dark gray (5Y 3/1) when moist; strong coarse prismatic structure; very hard, very firm, sticky and very plastic; few micro roots; many micro and few fine tubular pores; many prominent intersecting slickensides; slightly effervescent disseminated lime; strongly alkaline (pH 9.0); clear smooth boundary.
C1ca RSL 64552	38 to 48 inches, olive gray (5Y 5/2) clay, olive gray (5Y 4/2) when moist; moderate coarse prismatic structure; very hard, very firm, sticky and very plastic; very few micro roots; many micro tubular pores; many prominent intersecting slickensides; strongly effervescent disseminated lime; strongly alkaline (pH 8.8); diffuse boundary.
C2 RSL 64553	48 to 61 inches, olive gray (5Y 5/2) clay, olive gray (5Y 4/2) when moist; moderate coarse prismatic structure; hard, very firm, sticky and very plastic; many micro tubular pores; many prominent intersecting slickensides; slightly effervescent disseminated lime; strongly alkaline (pH 8.7); diffuse boundary.
C3 RSL 64554	61 to 72 inches, olive gray (5Y 5/2) clay, olive gray (5Y 4/2) when moist; weak medium prismatic structure; hard, very firm, sticky and very plastic; many micro tubular pores; many prominent intersecting slickensides; slightly effervescent disseminated lime; strongly alkaline (pH 8.6)

1/ The Willows series is in a fine, montmorillonitic, thermic family of Typic Pelloxererts. This pedon has more than 60 percent clay.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Chromic Pelloxerert, fine, montmorillonitic, mesic

SOIL Pit silty clay (taxadjunct) SOIL Nos. S54Calif-18-3 LOCATION Lassen County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 54305 - 54310

Depth (In)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand (Pct. of < 2 mm): Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1		2A2 Coarse fragments: > 2 Pct.	2 – 19 (Pct. of < 76 mm)	19 – 76 (Pct. of < 76 mm)
0-6	A1p	7.6	44.6	47.8	0.6	1.2	0.8	2.7	2.3	6.8	37.8		5.3			0		
6-21	A12	5.5	32.4	62.1	0.0	0.4	0.3	1.8	3.0	8.4	24.0		2.5			0		
21-36	B2	6.5	29.0	64.5	0.6	0.8	1.0	2.2	1.9	15.2	13.8		4.6			0		
36-44	B3	25.8	30.6	43.6	0.0	3.1	4.0	7.3	11.4	12.3	18.3		14.4			0		
44-60	C1	21.7	39.4	38.9	6.7	3.3	1.9	3.3	6.5	13.8	25.6		15.2			0		
60-94	C2	47.4	41.6	11.0	0.1	0.5	0.9	17.7	28.2	19.1	22.5		19.2			0		

Depth (In.)	6A1a Organic carbon Pct	6B1a Nitrogen Pct.	C/N		6E1b Carbonate as $CaCO_3$ Pct.		Bulk density g/cc	g/cc	g/cc		Water content: Pct.	Pct.	4B2 15 bar Pct.			pH: 8C1b Sat. Paste	8C1a 1:10
0-6	2.84	0.195	14.6		-								31.3			7.8	8.3
6-21	1.15	0.071	16.2		1								32.6			8.4	9.2
21-36	0.82	0.056	14.6		2								38.5			8.5	9.3
36-44	0.18				6								25.4			7.2	9.2
44-60	0.12				2								25.3			8.0	9.2
60-94	0.05				1								15.2			7.9	8.6

Depth (In.)	Extractable bases: 5B1a Ca 6N2b	5B1a Mg 6O2c	5B1b Exch. Na 6P2a	5B1b Exch. K 6Q2a	Sum of bases	5A2a CEC NaOAc			Water extract from saturated paste: 6N1a 6O1a Ca + Mg		6P1a Na	6Q1a K				8A1: CO_3	HCO_3	Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter											mmho/cm
0-6	20.4	18.4	20.3	3.2	62.3	62.6			46.1		235.0	2.8								16.30
6-21	22.5	18.0	18.3	1.2	60.0	57.2			0.7		35.5	0.4								3.63
21-36	23.0	27.2	26.0	1.2	77.4	66.6			0.6		14.0	0.1								1.38
36-44	21.9	22.6	11.1	0.7	56.3	44.9			0.4		10.6	0.1								1.05
44-60	34.9	22.5	8.1	0.7	66.2	49.8			0.3		8.7	0.1								0.94
60-94	23.3	13.2	2.0	0.4	38.9	33.1			1.6		4.2	0.1								0.65

Depth (In.)	8A Water at Saturation Pct.	5D1 Exchangeable Na Pct.		6F1a Gypsum Pct.			
0-6	96.7	32		tr.			
6-21	158.3	32		-			
21-36	219.6	39		-			
36-44	74.9	25		-			
44-60	70.4	16		-			
60-94	45.3	6		-			

PIT SILTY CLAY (taxadjunct) 1/
S54Calif-18-3

Location: Lassen County, California, in Honey Lake Valley SCD on John Theodore ranch, 1/4 mile N of SW corner, section 29, T. 29 N., R. 15 E., and 75 feet east of road, about 5 miles E of Wendel.
Date of Sampling: October 19, 1954.
Collectors: S. B. Johnson, R. E. Nelson, S. Porter, R. C. Roberts and L. R. Wohletz.
Classification: Chromic Pelloxerert, fine, montmorillonitic, mesic.
Vegetation: The area where sample was taken had been plowed or disked and was in grasses and weeds such as sweet clover, saltgrass, rye grass, and brassia. Virgin area across the road was a wet meadow and in grasses with some big greasewood and rabbitbrush. Climate: At Susanville, 18 miles west of the sample site and 200 feet higher elevation, the January average temperature is 30.7°F, the July average is 69.5° F, and the growing season is 142 days. Average annual precipitation for a 30-year period is 17.8 inches divided as follows, January 3.64, February 2.66, March 2.64, April 1.05, May 0.84, June 0.51, July 0.22, August 0.19, September 0.50, October 1.01, November 1.79 and December 2.77. The average annual precipitation at the sample site is probably 11 to 13 inches. The average snowfall is slightly less than at Susanville, which is 71 inches. Parent Material: Stratified lake-laid sediments mostly fine-texture of "Lahontan" age. Relief: Nearly level basin floor with many winding old abandoned stream channels or old slough ways. Elevation: 4000 feet. Drainage: Slow external drainage, and slow drainage through the soil after it becomes saturated; water table at 3 to 5 feet, and the site may be flooded at times. Biological activity: Little or no evidence of macroscopic activity.

HORIZON	DESCRIPTION
A1p RSL No. 54305	0 to 6 inches, dark gray (10YR 4/1, very dark gray 10YR 3/1 moist) silty clay which is plastic and sticky when wet, firm when moist and hard when dry. This layer is light weight and appears to be high in organic matter and breaks into medium subangular blocky units. This layer has considerable visible salt and a thin layer covers the surface in places. Saltgrass roots are very numerous in this horizon. It has a pH of 8.6 and rather abruptly changes to layer below.
A12 RSL No. 54306	6 to 21 inches, dark gray (10YR 4/1, very dark gray 10YR 3/1 moist) moderate medium prismatic heavy clay which is very plastic and very sticky when wet and very hard when dry. The prisms readily break to fine angular blocky aggregates. This layer has about 10 percent of the surface area occupied by hard light brownish gray (10YR 6/2, grayish brown 10YR 5/2 moist) lime concretions about 1/8 inch across. When dry this layer has cracks about 1 inch wide every 4 to 8 inches. The pH is 8.9, and this layer changes abruptly to layer below.
B2 RSL No. 54307	21 to 36 inches, very dark gray (10YR 3/1, black 2/1 moist) very plastic sticky clay that has lots of silt. This layer is extremely hard when dry and the structure is weak very coarse prismatic that very readily breaks into strong fine angular blocky aggregates. The prisms have very shiny polished sides like slickensides. This layer has clay flows around the structural aggregates, and about 8 percent of the surface area is occupied by very hard grayish brown (10YR 5/2, dark grayish brown 10YR 4/2 moist) irregular shaped lime concretions. The pH is 8.9. When dry this layer has wide cracks about 8 inches apart. It gradually changes to layer below.
B3 RSL No. 54308	36 to 44 inches, grayish brown (10YR 5/2, very dark grayish brown 2.5Y 3/2 moist) strong medium angular blocky silty clay loam which breaks very readily into finer angular aggregates. All aggregates are colloidal coated. This layer is not nearly as hard as layer above and is less plastic. It has a pH of 9.0 and roots are quite numerous from the surface to the bottom of this layer. It has some lime concretions and considerable material from layer above that occurs as mottlings.
C1 RSL No. 54309	44 to 60 inches, light brownish gray (10YR 6/2, dark grayish brown 2.5Y 4/2 moist) weak medium angular blocky silty clay loam which is plastic when wet and friable when moist and slightly calcareous. The pH is 8.4.
C2 RSL No. 54310	60 to 94 inches, saturated stratified loam, silt loam, and sandy loam, all noncalcareous and dark grayish brown (10YR 4/2) when wet. This horizon is loose and friable and only slightly plastic. It has some mica and is noncalcareous. pH 8.2.

