Soil Survey Investigations Report No. 30

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

...TEXAS

SOIL CONSERVATION SERVICE • U.S. DEPARTMENT OF AGRICULTURE
In cooperation with
TEXAS AGRICULTURAL EXPERIMENT STATION

Soil survey investigations reports already published:

SSIR No. 1	Soil Survey Laboratory Methods and Procedures for Collecting Soil Samples
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:
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SSIR No. 3	Iowa
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JANUARY 1976

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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. SSIR No. 21 reports a single specific study. Other reports in the series contain pedon descriptions and data from the individual states and Puerto Rico and the Virgin Islands. The entire series is listed on the inside front cover.

This report contains pedon descriptions and data obtained in Texas from 1953 to 1970. The majority of laboratory analyses were conducted at the Soil Survey Investigations Unit, Lincoln, Nebraska, and the laboratories at Texas Agricultural Experiment Station, College Station, Texas.

Laboratory data for different soils cannot always be compared without allowance for the method. Methods are indexed by code or footnote in data sheet column headings and are identified briefly on the code sheets. Detailed explanations of coded procedures are in SSIR No. 1.

Many of the soil descriptions published herein were prepared as working documents, not necessarily for publication. Some contain unusually detailed information pertinent to specific soil survey investigations. Such information, including older concepts of soil series, relationships among pedons, and field estimates of properties, is useful in a publication of this type. Editing is, therefore, minimal with emphasis toward preservation of descriptive data.

Many pedons no longer represent the soil series with which they were originally identified. All were classified during the period 1970 to 1974 and were checked against series classification as of October 1974. Some series names changed and are footnoted where the original name carries useful connotations. Pedons that are not included within the limits of recognized series are classified only to the family level. In the taxonomic and geographic indexes and in the body of the text, pedons are arranged by taxonomic unit.

CLASSIFICATION INDEX

ALFISOL

AQUALF

ALBAQUALF

Typic Albaqualf
Fine-loamy, mixed, thermic
Series not designated 3

Vertic Albaqualf
Fine, montmorillonitic, thermic
Edna loam 5
Lufkin loam 7
Lufkin fine sandy loam 9
Lufkin silt loam 11

NATRAQUALF

Typic Natraqualf
Fine, montmorillonitic, hyperthermic
Livia loam 13

Fine, mixed, hyperthermic
Matagorda very fine sandy loam 15
Matagorda very fine sandy loam 17

Albic Natraqualf
Fine, montmorillonitic, hyperthermic
Series not designated 19

OCHRAQUALF

Typic Ochraqualf
Fine-loamy, mixed, hyperthermic
Orelia fine sandy loam 21
Series not designated 23
Series not designated 25

Coarse-loamy, siliceous, thermic
Sorter silt loam 27
Sorter silt loam 29

Aeric Ochraqualf
Fine-loamy, mixed, hyperthermic
Series not designated 31

Vertic Ochraqualf
Fine, montmorillonitic, thermic
Wilson silt loam 33
Wilson silt loam 35
Wilson clay loam 37
Wilson loam 39

UDALF

FRAGIUDALF

Glossaquic Fragiudalf
Fine-loamy, siliceous, thermic
Splendora fine sandy loam 41
Splendora fine sandy loam 43

GLOSSUDALF

Aquic Glossudalf
Fine-silty over clayey, thermic
Series not designated 45

Haplic Glossudalf
Fine, mixed, thermic
Series not designated 47

HAPLUDALF

Vertic Hapludalf
Fine, montmorillonitic, thermic
Series not designated 49

Very fine, montmorillonitic, thermic
Series not designated 51

PALEUDALF

Typic Paleudalf
Fine-loamy, siliceous, thermic
Attoyac 53

Coarse-loamy, siliceous, thermic
Woden loamy fine sand 55
Woden loamy fine sand 57
Woden fine sandy loam 59
Woden fine sandy loam 61

Aquic Paleudalf
Fine-loamy, siliceous, thermic
Katy fine sandy loam 63

Grossarenic Paleudalf
Loamy, siliceous, thermic
Kenney fine sand 65
Kenney loamy fine sand 67

Plinthic Paleudalf
Fine-loamy, siliceous, thermic
Segno loamy fine sand 69
Segno fine sandy loam 71

Rhodic Paleudalf
Fine, kaolinitic, thermic
Series not designated 73

USTALF

HAPLUSTALF

Udic Haplustalf
Fine-loamy, mixed, thermic
Grandfield fine sandy loam 75
Series not designated 77

Fine, mixed, thermic
Lindy loam 79

PALEUSTALF

Typic Paleustalf
Fine, mixed, thermic
Wichita silty clay loam 81
Wichita silty clay loam 83