1/ The Pit series is in a fine, montmorillonitic, mesic family of Typic Chromoxererts. This pedon has gray colors throughout the upper 30 cm.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Chromic Pelloxerert, fine, montmorillonitic, thermic
SOIL Bosanko clay **SOIL Nos.** 864Calif-37-8 **LOCATION** San Diego County, California
SOIL SURVEY LABORATORY Riverside, California **LAB. Nos.** 6450 - 6455

Depth (In.)	Horizon	1B1b Total: Sand (2-0.05)	Silt (0.05-0.002)	Clay (< 0.002)	Sand: Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Silt: 0.05-0.02	Int. III (0.02-0.002)	3A1 Int. II (0.2-0.02)	(2-0.1)	* Clay <.002	** Clay <.002	1/ Coarse fragments 1A2a: ≥ 2	2 - 19	19 - 76
		Pct. of < 2 mm														Pct.	Pct. of < 76 mm	
0- 4	Ap	38.5	25.5	36.0	2.4	6.6	6.4	13.9	9.1	11.7	13.8	28.9	29.4	35.4	35.2	1	1	0
4-18	A11	33.3	28.8	37.9	2.4	6.2	5.9	11.5	7.3	15.7	13.1	29.6	26.0	39.1	38.4	2	2	0
18-22	A12	35.1	26.6	38.3	2.5	6.2	5.3	12.5	8.6	15.9	10.7	32.0	26.5	34.4	34.2	1	1	0
22-28	ACca	50.7	22.9	26.4	1.6	6.6	8.1	20.4	14.0	11.2	11.7	36.9	36.7	24.5	24.3	1	1	0
28-45	C1	79.6	11.1	9.3	7.0	19.6	14.3	29.3	9.4	6.6	4.5	25.8	70.2	6.7	5.9	12	12	0
45-57+	C2	81.5	11.3	7.2	5.3	19.3	14.2	32.0	10.7	6.8	4.5	29.0	70.8	5.4	4.5	17	17	0

Depth (In.)	6A1a * Organic carbon	6B1a* Nitrogen	C/N	* 6C2a Ext. Iron as Fe	6E1b ** Carbonate as $CaCO_3$	Bulk density: 4A1f 1/3 bar	4A1h Oven dry		3B2 C'	Water content: 4B1c 1/3 bar	4B2* 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH: 8C1b Saturated Paste	8C1a H_2O 1:1	8C1a H_2O 1:10
	Pct.	Pct.		Pct.	Pct.	g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.	in./in.			
0- 4	1.59	0.131	12	0.6	-						15.6			5.5	5.9	
4-18	0.54	0.057	9	0.6	-	1.50	1.75		0.99		25.0	17.0	0.053	0.052	6.7	7.1	
18-22	0.44	0.045	10	0.5	1	1.50	1.81		0.99		25.7	17.3	0.065	0.064	7.8	8.2	
22-28	0.28			0.5	1	1.53	1.71		0.99		23.7	17.2	0.038	0.037	7.8	8.4	
28-45	0.01			0.5	-	1.59	1.74		0.92		19.4	15.4	0.031	0.028	8.0	8.7	
45-57+	-			0.5	-	1.73	1.86		0.92		15.5	14.3	0.025	0.022	8.2	8.7	

Depth (In.)	Extractable bases 6N2a* Ca	6O2a* Mg	6P2a* Na	6Q2a* K	5B1a Sum* of bases	6H2a* Ext. Acidity	Cation Exch. Capacity 5A2a* NaOAc	5A3a* Sum	Water extract from saturated paste 8A1 ** 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K	6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter								mmho/cm
0- 4	17.2	12.5	0.6	1.0	31.3	4.5	34.7	35.8	2.1	2.1	2.3	0.3	-	3.6	2.4		0.65
4-18	23.2	14.6	1.4	0.3	39.5	1.5	41.7	41.0	1.2	0.7	3.0	tr.	-	3.4	1.4		0.52
18-22	31.9	14.7	2.5	0.3	49.4	-	44.7	49.4	0.7	0.8	4.7	tr.	-	4.5	0.4		0.55
22-28	36.4	17.2	3.9	0.2	57.7	-	53.3	57.7	0.6	0.8	5.5	tr.	-	4.8	0.5		0.62
28-45	38.9	23.3	7.6	0.1	69.9	1.4	65.7	71.3	0.4	0.4	5.8	tr.	-	3.5	0.7		0.63
45-57+	42.1	20.3	6.6	0.1	69.1	0.2	64.0	69.3	0.7	0.3	6.1	0.1	-	3.8	0.8		0.70

Depth (In.)	8A Water at Saturation	5D2 Exchangeable Na	5F SAR	Gypsum	Base Sat.	Clay mineralogy (<0.002 mm) 7A — Relative abundance based on height of diagnostic X-ray peak 7A2: Mont.	Verm.	Intev.	Mica	Kaol.	% Kaolinite (DTA)	*** % Mont. & Verm.	Charge density meq x10⁻³/m²	7n1 Ethylene glycol retention m²/gram
	Pct.	Pct.		Pct.	Pct.	X-ray								
0- 4	54.5	2	2		87									
4-18	61.0	3	3		96	xxxx	-	t	-	x	-	25	2.04	200
18-22	58.0	5	5		100									
22-28	51.9	7	7		100									
28-45	49.0	11	9		98									
45-57+	48.7	10	9		100	xxxx	x	t	-	-	-	34	2.03	262

1/, *, and **: Same as for Bonsall 37-5

*** Mehra and Jackson 1959 Constancy of the sum of mica unit cell potassium surface and interlayer sorption surface in vermiculite-illite clays. Soil Sci. Soc. Amer. Proc. 23:101-105.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

BOSANKO CLAY
S64Calif-37-8

Location: San Diego County, California. A soil profile pit located 120 feet east of the center line of Camp Pendleton Road and 150 feet north, 200 feet west of the southeast 1/4 corner of the northeast 1/4 of section 33, T. 10 S., R. 4 W. Date of Sampling: March 11, 1964.
Description By: Roy H. Bowman and Gerald Kester. Collectors: Reuben E. Nelson, George Borst, Gerald Kester, Lothair Grant, Roy H. Bowman and Donald Markewich.
Classification: Chromic Pelloxerert, fine, montmorillonitic, thermic.
Vegetation: Wild oats, mustard. Climate: Annual precipitation is 13 inches and mean annual temperature is 59° F. Parent Material: Tonalite grus. Topography: West-facing, smooth 4 percent slopes on rolling upland. Elevation: 145 feet above sea level. Drainage: Well drained; medium to rapid runoff; slowly permeable. Soil Moisture: Slightly moist.

HORIZON	DESCRIPTION
Ap RSL No. 6450	0 to 4 inches, dark gray (10YR 4/1) clay, very dark gray (10YR 3/1) moist; moderate coarse to fine granular structure; very hard, firm, sticky and plastic; abundant very fine and fine roots; many fine tubular and many fine to medium interstitial pores; slightly acid (pH 6.2); abrupt smooth boundary.
A11 RSL No. 6451	4 to 18 inches, dark gray (10YR 4/1) clay, very dark gray (10YR 3/1) moist; moderate medium angular blocky structure; extremely hard, very firm, sticky and plastic; few very fine and fine roots; common very fine and fine tubular pores; few slickensides; slightly acid (pH 6.5); abrupt wavy boundary.
A12 RSL No. 6452	18 to 22 inches, grayish brown (10YR 5/2) clay, very dark grayish brown (10YR 3/2) moist; moderate medium angular blocky structure; extremely hard, very firm, sticky and plastic; very few, very fine roots; few very fine to fine tubular pores; few slickensides; few small soft masses of lime; mildly alkaline (pH 7.8), slightly effervescent; clear wavy boundary.
ACca RSL No. 6453	22 to 28 inches, grayish brown (10YR 5/2) clay, very dark grayish brown (10YR 3/2) moist; moderate medium angular blocky structure; very hard, very firm, sticky and plastic; very few very fine roots; very few very fine tubular pores; moderately alkaline (pH 8.0), slightly to strongly effervescent; many medium to small soft masses of lime; contains features of rock structure of the underlying material; clear wavy boundary.
C1 RSL No. 6454	28 to 45 inches, pale brown tonalite grus, fine gravelly loamy sand in texture; massive; very hard, firm, nonsticky and nonplastic; seams of lime about 1/2 inch thick, 6 to 12 inches apart, extending obliquely into the underlying horizon; mildly alkaline (pH 7.5); strongly effervescent; clear smooth boundary.
C2 RSL No. 6455	45 to 57 inches +, pale yellow tonalite grus, fine gravelly loamy sand in texture; massive; very hard, firm, nonsticky and nonplastic; oblique seams of lime about 1/2 inch thick, 6 to 12 inches apart, occur to the depth of sampling; mildly alkaline (pH 7.5) and strongly effervescent.

SCS-420
10-64

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Chromic Pelloxerert, fine, montmorillonitic, thermic

SOIL Bosanko clay SOIL Nos. S64Calif-37-9 LOCATION San Diego County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 6456 - 6460

Depth (In.)	Horizon	1B1b Total: Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Size class and particle diameter (mm) 3A1 Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)			1/ Coarse fragments 1A2a: ≥ 2 Pct.	2 – 19 Pct. of < 2 mm	19 – 76 Pct. of < 76 mm
		Pct. of < 2 mm																
0- 5	Ap	50.5	28.9	20.6	4.9	10.8	8.5	15.6	10.7	13.8	15.1	33.1	39.8			4	4	0
5-18	A11	39.0	24.0	37.0	3.9	8.5	6.3	12.0	8.3	10.8	13.2	25.6	30.7			9	9	0
18-23	A12	43.4	19.4	37.2	7.3	10.7	6.7	11.7	7.0	9.2	10.2	22.6	36.4			11	11	0
23-30	ACca	61.5	11.7	26.8	13.1	20.4	9.2	13.8	5.0	3.9	7.8	15.4	56.5			14	14	0
30-48+	C1	75.8	9.7	14.5	16.5	26.7	10.5	16.4	5.7	2.8	6.9	16.4	70.1			22	22	0

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E1b Carbonate as $CaCO_3$		Exch. Bases: Na	K		3B2 C'	Water content:	4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility COLEF	4D1 Extensibility COLE	pH: 8C1b Saturated Paste	8C1a H_2O 1:1	8C1a H_2O 1:10
	Pct.	Pct.		Pct.	Pct.		meq /100 g		g/cc		Pct.	Pct.	Pct.	in./in.	in./in.			
0- 5	0.86	0.075	11	0.5			0.5	0.4					8.9			5.7	6.0	
5-18	0.34			0.6			2.1	0.2					16.0			6.6	7.0	
18-23	0.32			0.5			3.3	0.2					16.7			7.4	7.7	
23-30	0.12			0.4	1		5.3	0.1					16.7			7.6	8.0	
30-48+	0.02			0.6	<1		4.9	0.1					12.9			7.6	8.0	

Depth (In.)	Extractable bases: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	5B1a Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A2a NaOAc	5A3a Sum	Water extract from saturated paste 8A1: 6N1a Ca	6O1a Mg	6P1a Na	6Q1a K		6I1a CO_3	6J1a HCO_3	6K1a Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0- 5	7.4	6.9	0.6	0.4		3.3	18.6	18.5	0.9	1.2	2.4	0.1		-	2.2	1.5		0.46
5-18	18.5	10.4	2.4	0.2		2.0	33.4	33.2	1.3	1.2	6.2	0.1		-	2.6	5.9		0.95
18-23	22.3	10.1	4.2	0.2		1.1	38.4	37.0	3.1	4.2	14.2	0.1		-	2.0	18.4		2.33
23-30	31.2	12.0	6.6	0.1		0.8	46.0	49.4	8.4	8.7	24.6	0.1		-	2.0	35.6		4.08
30-48+	22.0	9.5	6.2	0.1		1.5	38.2	39.3	10.2	11.8	29.4	0.1		-	1.3	48.9		5.33

Depth (In.)	8A Water at Saturation Pct	5D2 Exchangeable Na Pct.	5F SAR	Base Sat. Cations Pct.	Base Sat. NaOAc CEC Pct.	Clay mineralogy (<0.002 mm) 7A: Relative abundance based on height of diagnostic X-ray peak 7A2: Mont.	Verm.	Int.	Mica	Kaol.
						X-ray				
0- 5	36.5	3	3	82	82					
5-18	50.8	6	5	94	93	xxxx	xx	-	-	t
18-23	59.2	9	7	97	93					
23-30	56.2	12	8	98	100+					
30-48+	44.9	13	9	96	99	xxx	xxx	-	-	t

1/ From characterization sample.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

BOSANKO CLAY
S64Calif-37-9

Location: San Diego County, California. A soil profile pit located 3700 feet north of Haverford Road and 140 feet west of Lilac Road in the SW1/4 of the NE1/4 of assumed section 3, T. 13 S., R. 1 E., on photo 6054NE. Date of Sampling: March 11, 1964.
Description By: David C. Estrada and Gerald Kester. Collectors: Reuben Nelson, Lothair Grant, George Borst, Gerald Kester, David C. Estrada and Roy H. Bowman.
Classification: Chromic Pelloxerert, fine, montmorillonitic, thermic.
Vegetation: Wild oats and other annual grasses and weeds. Climate: The average annual precipitation is 17 inches. The mean annual temperature is 61° F., the mean January temperature 53° F., and the mean July temperature 71° F. Parent Material: Tonalite grus. Topography: Nearly level positions of 2 percent slope on rolling upland. Elevation: 1,550 feet above sea level. Drainage: Well drained; medium runoff; very slowly permeable. Soil Moisture: Moist.
Remarks: Quartz fragments from 2 mm to 2 cm in size commonly occur throughout the profile.

HORIZON	DESCRIPTION
Ap RSL No. 6456	0 to 5 inches, gray (10YR 5/1) clay, very dark gray (10YR 3/1) moist; moderate to fine granular structure; very hard, firm, sticky and plastic; abundant very fine and fine vertical roots; many very fine and fine tubular and interstitial pores; slightly acid (pH 6.3); abrupt smooth boundary.
A11 RSL No. 6457	5 to 18 inches, gray (10YR 5/1) clay, very dark gray (10YR 3/1) moist; strong medium to coarse angular blocky structure; extremely hard, very firm, very sticky and very plastic; abundant very fine and fine roots; common very fine and fine tubular pores; neutral (pH 6.7); few slickensides; clear smooth boundary.
A12 RSL No. 6458	18 to 23 inches, color and texture same as above; moderate medium angular blocky structure; very hard, firm, very sticky and very plastic; plentiful very fine roots; common very fine, few fine tubular pores; mildly alkaline (pH 8.0); few intersecting slickensides; clear smooth boundary.
ACca RSL No. 6459	23 to 30 inches, brown (10YR 5/3) and white (10YR 8/1) heavy sandy clay loam, dark brown (10YR 4/3) and light gray (10YR 7/2) moist; moderate medium angular blocky structure; hard, friable, sticky and plastic; very few very fine roots; common very fine tubular pores; moderately alkaline (pH 8.2); slightly effervescent with disseminated lime, violently effervescent in soft masses; clear smooth boundary.
C1 RSL No. 6460	30 to 48 inches +, pale brown (10YR 6/3) tonalite grus of loamy coarse sand texture; moderately alkaline (pH 8.3).

CONSECUTIVE PEDON NUMBER C 69 57 C H A R A C T E R I Z A T I O N D A T A

SOIL SERIES CROPLEY SOIL NO. S69 CALI. 36-26 SAMPLE NO. 9 302-9 303 SAN BERNARDINO AREA

SOIL FAMILY CHROMIC PELLOXERERT FINE,MONTHORILLONITIC,THERM RIVERSIDE SOIL SURVEY LABORATORY

SAMPLE NO.	DEPTH CM.	HORZ.	SIZE, CLASS AND PARTICLE DIAMETER (MM) 1B1B,3A1 TOTAL FRACTION SAND 2- .05	SILT .05- .002	CLAY LT .002	VCS 2-1	SANDS CS 1- .5	MS .5- .25	FS .25- .10	VFS .1- .05	SILTS CSI .05- .02	FSI .02- .002	CLAYS CO. 2- .2U	FINE LT .2U	CARBO NATE 3A1A	1A2A INT. COARSE FRAGMENTS .02 WHOLE SOIL	PCT. OF 75- 20	I 20-5	II 5-2	III PCT. OF LT 75
			PERCENT OF LESS THAN 2MM																	
9 302	0- 20	AP	26.0	42.5	31.5	1.4	3.9	2.9	8.0	9.8	21.2	21.3				36.1	--A	--	--	--
9 303	58- 86	AC2	29.3	34.8	35.9	0.8	3.3	3.7	10.4	11.1	16.1	18.7				33.8	--A	--	--	--

SAMPLE NO.	DEPTH CM.	ORG.MATTER CARBON 6A1A	NITROGEN 6B1A	CARBONATE AS CACO3 LT 2 6E1B	2-19 6E1B	EXT. IRON FE 6C2B	ATTERBERG LIMIT LL 4F2	PL 4F1	BULK DENSITY EST 1/3 BAR 4A1F	DRY 4A1F	CM 4AH	3B2	WATER CONTENT 1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2	EXTENSBLTY LEF 4D1	LE 4D1	PH H2O 1/1 8C1A	H2O 1/10 8C1A	CACL2 8C1E
		-PERCENT--		-PERCENT-		PCT.	PCT.	NO.40	GRAMS PER CC				----PERCENT----			-PERCENT--				
9 302	0- 20	2.69	0.242						1.15	1.48	1.00		33.2	17.5	8.8	8.8	7.2		6.9	
9 303	58- 86	0.76	0.078						1.27	1.59	1.00		34.1	18.5	7.8	7.8	7.5		7.0	

SAMPLE NO.	DEPTH CM.	EXTRACTABLE BASES CA 5B4A 6N2E	MG 5B4A 6O2D	NA 5B4A 6P2A	K 5B4A 6Q2A	SUM	BASE SAT. PCT.	C E C NA- DAC 5A2A	NH4- OAC 5A6A	WATER EXTRACT FROM SATURATED PASTE EC 8A1A	CA 6N1B	MG 6O1B	NA 6P1A	K 6Q1A	CO3 6I1A	HCO3 6J1A	CL 6K1A	SO4 6L1B	B 6T1A	PH SAT. PASTE 8C1B
		-MEQ/100G						-MEQ/100G		MMHO	-MEQ/1000 ML								PPM	
9 302	0- 20	25.1	6.6	0.3	2.0	34.0	100+		30.9											
9 303	58- 86	27.1	7.0	1.4	0.6	36.1	100+		33.9											

SAMPLE NO.	DEPTH CM.	WATER AT SAT. 8A PCT.	EXCHANGBLE NA 5B4B MEQ.	K 5D2 PCT.	5E	SAR	GYPSUM AMT. 6F1B PERCENT	REQ. 6P3A	CLAY MINERALOGY LESS THAN 0.002 MM X RAY I 7A2E	II 7A2E	III 7A2E	DTA IV 7A3	LT. .0002 MM X RAY I 7A2E	II 7A2E	III 7A2E	MINERAL CODE	RELATIVE AMOUNT
9 302	0- 20		0.3	1					MI 5	MM 3						MI MICA	1 TRACE
9 303	58- 86		1.4	4					MT 4	MI 3						MM MT/MICA	2 SMALL
																MT MONTMORT	3 MODERATE
																	4 ABUNDANT
																	5 DOMINANT
																	6 INDETER.

SAMPLE PREPARATION CODES
A=STANDARD PREPARATION.