Aquic Arenic Paleustalf
Loamy, siliceous, thermic
Nimrod fine sand 85
Nimrod fine sand 87

Aridic Paleustalf
Fine-loamy, mixed, thermic
Amarillo fine sandy loam 89
Amarillo fine sandy loam 91
Amarillo loamy fine sand 93
Amarillo loamy fine sand 95
Amarillo sandy clay loam 97
Patricia fine sand 99
Patricia fine sand 101
Series not designated 103

Fine, carbonatic, mesic
Series not designated 105

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ALFISOL--Continued

USTALF--Continued

PALEUSTALF--Continued

Udertic Paleustalf
Fine, montmorillonitic, thermic
Axtell very fine sandy loam 107
Axtell fine sandy loam 109
Crockett fine sandy loam 111
Crockett fine sandy loam 113
Crockett loamy fine sand 115
Series not designated 117
Series not designated 119

Udic Paleustalf
Fine-loamy, mixed, thermic
Miles very fine sandy loam 121
Miles fine sandy loam 123
Miles fine sandy loam 125

Fine, mixed, thermic
Windthorst loamy fine sand 127
Series not designated 129

ARIDISOL

ORTHID

CALCIORTHID

Typic Calciorthid
Fine-silty, mixed, thermic
Series not designated 131

Ustollic Calciorthid
Fine-silty, mixed, thermic
Hoban silty clay loam 133
Hoban loam 135
Reagan loam 137
Reagan clay loam 139

CAMBORTHID

Ustollic Camborthid
Fine-silty, mixed, thermic
Hodgins silty clay loam 141
Hodgins silt loam 143

GYPSIORTHID

Calcic Gypsiorthid
Fine-loamy, gypsic, thermic
Reeves clay loam 145
Reeves silt loam 147

Fine-silty, mixed, thermic
Series not designated 149

ENTISOL

PSAMMENT

USTIPSAMMENT

Typic Ustipsamment
Mixed, thermic
Tivoli fine sand 151

INCEPTISOL

OCHREPT

USTOCHREPT

Typic Ustochrept
Loamy, carbonatic, thermic, shallow
Brackett loam 153
Brackett loam 155

Aridic Ustochrept
Fine-silty, thermic
Series not designated 157

MOLLISOL

AQUOLL

ARGIAQUOLL

Typic Argiaquoll
Fine-silty, mixed, thermic
Morey silt loam 159
Morey silt loam 161

Vertic Argiaquoll
Fine, montmorillonitic, thermic
Bernard silty clay loam 163

UDOLL

ARGIUDOLL

Aquic Argiudoll
Fine, mixed, thermic
Bonham silt loam 165
Bonham silt loam 167

USTOLL

ARGIUSTOLL

Typic Argiustoll
Montmorillonitic, thermic
Series not designated 169

Pachic Argiustoll
Fine-loamy, mixed, hyperthermic
Series not designated 171
Series not designated 173

Udic Argiustoll
Fine, mixed, thermic
Series not designated 175

CALCIUSTOLL

Typic Calciustoll
Fine-loamy, mixed, thermic
Venus clay loam 177

Fine-silty, mixed, thermic
Lewisville clay loam 179
Series not designated 181

Fine-silty, carbonatic, thermic
Series not designated 183
Series not designated 185

Loamy, carbonatic, thermic, shallow
Series not designated 187

Aridic Calciustoll
Fine-loamy, mixed, thermic
Portales fine sandy loam 189
Portales fine sandy loam 191
Series not designated 193

Fine-silty, mixed, hyperthermic
Uvalde clay loam 195
Uvalde loam 197

Fine-loamy, mixed, mesic
Series not designated 199

Fine-silty, mixed, mesic
Series not designated 201

MOLLISOL--Continued

USTOLL--Continued

CALCIUSTOLL--Continued

Aridic Calciustoll--Continued
Fine-silty, mixed, thermic
Series not designated 203

Lithic Calciustoll
Clayey-skeletal, montmorillonitic, thermic
Tarrant cobbly clay 205
Tarrant cobbly silty clay 207
Tarrant cobbly silty clay 209
Tarrant cobbly silty clay 211

Petrocalcic Calciustoll
Fine-silty, mixed, thermic
Series not designated 213
Series not designated 215

Vertic Calciustoll
Fine, montmorillonitic, thermic
Series not designated 217

Fine, mixed, thermic
Knippa silty clay 219
Knippa clay 221

HAPLUSTOLL

Typic Haplustoll
Fine-silty, mixed, mesic
Series not designated 223

Aridic Haplustoll
Fine, mixed, mesic
Series not designated 225

Entic Haplustoll
Fine-silty, carbonatic, thermic
Austin silty clay 227
Austin silty clay 229