CROPLEY CLAY LOAM
S69Calif-36-26

Location: San Bernardino County, California; about 1/2 mile west of Highway 71, and about 45 feet north of Eucalyptus Avenue, SW¼, SW¼, SE¼ of sec. 16, T.2S., R.8W. Date of Sampling: June 11, 1969.
Description by: A. A. Knecht, W. Z. Brock. Collectors: A. A. Knecht, W. Z. Brock.
Classification: Chromic Pelloxerert, fine, montmorillonitic, thermic.
Vegetation: Small grain stubble and annual grasses. Climate: Average annual precipitation about 16 inches. Mean temperature about 61°F. Parent Material: Mixed alluvium. Topography: Alluvial fan, gently sloping, about 2 percent slopes. Elevation: 700 feet. Drainage: Moderately well drained; slow runoff, slow permeability. This area is above the flood plain and the water table is below five feet. Soil Moisture: This profile was dry down to 34 inches and moist below.
Remarks: Field reaction was determined by the Truog method. Two horizons (0-8" and 23-34") were analyzed in the Riverside Soil Survey Laboratory.

HORIZON	DESCRIPTION
	(0-20 cm.)
Ap RSL 69302	0 to 8 inches, dark gray (10YR 4/1) clay loam, black (10YR 2/1) moist; strong very coarse subangular blocky structure; extremely hard, very firm, very sticky, very plastic; many very fine and fine roots; many very fine and fine vertical inped interstitial pores; slightly acid (pH 6.5); clear smooth boundary.
	(20-58 cm.)
AC1	8 to 23 inches, dark gray (10YR 4/1) clay loam, black (10YR 2/1) moist; moderate very coarse angular blocky structure; extremely hard, very firm, very sticky, very plastic; many very fine roots; many very fine and fine random interstitial pores; neutral (pH 7.0); gradual wavy boundary.
	(58-86 cm.)
AC2 RSL 69303	23 to 34 inches, dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate very coarse prismatic structure; extremely hard, extremely firm, very sticky, very plastic; common very fine roots; common very fine and fine discontinuous tubular pores; intersecting slickensides; moderately alkaline (pH 8.0); gradual wavy boundary.
	(86-105 cm.)
C1	34 to 41 inches, dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate very coarse prismatic structure; extremely hard, very firm, very sticky, very plastic; few very fine roots; few very fine discontinuous tubular pores; moderately alkaline (pH 8.0); gradual wavy boundary.
	(105-140 cm.)
C2	41 to 55 inches, grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; massive; very hard, firm, sticky, plastic; very few very fine roots; very few very fine random pores; moderately alkaline (pH 8.0); clear wavy boundary.
	(140-150 cm.)
C3	55 to 60 inches, grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; massive; very hard, firm, sticky, plastic; strongly effervescent; moderately alkaline (pH 8.0).

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Chromic Pelloxerert, fine, montmorillonitic, thermic

SOIL Diablo clay SOIL Nos. S58Calif-1-1 LOCATION Alameda County, California

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 591000 - 591006

Depth (In.)	Horizon	1B1b Size class and particle diameter (mm) 3A1 Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand: Very coarse (2–1)	Sand: Coarse (1–0.5)	Sand: Medium (0.5–0.25)	Sand: Fine (0.25–0.1)	Sand: Very fine (0.1–0.05)	Silt (0.05–0.02)	Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	Coarse fragments 1A2c: 2A2 > 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76mm	
0-6	A11	12.1	42.0	45.9	0.0	0.1	0.2	3.3	8.5	14.1	27.9	25.2	3.6			<1		
6-15	A12	11.1	41.5	47.4	0.0	0.1	0.3	3.3	7.4	12.7	28.8	22.6	3.7			<1		
15-26	A13ca	9.3	43.7	47.0	0.1	0.1	0.2	2.6	6.3	11.5	32.2	19.8	3.0			<1		
26-32	A14ca	8.8	43.1	48.1	0.0	0.1	0.2	2.5	6.0	9.7	33.4	17.6	2.8			<1		
32-42	ACca	7.8	48.3	43.9	0.2	0.5	0.4	2.1	4.6	9.5	38.8	15.7	3.2			<1		
42-50	C2	6.8	56.0	37.2	0.4	0.6	0.4	1.1	4.3	16.3	39.7	21.5	2.5			<1		
50+	Dr	18.0	63.7	18.3	0.2	0.3	0.2	0.9	16.4	30.7	33.0	47.8	1.6					

Depth (In.)	6A1a Organic carbon	6B2a Nitrogen	C/N	6C2b Ext. Iron as Fe	6E1e Carbonate as $CaCO_3$	Bulk density 4A1f 1/3 bar	Bulk density 4A1h Oven dry	Bulk density	3B2	Water content	4B1c 1/3 bar	4B2 15 bar	4D1	4D1	pH 8C1a H_2O 1:1		
	Pct	Pct.		Pct.	Pct.	g/cc	g/cc	g/cc	Cm	Pct.	Pct.	Pct.	Extensibility LEf Pct	Extensibility LE Pct.			
0-6	1.37	0.172	8												6.4		
6-15	0.92	0.135	7		1										7.4		
15-26	0.71	0.109	7		3										7.6		
26-32	0.64	0.102	6		4										7.7		
32-42	0.41	0.091	5		8										7.8		
42-50	0.25				8										7.9		
50+	0.10				4										8.0		

Depth (In.)	Extractable bases 5A1: 6N2b Ca	6O2b Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1b NH_4OAc	5A3a Sum		6G1e KCl Ext. Al^{+++}	CEC 100 g clay					Base saturation 5C3 Sum	
	meq/100 g															Pct.	Pct.
0-6	22.9	9.0	0.1	1.0		3.1	32.6	36.2			71.0					91	
6-15	*		0.1	0.9			32.0				67.5						
15-26	*		0.2	0.9			30.5				64.9						
26-32	*		0.3	0.8			31.6				65.7						
32-42	*		0.3	0.8			26.5				60.4						
42-50	*		0.4	0.7			26.8				72.0						
50+	*		0.3	0.6			19.8				108.2						

Depth (In.)	Clay mineralogy (<0.002 mm.) 3A1: Mont.	Verm.	Mica 7A2 X-ray	Kaolin.

* Calcareous

DIABLO CLAY
58Calif-1-1

Location: 1325 feet east and 275 feet north of SW corner, Section 25, in SW1/4, SE1/4, SW1/4, Section 25, R. 1 E., T. 2 S., Bailey Ranch, Alameda County, California. Date of Sampling: November 10, 1958.
Description by: R. Ulrich. Collectors: R. E. Nelson, Larry Welch, Robert Mitchel, Leo Mayers, Lynn Whittig, R. Ulrich.
Classification: Chromic Pelloxerert, fine, montmorillonitic, thermic.
Vegetation: Annual brome grasses (soft chess and ripgut mostly), mouse barley, wild oats, poverty fescue, bur clover, star thistle, bull thistle, and mustard. Present use is annual grass range; may have been cultivated sometime in past. Climate: Rainfall is 14-15 inches (estimated); mean annual soil temperature about 60° F. Distinct summer-dry, winter-moist Mediterranean type climate. Parent Material: Interbedded calcareous fine grained sandstone and shale. Lime content is variable but it usually is weak or slightly calcareous although thin seams of limestone and other strongly calcareous sediments may occur. Slope: About 30 percent (estimated), north facing, plane surface. Elevation: About 600 feet. Drainage: Well drained with slow surface runoff when dry and deeply cracked to medium and rapid runoff when moist and expanded during the rainy season. Internal drainage is variable ranging from very rapid when dry and deeply cracked during the dry season to slow internal drainage when moist and essentially massive following expansion during the rainy season.

HORIZON	DESCRIPTION
A11 BSL No. 591000	0 to 6 inches, dark gray (5Y 4/1) clay, very dark gray (5Y 3/1) moist, the immediate very thin surface crust dries 5Y 6/1 to 7/1 in color; strong coarse prismatic and strong coarse and medium blocky; very hard, very firm, very plastic, sticky; plentiful fine roots but mainly along structure planes and faces; few extremely fine and very fine tubular pores; noncalcareous; clear slightly wavy lower boundary.
A12 BSL No. 591001	6 to 15 inches, dark gray (5Y 4/1) clay, very dark gray (5Y 3/1) moist; moderate coarse prismatic and moderate coarse blocky; very hard, very firm, very plastic, sticky; few fine roots; concentrated mainly along structural planes and facings; few extremely fine and very fine tubular pores; noncalcareous in most of mass except for an occasional small hardened whitish lime nodule embedded in mass; few slickensides; clear wavy lower boundary.
A13ca BSL No. 591002	15 to 26 inches, finely mottled gray and olive gray (5Y 5/1 and 5/2) clay, dark gray and olive gray (5Y 4/1 and 4/2) moist, with few fine whitish hard lime nodules; moderate coarse prismatic and moderate medium blocky; very hard, very firm, very plastic, sticky; few fine roots, concentrated mainly along structure planes and facings; few extremely fine and very fine tubular pores; slightly calcareous in matrix, with strong effervescense by the lime nodules; numerous slickensides; clear slightly wavy lower boundary.
A14ca BSL No. 591003	26 to 32 inches, similar colored clay with few fine whitish hard lime nodules; weak coarse prismatic and weak medium blocky; very hard, very firm, very plastic, sticky; few fine roots mainly along structural planes and facings, distinctly flattened in appearance; few extremely fine and very fine tubular pores, slightly calcareous in matrix, with strong lime nodule effervescence; numerous slickensides; diffuse lower boundary.
ACca BSL No. 591004	32 to 42 inches, light olive gray (5Y 6/2) heavy silty clay loam, olive gray (5Y 5/2) moist, with abundant whitish lime films and soft segregations; weak medium subangular blocky; very hard, very firm, plastic, slightly sticky; few fine roots; few extremely fine and very fine tubular pores; moderately calcareous; clear wavy lower boundary.
C2 BSL No. 591005	42 to 50 inches, fine and medium mottled olive gray and light olive gray (5Y 5/2 and 6/2) silty clay loam, olive gray (5Y 5/2 and 4/2) moist, with many embedded shale fragments and soft whitish lime films and soft and hardened lime nodules; weak fine and medium subangular blocky; very hard, very firm, plastic, slightly sticky; few fine roots; few extremely fine and very fine tubular pores; moderately calcareous; abrupt smooth lower boundary.
Dr BSL No. 591006	50 inches +, light olive gray (5Y 6/2) fractured shale and fine grained sandstone, olive gray (5Y 5/2) moist, with whitish lime films on fracture facings; parent rock materials react weakly to dilute acid, with a strong reaction being obtained from the whitish lime segregations.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Chromic Pelloxerert, fine, montmorillonitic, thermic
SOIL Diablo clay SOIL Nos. S58Calif-1-2 LOCATION Alameda County, California

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 591007 - 591012

Depth (In.)	Horizon	1B1b Size class and particle diameter (mm) 3A1 Total: Sand (2–0.05)	Silt (0.05–0.002)	Clay (< 0.002)	Sand: Very coarse (2–1)	Coarse (1–0.5)	Medium (0.5–0.25)	Fine (0.25–0.1)	Very fine (0.1–0.05)	Silt: 0.05–0.02	Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	Coarse fragments 1A2d: 2A2 > 2	2 - 19	19–76
		Pct. of < 2 mm														Pct.	Pct. of < 76mm	
0-7	A11	18.4	42.7	38.9	0.0	0.2	0.6	6.0	11.6	14.3	28.4	30.3	6.8			<1		
7-17	A12	18.0	42.1	39.9	0.0	0.1	0.6	5.8	11.5	13.3	28.8	29.3	6.5			<1		
17-28	A13ca	11.4	48.5	40.1	0.1	0.2	0.5	3.7	6.9	10.6	37.9	20.3	4.5			<1		
28-37	Cca1	12.6	48.8	38.6	0.2	0.2	0.4	3.0	8.8	9.9	38.9	20.9	3.8			<1		
37-48	Cca2	24.7	50.7	24.6	0.0	0.1	0.2	3.7	20.7	20.3	30.4	44.1	4.0			<1		
48+	Dr	45.6	46.8	7.6	0.0	0.1	0.4	8.3	36.8	24.4	22.4	65.8	8.8			<1		

Depth (In.)	6A1a Organic carbon	6B2a Nitrogen	C/N	6C2b Ext. Iron as Fe	6E1e Carbonates $CaCO_3$	Bulk density: 4A1f 1/3 bar	4A1h Oven dry		3B2 Cm	Water content	4B1c 1/3 bar	4B2 15 bar	4D1 Extensibility LEf	4D1 Extensibility LE	pH 8C1a H_2O 1:1		
	Pct.	Pct.		Pct.	Pct.	g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	Pct	Pct.			
0-7	2.16	0.222	10												6.4		
7-17	1.04	0.145	7												6.9		
17-28	0.74	0.115	6		4										7.6		
28-37	0.54	0.091	6		6										7.7		
37-48	0.37	0.070	5		16										7.8		
48+	0.08				5										7.9		

Depth (In.)	Extractable bases 5A1: 6N2b Ca	6O2b Mg	6P2a Na	6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity: 5A1b NH_4OAc	5A3a Sum		6G1e KCl Ext. Al^{+++}	CEC 100g clay					Base saturation 5C3 Sum	
	meq/100 g															Pct.	Pct.
0-7	28.6	5.8	0.1	1.1		3.3	34.6	38.9			88.9					92	
7-17	32.5	4.6	0.1	0.8		1.8	33.8	39.8			84.7					95	
17-28	*		0.1	0.7			32.4				80.8						
28-37	*		0.2	0.7			32.4				83.9						
37-48	*		0.1	0.5			22.2				90.2						
48+	*		0.1	0.5			19.3				253.9						

Depth (In.)	Clay mineralogy (<0.002 mm.) 3A1: Mont.	Verm.	Mica 7A2 X-ray	Kaolin.

* Calcareous

DIABLO CLAY
S58Calif-1-2

Location: 1300 feet east and 1150 feet south of NW corner of Section 24, in SE1/4, NW1/4, NW1/4, Section 24, R. 1 E., T. 2 S., Beck Ranch, Alameda County, California.
Date of Sampling: November 11, 1958.
Description by: R. Ulrich. Collectors: R. E. Nelson, Larry Welch, Robert Mitchel, R. Ulrich.
Classification: Chromic Pelloxerert, fine, montmorillonitic, thermic.
Vegetation: Annual brome grasses (soft chess and ripgut mostly), annual rye, wild oats, bur clover, mustard, dock and other weeds. Present use is annual grass range; may have been cultivated sometime in the past. Climate: Rainfall is 14-15 inches (estimated); mean annual soil temperature about 60° F. Distinct summer-dry, winter-moist Mediterranean type climate. Parent Material: Interbedded calcareous fine grained sandstone and shale. Lime content is variable but it is usually weak or slightly calcareous although thin seams of limestone and other strongly calcareous sediments may occur. Slope: About 35 percent (estimated), north facing, plane surface. Elevation: About 850 feet, estimate based on contours on Livermore Soil Survey Map (1910). Drainage: Well drained with slow surface runoff when dry and deeply cracked and medium to rapid runoff when moist and expanded during the rainy season. Internal drainage is also variable ranging from very rapid when dry and deeply cracked during the dry season and for a period of time after the start of the rainy season to slow internal drainage when moist and essentially massive following expansion during the rainy season.

HORIZON	DESCRIPTION
A11 BSL No. 591007	0 to 7 inches, dark gray (5Y 4/1) clay, very dark gray (5Y 3/1) moist, the immediate very thin surface crust dries to 5Y 6/1 or lighter color; strong coarse prismatic and strong coarse and medium blocky; very hard, very firm, very plastic, sticky; plentiful fine roots but concentrated along structural facings and planes; few extremely fine and very fine tubular pores; noncalcareous; clear slightly wavy lower boundary.
A12 BSL No. 591008	7 to 17 inches, similar colored silty clay, moderate coarse prismatic and moderate coarse and medium blocky; very hard, very firm, very plastic, sticky; few fine roots, mainly along structural facings and planes; few extremely fine and very fine tubular pores; noncalcareous but a fine hard lime nodule or a slightly calcareous shale fragment may be included in sampled material; few slickensides, mainly in lower part; clear slightly wavy lower boundary.
A13ca BSL No. 591009	17 to 28 inches, finely mottled dark gray and olive gray (5Y 4/1 and 4/2; very dark gray and dark olive gray, 5Y 3/1 and 3/2, moist) silty clay with few fine faint "bluish gray" mottles; moderate coarse prismatic and moderate coarse blocky; very hard, very firm, plastic, sticky; few fine roots; few extremely fine and very fine tubular pores; slightly calcareous with a few fine hardened whitish lime nodules and some mycelial lime films in lower part; few slickensides; clear wavy lower boundary.
Cca1 BSL No. 591010	28 to 37 inches, greenish gray (5GY 6/1; darker greenish gray, 5GY 5/1, moist) heavy silty clay loam with masses and seams of olive gray (5Y 5/2; dark olive gray, 5Y 3.5/2, moist) materials, weak medium subangular blocky; hard to very hard, firm to very firm, plastic, slightly sticky; few fine roots; few extremely fine and very fine tubular pores; moderately calcareous with abundant whitish mycelial lime films on ped surfaces and few fine whitish hardened lime nodules; few slickensides; clear wavy lower boundary.
Cca2 BSL No. 591011	37 to 48 inches, coarsely to finely mottled olive gray and greenish gray (5Y 5/2 and 5GY 6/1; darker olive gray 5Y 4/2 and greenish gray 5GY 5/1, moist) heavy silty clay loam with many light gray and white (5Y 7/1 and 8/1, moist) soft lime segregations, hardened lime nodules, and mycelial lime films; weak fine subangular blocky; hard, firm, plastic, sticky; few fine roots; few extremely fine and very fine tubular pores; moderately calcareous, including both segregated and disseminated lime, numerous small shale fragments; abrupt smooth lower boundary.
Dr BSL No. 591012	48 inches +, greenish gray (5GY 6/1; darker greenish gray 5GY 5/1, moist) shattered fine grained sandstone to coarse grained shale with whitish lime films on fracture facings; parent rock fragments react weakly to dilute acid, with strong reaction being obtained from the whitish lime films.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Diablo clay **LOCATION** Sonoma County, California

SOIL FAMILY: Chromic Pelloxerert, fine, montmorillonitic, thermic.

SOIL NOS. S61Calif-49-11 **LAB. NOS.** 61463 - 61469

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)								3A1 2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002 > 2	
0- 7	Ap	0.2	0.3	0.3	1.2	2.2	36.4	59.4	13.4	26.0 0	c
7-17	A11	0.0	0.2	0.2	1.0	2.1	36.3	60.2	12.8	26.3 0	c
17-29	A12	0.0	0.1	0.2	1.1	2.1	35.3	61.2	12.7	25.5 0	c
29-39	A13	0.2	0.2	0.3	1.5	2.5	36.3	59.0	13.1	26.8 0	c
39-54	C1	1.3	1.3	1.0	3.7	4.8	37.4	50.5	19.5	25.3 2	c
54-65	C2	0.8	1.1	0.6	1.2	1.5	50.4	44.4	12.6	40.1 0	sic
65-76+	C3	0.7	2.2	1.1	1.8	1.2	52.5	40.5	12.3	42.4 0	sic-sicl

pH		ORGANIC MATTER			SATURATION EXTRACT SOLUBLE						8A1
8C1b SATURATED PASTE 1:1	1:5	8C1a 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6P1a Na^+	6Q1a K^+	6N1a Ca^{++}	6O1a Mg^{++}	6K1a Cl^-	6I1a $CO_3^=$	6J1a HCO_3^-
						← milliequivalents per liter →						
6.1		6.9	1.59	0.117	14	0.9	0.1	1.6	1.9	0.7	-	2.8
7.5		8.3	0.77	0.056	14	1.0	0.1	2.2	2.1	0.3	-	4.2
7.8		8.6	0.67	0.049	14	2.8	0.1	1.2	1.6	1.5	-	4.4
8.1		9.0	0.57	0.048	12	4.4	-	0.7	1.0	1.6	-	4.9
8.3		9.1	0.18			11.8	0.1	1.5	3.2	10.6	-	3.3
8.0		9.0	0.13			16.0	0.2	2.4	4.4	30.8	-	5.9
8.2		9.1	0.12			11.6	0.2	1.5	3.2	13.1	-	2.2