Clayey, mixed, thermic, shallow
Stephen clay 231
Stephen silty clay 233

Pachic Haplustoll
Thermic
Series not designated 235

Vertic Haplustoll
Fine, montmorillonitic, thermic
Krum silty clay 237

PALEUSTOLL

Typic Paleustoll
Fine, mixed, thermic
Tillman silty clay loam 239
Tillman clay loam 241

Aridic Paleustoll
Fine-loamy, mixed, thermic
Acuff sandy clay loam 243
Acuff sandy clay loam 245

Fine-silty, mixed, mesic
Series not designated 247

Torrertic Paleustoll
Fine, mixed, mesic
Series not designated 249
Series not designated 251

ULTISOL

UDULT

PALEUDULT

Arenic Plinthic Paleudult
Clayey, kaolinitic, thermic
Conroe gravelly loamy fine sand 253

Grossarenic Paleudult
Loamy, siliceous, thermic
Darco fine sand 255

Loamy, mixed, thermic
Series not designated 257

Plinthic Paleudult
Clayey, kaolinitic, thermic
Series not designated 259

Rhodic Paleudult
Clayey, kaolinitic, thermic
Nacogdoches fine sandy loam 261

Fine-loamy, thermic
Series not designated 263

VERTISOL

UDERT

PELLUDERT

Typic Pelludert
Fine, montmorillonitic, thermic
Lake Charles clay 265
Lake Charles clay 267
Lake Charles clay 269
Lake Charles clay 271

Very fine, montmorillonitic, thermic
Series not designated 273

Fine, montmorillonitic, hyperthermic
Francitas silty clay loam 275
Francitas clay loam 277

Entic Pelludert
Fine, montmorillonitic, thermic
Beaumont silty clay 279
Beaumont silty clay 281
Beaumont clay 283
Beaumont clay 285
Beaumont clay 287

Very fine, montmorillonitic, thermic
Series not designated 289

USTERT

CHROMUSTERT

Typic Chromustert
Fine, montmorillonitic, thermic
Series not designated 291

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VERTISOL--Continued

USTERT--Continued

CHROMUSTERT--Continued

Udic Chromustert
Clayey, montmorillonitic, thermic, shallow
Crawford silty clay 293
Crawford silty clay 295

PELLUSTERT

Typic Pellustert
Fine, montmorillonitic, hyperthermic
Victoria clay 297
Victoria clay 299
Victoria clay 301
Victoria clay 303
Series not designated 305

Very fine, montmorillonitic, hyperthermic
Series not designated 307

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Udic Pellustert
Fine, montmorillonitic, thermic
Branyon clay 309
Branyon silty clay 311
Branyon silty clay 313
Burleson clay 315
Burleson clay 317
Burleson silty clay 319
Houston Black clay 321
Houston Black clay 323
Series not designated 325
Series not designated 327
Series not designated 329
Series not designated 331
Series not designated 333
Series not designated 335

Very fine, montmorillonitic, thermic
Series not designated 337

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BASTROP COUNTY		
Alfisol		
Ustalf		
Paleustalf	Series not designated	117
BAYLOR COUNTY		
Alfisol		
Ustalf		
Haplustalf	Grandfield fine sandy loam	75
BEE COUNTY		
Vertisol		
Ustert		
Pellustert	Series not designated	305
BELL COUNTY		
Mollisol		
Ustoll		
Calciustoll	Lewisville clay loam	179
	Venus clay loam	177
Vertisol		
Ustert		
Pellustert	Houston Black clay	323
BLANCO COUNTY		
Inceptisol		
Ochrept		
Ustochrept	Brackett loam	153
BOSQUE COUNTY		
Mollisol		
Ustoll		
Haplustoll	Krum silty clay	237
BRAZOS COUNTY		
Alfisol		
Aqualf		
Albaqualf	Lufkin loam	7
	Lufkin fine sandy loam	9
Mollisol		
Ustoll		
Argiustoll	Series not designated	169
Ultisol		
Udult		
Paleudult	Series not designated	257
BROWN COUNTY		
Vertisol		
Ustert		
Chromustert	Series not designated	291
BURLESON COUNTY		
Vertisol		
Ustert		
Pellustert	Burleson silty clay	319
CALHOUN COUNTY		
Alfisol		
Aqualf		
Natraqualf	Livia loam	13
	Matagorda very fine sandy loam	15
	Matagorda very fine sandy loam	17
	Series not designated	19