5A2a	EXTRACTABLE CATIONS 5B					5D1	8A1a	6E1b	6C1b	4B2	8A
CATION EXCHANGE CAPACITY (-(Na)	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	EXCH. Na %	Elec. Conduc. mmhos/cm. at 25° C.	$CaCO_3$ Equivalent Pct.	Ext. Iron % Fe	Soil water 15 atmos. Pct.	MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →										
62.2	43.8	10.0	6.2	0.3	1.0	tr.	0.4	-	0.1	31.6	86.4
61.8	36.0	25.2	-	0.4	0.8	1	0.5	1	0.2	29.7	80.7
61.6	34.0	29.0	-	1.5	0.9	2	0.5	1	0.3	29.2	82.9
57.9	28.8	32.9	-	2.9	0.9	5	0.6	3	0.1	29.1	89.1
45.2	25.5	24.5	-	1.3	0.8	3	1.7	4	0.1	23.6	82.5
35.6	22.0	20.3	-	3.0	0.7	8	2.5	5	0.1	21.3	72.5
32.9	20.7	17.8	-	2.7	0.7	8	1.8	13	0.1	21.3	73.1

DIABLO CLAY
S61Calif-49-11

Location: Sonoma County, California. NW 1/4, NW1/4, section 14, T. 5 N., R. 7. W. projected; also starting from the center of the town of Petaluma find the point due northeast 3 1/4 miles where East Washington Street forms a "T" junction with Adobe Road. The site is 6000 feet northerly of this point on a line bearing 5° east of true north on a sloping hillside of aspect southeast. It is 1120 feet due southeast of the homestead (Beffa's milk barn). (Site spotted on photo No. CSH-1BB-165.) Date of Sampling: June 27, 1961.
Collectors: Reuben Nelson, Leo C. Klameth, V. C. Miller, G. Lambert, J. H. Kashiwagi, F. Graham.
Classification: **Chromic Pelloxerert, fine, montmorillonitic, thermic.**

Vegetation: Natural before cultivation - annual grasses and forbs, few scattered oaks. Use: Oat hay production. Climate: Subhumid mesothermal. Annual precipitation 24.7 inches. Mean January temperature 46.7° F., mean July temperature 66.3° F., mean annual temperature 57.5° F. Parent Material: Soft sandstone and shale of the Petaluma formation. Elevation: 340 feet. Relief: Smoothly rolling hills on 13 percent slope with southeast aspect. Drainage: Moderately well drained. Biological Activity: No worm or rodent activity apparent at this time of year.

HORIZON	DESCRIPTION
Ap RSL No. 61463	0 to 7 inches, gray (N 5/) clay, black (10YR 2/1) or very dark gray (10YR 3/1) when moist; granular; very hard when dry, extremely firm when moist; very sticky and very plastic when wet; abundant very fine roots; many very fine interstitial pores; immediate surface tends to be fine medium granular; a few vertical cracks throughout horizon; medium acid, pH 6.0; abrupt, smooth boundary.
A11 RSL No. 61464	7 to 17 inches, dark gray (N 4/) clay, black (10YR 2/1) when moist; massive; extremely hard when dry, extremely firm when moist, very sticky and very plastic when wet, plentiful medium and very fine roots; common very fine, medium tubular and interstitial pores; slickensides present; very few fine lime spots also present; a few vertical cracks throughout horizon; neutral reaction, pH 7.0; gradual, wavy boundary.
A12 RSL No. 61465	17 to 29 inches, dark gray (N 4/) clay with a few fine white (5Y 8/1) lime specks, black (10YR 2/1) when moist; massive; extremely hard when dry, extremely firm when moist, very sticky, very plastic when wet; plentiful medium and very fine roots; common very fine and medium tubular and interstitial pores; numerous slickensides; few scattered medium lime blotches throughout horizon; mildly alkaline reaction, pH 7.5; diffuse, wavy boundary.
A13 RSL No. 61466	29 to 39 inches, gray (5Y 5/1) clay with a few, fine white (5Y 8/1) lime specks, black (10YR 2/1) when moist; massive; extremely hard when dry, extremely firm when moist, very sticky, very plastic when wet; plentiful medium and very fine roots; common very fine and medium tubular and interstitial pores; numerous slickensides; many small lime blotches scattered throughout horizon; mildly alkaline reaction, pH 7.5; clear, irregular boundary.
C1 RSL No. 61467	39 to 54 inches, light olive gray (5Y 6/2) clay with white (5Y 8/1) lime spots, olive gray (5Y 4/2) when moist; massive; extremely hard when dry, extremely firm when moist, very sticky and very plastic when wet; plentiful very fine roots; common very fine and fine tubular pores; frequent slickensides; a few vertical streaks of A horizon less than five millimeters wide mixed in; moderately alkaline reaction, pH 8.0; gradual, smooth boundary.
C2 RSL No. 61468	54 to 65 inches, gray (5Y 6/1) clay with white (5Y 8/1) fine lime spots, olive gray (5Y 4/2) when moist; massive; extremely hard when dry, very firm when moist, very sticky and very plastic when wet; few very fine roots; common very fine and fine tubular pores; frequent slickensides; vertical lime krotovina 1 1/2 inches diameter throughout horizon; moderately alkaline reaction, pH 8.0; clear, irregular boundary.
C3 RSL No. 61469	65 to 76 inches, light gray (5Y 7/1) silty clay, dark gray (5Y 4/1) when moist; mottled color light olive gray (5Y 6/2); massive breaking to fine and medium subangular blocky; very hard when dry, very firm when moist, very sticky and plastic when wet; no roots; very few fine tubular pores; horizon soil material has the appearance of weathered siltstone; large lime blotches present are violently effervescent upon application of dilute hydrochloric acid; moderately alkaline reaction, pH 8.0.

SOIL SURVEY LABORATORY Riverside, California

SOIL TYPE Diablo clay **LOCATION** Sonoma County, California

SOIL FAMILY: Chromic Pellox rert, fine, montmorillonitic, thermic.

SOIL NOS. S61Calif-49-12 **LAB. NOS.** 61470 - 61477

DEPTH INCHES	HORIZON	1B1b PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2	
0- 7	Ap	0.1	0.5	1.9	6.8	4.9	30.7	55.1	19.3	20.5	0	c
7-19	A11	0.0	0.6	2.0	7.0	5.0	30.7	54.7	20.7	19.2	0	c
19-30	A12	0.1	0.6	2.1	7.1	5.5	29.6	55.0	18.9	20.3	0	c
30-38	A(C)	0.4	0.8	1.5	4.8	3.7	34.1	54.7	15.0	25.6	0	c
38-46	C1	0.6	0.6	0.4	1.1	0.9	43.4	53.0	5.5	39.4	0	sic
46-56	C2	1.4	1.6	0.6	0.6	0.3	37.3	58.2	2.0	35.9	0	c
56-73	C3	0.8	0.5	0.2	0.2	0.1	31.5	66.7	1.2	30.5	0	c
73-83+	C4	0.1	0.0	0.1	0.2	0.1	53.2	46.3	10.2	43.2	0	sic

pH		ORGANIC MATTER			SATURATION EXTRACT SOLUBLE						8A1
8C1b SATURATED PASTE 1:1	1:5	8C1a 1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	6P1a Na^+	6Q1a K^+	6N1a Ca^{++}	6O1a Mg^{++}	6K1a Cl^-	6I1a $CO_3^=$	6J1a HCO_3^-
						← milliequivalents per liter →						
6.5		7.4	1.24	0.112	11	1.2	0.1	1.8	1.5	1.0	-	2.9
7.6		8.5	0.72	0.065	11	2.3	0.1	1.8	1.8	0.3	-	4.7
7.9		8.9	0.65	0.056	12	5.2	0.1	0.7	0.7	1.5	-	4.3
8.2		9.2	0.53	0.049	11	10.8	0.1	1.0	1.2	5.3	-	4.7
8.4		9.3	0.27	0.033		12.9	0.2	1.1	1.2	8.7	-	3.8
8.5		9.4	0.15			13.8	0.2	1.1	1.1	10.0	-	3.3
8.6		9.4				9.9	0.1	0.4	0.8	6.7	-	3.4
8.5		9.4				7.5	0.1	0.6	0.2	3.1	-	4.3

5A2a	EXTRACTABLE CATIONS 5B					5D1	8A1a	6E1b	6C1b	4B2		8A
CATION EXCHANGE CAPACITY (+ Na)	5B1a Ca 6N2b	5B1a Mg 6O2c	6H2a H	Exch. 5B1b Na 6P2a	Exch. 5B1b K 6Q2a	EXCH. Na %	Elec. Conduc. mmhos/cm. at 25° C.	$CaCO_3$ equivalent %	Ext. Iron % Fe	Soil water 15 atmos. Pct.		MOISTURE AT SATURATION %
	milliequivalents per 100g. soil →											
56.4	28.3	20.6	6.2	0.4	0.7	1	0.4	-	0.3	25.5		69.4
55.2	28.4	24.8	-	0.9	0.5	2	0.5	tr.	0.3	24.8		73.1
55.1	28.2	24.0	-	3.2	0.6	6	0.6	1	0.3	25.7		76.5
51.8	27.4	23.6	-	5.3	0.7	10	1.3	2	0.3	25.3		89.3
46.2	25.6	21.8	-	6.0	0.7	13	1.7	3	0.2	23.4		103.8
52.8	21.4	22.1	-	6.9	0.7	13	1.7	6	0.2	28.1		90.5
47.8	21.0	25.0	-	8.2	0.8	17	1.1	2	0.1	27.3		112.9
42.5	17.5	20.2	-	6.3	0.5	15	0.8	1	0.1	23.0		99.3

DIABLO CLAY
S61Calif-49-12

Location: Sonoma County, California. Sartori Ranch - 1600 feet west and 1000 feet south of northerly most water tank on Manor Lane. SW1/4, NW1/4, section 13, T. 5 N., R. 7 W.
Date of Sampling: June 28, 1961.
Collectors: Reuben Nelson, Leo C. Klameth, V. C. Miller, G. Lambert, J. H. Kashiwagi, F. Graham.
Classification: **Chromic Pelloxerert, fine, montmorillonitic, thermic.**

Vegetation: Natural before cultivation - annual grasses and forbs and a few scattered oaks. Use: Oat hay production. Climate: Subhumid mesothermal. Annual precipitation 24.7 inches, mean January temperature 46.7° F., mean July temperature 66.3° F., mean annual temperature 57.5° F. Parent Material: Soft sandstone and shale of the Petaluma formation. Elevation: 400 feet. Relief: Smoothly rolling hills on 14 percent slope with southeast aspect. Drainage: Moderately well. Biological Activity: No worm or rodent activity apparent at this time of year.

HORIZON	DESCRIPTION
Ap RSL No. 61470	0 to 7 inches, dark gray (N 4/) clay, very dark gray (10YR 3/1) when moist, surface quarter inch is strong very fine subangular blocky, remainder of horizon weak coarse subangular blocky structure; very hard when dry, firm when moist, very sticky and very plastic when wet; abundant very fine and fine roots; many very fine and fine interstitial pores; slightly acid reaction, pH 6.5; abrupt, wavy boundary.
A11 RSL No. 61471	7 to 19 inches, very dark gray (N 3/) clay with common fine distinct mottles of light gray (10YR 7/1) when dry, black (10YR 2/1) with common fine distinct mottles of gray (10YR 5/1) when moist; massive; extremely hard when dry, extremely firm when moist, very sticky and very plastic when wet; abundant very fine and fine roots; common very fine tubular pores; few small scattered lime concretions and blotches; common slickensides; slightly acid reaction, pH 6.5; gradual, smooth boundary.
A12 RSL No. 61472	19 to 30 inches, dark gray (5Y 4/1) clay, very dark grayish brown (2.5Y 3/2) when moist; massive breaking to weak fine subangular blocks; extremely hard when dry, very firm when moist, very sticky and very plastic when wet; plentiful very fine roots; common fine tubular pores; few small scattered lime concretions and blotches; moderately alkaline reaction, pH 8.0; gradual, smooth boundary.
A(C) RSL No. 61473	30 to 38 inches, dark gray (N 4/) clay with many medium distinct white (N 8/) mottles, olive gray (5Y 4/2) when moist; massive; extremely hard when dry, very firm when moist, very sticky and very plastic when wet, very few very fine roots; common very fine and fine tubular pores; scattered lime splotches throughout mass, fine and medium size; numerous slickensides; moderately alkaline reaction, pH 8.0; gradual, smooth boundary.
C1 RSL No. 61474	38 to 46 inches, light olive gray (5Y 6/2) clay, olive gray (5Y 4/2) when moist; massive; extremely hard when dry, very firm when moist, very sticky and very plastic when wet; very few very fine roots; common very fine and fine tubular pores; tonguing of A material into horizon, 2 to 10 millimeters in thickness; mass is limy with scattered splotches, but slickensides are less numerous than above; moderately alkaline reaction, pH 8.0; gradual, wavy boundary.
C2 RSL No. 61475	46 to 56 inches, light olive gray (5Y 6/2) clay, olive gray (5Y 4/2) when moist; massive; extremely hard when dry, firm when moist, sticky and plastic when wet; very few fine roots; common very fine and fine tubular pores; knots of weathered siltstone present breaking out to medium subangular blocky structure; few large soft lime streaks present, also some small and medium lime concretions mixed in with general matrix.
C3 RSL No. 61476	56 to 73 inches, light olive gray (5Y 6/2) clay, olive gray (5Y 4/2) when moist; massive; extremely hard when dry, firm when moist, very sticky and very plastic when wet; very few fine roots; common very fine and fine tubular pores; many evident slickensides; calcareous throughout mass with some large blotchy areas; small fragments of weathered siltstone throughout horizon, moderately alkaline reaction, pH 8.0; diffuse, irregular boundary.
C4 RSL No. 61477	73 to 83 inches +, light gray (5Y 7/2) clay, olive gray (5Y 4/2) when moist; massive; very hard when dry; firm when moist, very sticky and very plastic when wet; no roots; common very fine tubular pores; many slickensides; some portions of mass have medium subangular blocky structure; few small lime flecks present; effervescense is restricted to lime flecks; moderately alkaline reaction, pH 8.0.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL FAMILY: Chromic Pelloxerert, fine, montmorillonitic, thermic
SOIL Diablo clay SOIL Nos. S65Calif-27-10 LOCATION Monterey County, California

SOIL SURVEY LABORATORY Riverside, California LAB. Nos. 65443 - 65448

Depth (In.)	Horizon	1B1b Total Sand (2–0.05)	Total Silt (0.05–0.002)	Total Clay (< 0.002)	Sand (Pct. of < 2 mm) Very coarse (2–1)	Sand Coarse (1–0.5)	Sand Medium (0.5–0.25)	Sand Fine (0.25–0.1)	Sand Very fine (0.1–0.05)	Silt 0.05–0.02	Silt Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Carbonate clay	3A1a Non-carbonate clay	1/ Coarse fragments 1A2a > 2 Pct.	2 - 19 Pct. of < 76mm	19 - 76 Pct. of < 76mm
0-5	A11	8.2	35.1	56.7	0.4	0.5	0.4	1.4	5.5	14.0	21.1	20.4	2.7	0	57			
5-18	A12	8.9	34.3	56.8	0.4	0.5	0.2	1.1	6.7	13.3	21.0	20.8	2.2	0	57			
18-30	A13	7.6	34.6	57.8	0.4	0.4	0.2	0.9	5.7	13.7	20.9	20.1	1.9	0	58			
30-39	A14	6.8	34.7	58.5	0.3	0.3	0.2	0.7	5.3	14.3	20.4	20.1	1.5	0	59			
39-53	A15	7.2	35.1	57.7	0.4	0.3	0.2	0.7	5.6	14.6	20.5	20.7	1.6	0	58			
53-68+	C	21.0	52.9	26.1	0.0	1.4	3.2	7.7	8.7	19.7	33.2	32.9	12.3	0	26			

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. Iron as Fe Pct.	6E1b Carbonate as $CaCO_3$ Pct.	Bulk density 4A1f 1/3 bar g/cc	Bulk density 4A1h Oven dry g/cc	Bulk density g/cc	3B2 Cm	Water content Pct.	Water content 4B1c 1/3 bar Pct	Water content 4B2 15 bar Pct.	4D1 Extensibility COLEP in./in.	4D1 Extensibility COLE in./in.	pH 8C1a H_2O 1:1		
0-5	2.12	0.351	6		-	1.18	1.65		1.00		39.8	33.2	0.118	0.118	6.8		
5-18	1.02	0.102	10		-	1.19	1.56		1.00		36.8	29.2	0.093	0.093	6.9		
18-30	0.74				-	1.25	1.59		1.00		35.2	28.9	0.084	0.084	7.1		
30-39	0.50				-	1.25	1.68		1.00		35.9	32.4	0.102	0.102	7.5		
39-53	0.39				-	1.20	1.57		1.00		36.6	30.6	0.095	0.095	7.7		
53-68+	0.05				-	1.13	1.25		1.00		49.3	36.0	0.034	0.034	8.0		

Depth (In.)	Extractable bases 6N2a Ca	6O2a Mg	6P2a Na	5B1a 6Q2a K	Sum of bases	6H2a Ext. Acidity	Cation Exch. Capacity 5A1a NH_4OAc	Cation Exch. Capacity 5A3a Sum	6G1d KCl Ext. Al^{+++}	Atterberg limits Plastic limit	Atterberg limits Liquid limit	Atterberg limits Plastic index	5D2 Exch. Na	Base saturation 5C1 NH_4OAc	
	meq/100 g									Pct. of <0.4 mm			Pct.	Pct	Pct.
0-5	34.1	12.1	0.3	1.4	47.9		44.6							100+	
5-18	34.3	11.2	0.6	0.7	46.8		45.8			30	65	35		100+	
18-30	34.4	10.7	1.1	0.6	46.8		44.3							100+	
30-39	33.5	10.1	1.5	0.6	45.7		43.4							100+	
39-53	32.2	10.5	1.6	0.7	45.0		42.2							100+	
53-68+	30.1	10.1	1.9	0.6	42.7		38.8			49	73	24	5	100+	

Depth (In.)	Clay mineralogy (<0.002 mm) 7A Mont.	Verm.	Mica	Kaolin	X-ray
0-5	xxxx			x	
5-18					
18-30	xxxx			x	
30-39					
39-53					
53-68+	xxxx			t	

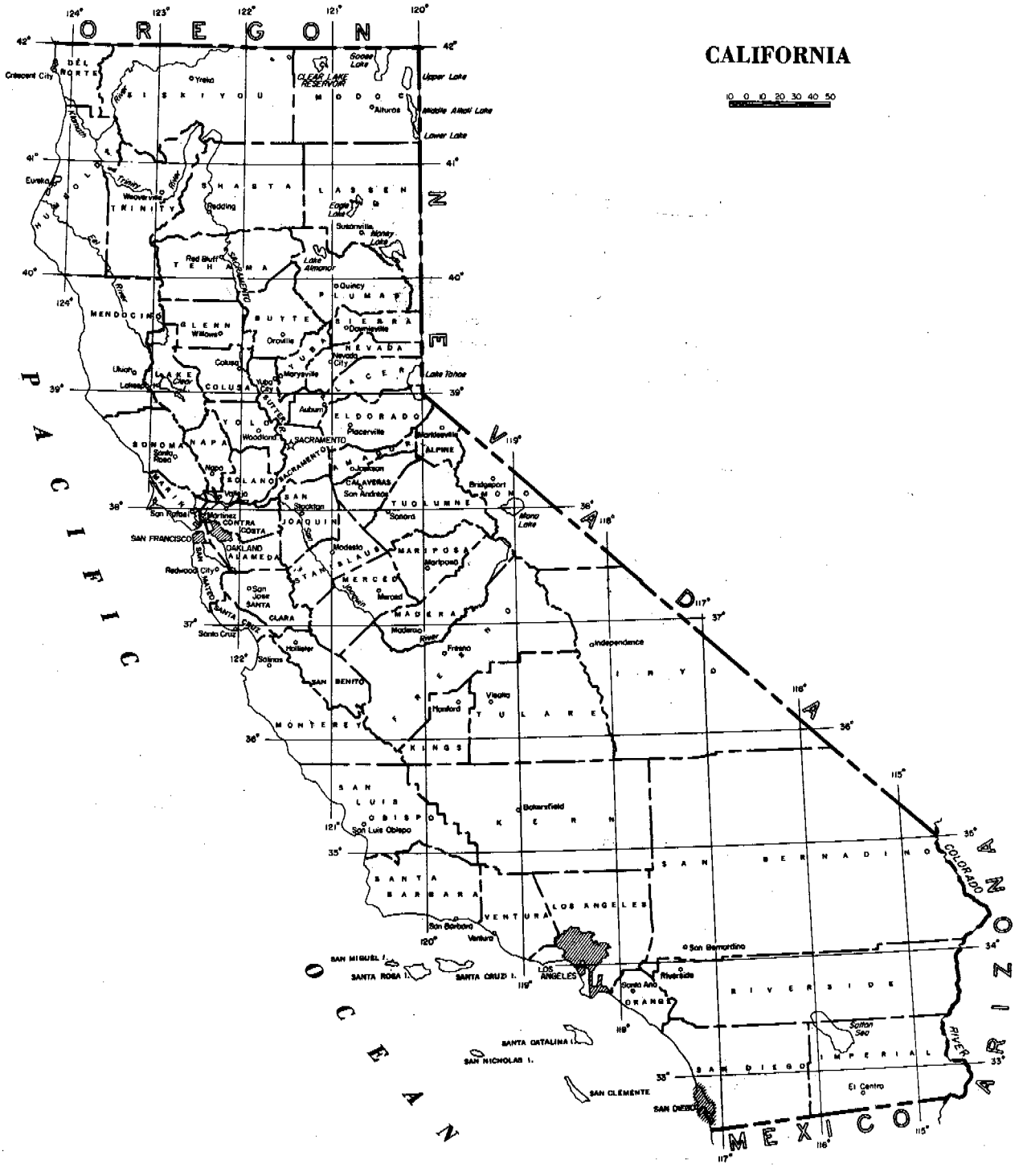
1/ Apparent coarse fragments dispersed readily. Hence the characterization sample was ground whole and all chemical and physical data are on a whole soil basis.

- = looked for but not found
t = trace
x = small
xx = moderate
xxx = abundant
xxxx = dominant

DIABLO CLAY
S65Calif-27-10

Location: Monterey County, California. East 1/4 line of Sec. 25, T20S, R9E, about 6 miles east of San Lucas off Highway 198. (SE corner of $SE\frac{1}{4}$ of $NE\frac{1}{4}$.) Date of Sampling: May 19, 1965.
Description by: Lewis C. Leifer. Collectors: W. D. Nettleton and Benny R. Brasher; C. J. Weisel, R. D. Waggoner, F. J. Pecarich. Site selection by T. D. Cook.
Classification: **Chromic Pelloxerert, fine, montmorillonitic, thermic. (Grumusol).**
Vegetation: Range - soft chess, wild oats, ripgut, brome, filaree, annual fescue. Climate: Precipitation 10 inches; mean annual temperature 62°F., mean January temperature 59°F., mean July temperature 68°F. Parent Material: Shale, Plio-Pleistocene, non-marine. Topography: Moderately steep slopes, locally slightly concave, 26 percent NE facing slope; about 100 feet below ridge top. Elevation: 1200 feet. Drainage: Well drained, permeability slow, runoff medium. Soil Moisture: Very slightly moist to 18 inches and slightly moist to about 40 inches, very nearly dry below, mostly wilting point and below.
Remarks: Field determinations of pH by Truog Kit. Classification assumes intersecting slickensides. Vertical cracks > 0.4 inches (1cm) extend below 20 inches (50 cm), cracks < 0.4 inch (1 cm) extends through the A13 to 30 to 36 inches (76-91 cm). Some parts of the pit have calcareous soil in the lower solum, but not on the face used for sampling and description. This soil in this area occurs only on north, concave, or toe slopes within broader areas of Shedd or Linne. Asterisks indicate horizons sampled for California Division of Highways.

HORIZON	DESCRIPTION
A11 RSL 65443	0 to 5 inches, very dark gray (10YR 3/1) clay, moist or dry; top 1 inch is dark gray (5Y 4/1); moderate coarse angular blocky structure; extremely hard, firm, very sticky and very plastic; plentiful very fine roots; common very fine interstitial and common very fine tubular pores; surface has 1/8 to 1/4 inch thick layer of fine strong subangular blocks occurring on 75 percent of the area; **neutral (pH 7.0); gradual smooth boundary.**
*A12 RSL 65444	5 to 18 inches, very dark gray (10YR 3/1) moist or dry; moderate coarse subangular blocky structure; very hard, firm, very sticky and very plastic; plentiful very fine roots; common very fine interstitial and few very fine tubular pores; slightly acid (pH 6.5); gradual smooth boundary.
A13 RSL 65445	18 to 30 inches, dark gray (10YR 4/1) clay, very dark gray (10YR 3/1) moist; moderate coarse subangular blocky structure; very hard, firm, very sticky and very plastic; few very fine roots; few very fine interstitial and very few very fine tubular pores; numerous fine and medium shiny clay pressure faces; few weak slickensides, distinct slickensides do not appear to intersect; neutral (pH 7.0); gradual smooth boundary.
A14 RSL 65446	30 to 39 inches, dark gray (10YR 4/1) clay; very dark grayish brown (2.5Y 3/2) moist; weak medium subangular blocky structure; very hard, firm, very sticky and very plastic; few very fine roots; very few very fine tubular and few very fine interstitial pores; slickensides and pressure faces as in A13 above; moderately alkaline (pH 8.0), noncalcareous; gradual smooth boundary.
A15 RSL 65447	39 to 53 inches, grayish brown (2.5Y 5/2) clay, very dark grayish brown (2.5Y 3/2) moist; weak medium subangular blocky structure; very hard, firm, very sticky and very plastic; no roots; moderately alkaline (pH 8.0), noncalcareous; abrupt wavy boundary.
*C RSL 65448	53 to 68 inches, soft shale, pale yellow (5Y 7/3) moist; shale can be broken in hand with some difficulty.


CALIFORNIA
10 0 10 20 30 40 50
OREGON
NEVADA
ARIZONA
MEXICO
PACIFIC
OCEAN
DEL NORTE
SISKIYOU
MODOC
HUMBOLDT
TRINITY
SHASTA
LASSEN
TEHAMA
PLUMAS
MENDOCINO
GLENN
BUTTE
SIERRA
NEVADA
YUBA
LAKE
COLUSA
SUTTER
LACER
YOLO
ELDORADO
SONOMA
NAPA
SACRAMENTO
ALPINE
AMADOR
SOLANO
CALAVERAS
MARIN
SAN JOAQUIN
TUOLUMNE
MONO
CONTRA COSTA
SAN FRANCISCO
OAKLAND
ALAMEDA
STANISLAUS
MARIPOSA
MERCED
SAN MATEO
SANTA CLARA
MADERA
SANTA CRUZ
FRESNO
IRYO
SAN BENITO
TULARE
MONTEREY
KINGS
SAN LUIS OBISPO
KERN
SAN BERNADINO
SANTA BARBARA
VENTURA
LOS ANGELES
RIVERSIDE
ORANGE
SAN DIEGO
IMPERIAL
COLORADO RIVER
SAN MIGUEL I.
SANTA ROSA I.
SANTA CRUZ I.
SANTA CATALINA I.
SAN NICHOLAS I.
SAN CLEMENTE
Crescent City
Yreka
Alturas
Eureka
Weaverville
Redding
Susanville
Red Bluff
Quincy
Downieville
Willows
Oroville
Nevada City
Colusa
Marysville
Yuba City
Lakeport
Ukiah
Auburn
Placerville
Woodland
Santa Rosa
Napa
Jackson
San Andreas
Vallejo
Stockton
Bridgeport
Sonora
San Rafael
Martinez
Modesto
Mariposa
Redwood City
San Jose
Merced
Santa Cruz
Hollister
Salinas
Madera
Fresno
Independence
Visalia
Hanford
Bakersfield
San Luis Obispo
San Bernardino
Riverside
Santa Ana
Ventura
Santa Barbara
Los Angeles
Sutton Sea
El Centro
Mono Lake
Lake Tahoe
Lower Lake
Upper Lake
Middle Alkali Lake
Goose Lake
Eagle Lake
Lake Almanor
Clear Lake
CLEAR LAKE RESERVOIR
Klamath River
Trinity River
Eel River
Sacramento River
Joaquin River
Kern River
Colorado River
124°
123°
122°
121°
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