Classification	Soil Series	Page
Vertisol		
Udert		
Pelludert	Francitas silty clay loam	275
	Francitas clay loam	277
CARSON COUNTY		
Inceptisol		
Ochrept		
Ustochrept	Series not designated	157
Mollisol		
Ustoll		
Calciustoll	Series not designated	193
	Series not designated	203
CASS COUNTY		
Alfisol		
Udalf		
Paleudalf	Woden loamy fine sand	55
	Woden loamy fine sand	57
CHAMBERS COUNTY		
Vertisol		
Udert		
Pelludert	Beaumont silty clay	279
	Beaumont clay	283
CHEROKEE COUNTY		
Alfisol		
Udalf		
Paleudalf	Kenney fine sand	65
	Kenney loamy fine sand	67
	Woden fine sandy loam	59
	Woden fine sandy loam	61
COLLIN COUNTY		
Mollisol		
Ustoll		
Haplustoll	Stephen clay	231
	Stephen silty clay	233
	Series not designated	235
Vertisol		
Ustert		
Pellustert	Burleson clay	315
	Burleson clay	317
	Series not designated	327
	Series not designated	329
	Series not designated	331
	Series not designated	337
COOKE COUNTY		
Alfisol		
Ustalf		
Haplustalf	Lindy loam	79
CORYELL COUNTY		
Mollisol		
Ustoll		
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	Series not designated	185
	Series not designated	187
	Series not designated	217
Vertisol		
Ustert		
Chromustert	Crawford silty clay	293

Classification	Soil Series	Page
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Ustalf		
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Entisol		
Psamment		
Ustipsamment	Tivoli fine sand	151
DENTON COUNTY		
Vertisol		
Ustert		
Pellustert	Series not designated	333
	Series not designated	335
EASTLAND COUNTY		
Alfisol		
Ustalf		
Paleustalf	Windthorst loamy fine sand	127
ELLIS COUNTY		
Vertisol		
Ustert		
Pellustert	Houston Black clay	321
ERATH COUNTY		
Alfisol		
Ustalf		
Haplustalf	Series not designated	77
Paleustalf	Nimrod fine sand	85
	Nimrod fine sand	87
FALLS COUNTY		
Alfisol		
Aqualf		
Ochraqualf	Wilson clay loam	37
FANNIN COUNTY		
Mollisol		
Udoll		
Argiudoll	Bonham silt loam	165
	Bonham silt loam	167
Vertisol		
Ustert		
Pellustert	Series not designated	325
FAYETTE COUNTY		
Alfisol		
Aqualf		
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Vertisol		
Ustert		
Pellustert	Branyon clay	309
FORT BEND COUNTY		
Alfisol		
Aqualf		
Albaqualf	Edna loam	5
Udalf		
Paleudalf	Katy fine sandy loam	63
Mollisol		
Aquoll		
Argiaquoll	Bernard silty clay loam	163
Vertisol		
Udert		
Pelludert	Beaumont clay	285
	Lake Charles clay	265
FRANKLIN COUNTY		
Alfisol		
Aqualf		
Albaqualf	Lufkin silt loam	11
GILLESPIE COUNTY		
Inceptisol		
Ochrept		
Ustochrept	Brackett loam	155
GONZALES COUNTY		
Alfisol		
Ustalf		
Paleustalf	Crockett loamy fine sand	115
HANSFORD COUNTY		
Alfisol		
Ustalf		
Paleustalf	Series not designated	105
Mollisol		
Ustoll		
Calciustoll	Series not designated	199
	Series not designated	201
Haplustoll	Series not designated	223
	Series not designated	225
Paleustoll	Series not designated	247
	Series not designated	249
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HARDEMAN COUNTY		
Mollisol		
Ustoll		
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HARRIS COUNTY		
Vertisol		
Udert		
Pelludert	Lake Charles clay	267
HASKELL COUNTY		
Alfisol		
Ustalf		
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HOWARD COUNTY		
Alfisol		
Ustalf		
Paleustalf	Amarillo loamy fine sand	95
	Amarillo sandy clay loam	97
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Udert		
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Mollisol		
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Alfisol		
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	Wilson silt loam	35
Ustalf		
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	Axtell fine sandy loam	109
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Alfisol		
Ustalf		
Paleustalf	Miles very fine sandy loam	121
Mollisol		
Ustoll		
Paleustoll	Tillman clay loam	241
KNOX COUNTY		
Alfisol		
Ustalf		
Paleustalf	Miles fine sandy loam	123
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Alfisol		
Ustalf		
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Ustalf		
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	Patricia fine sand	101
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Ustoll		
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	Acuff sandy clay loam	245
MC LENNAN COUNTY		
Mollisol		
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	Austin silty clay	229
Vertisol		
Ustert		
Chromustert	Crawford silty clay	295
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Ustoll		
Calciustoll	Tarrant cobbly silty clay	209
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Udult		
Paleudult	Conroe gravelly loamy fine sand	253
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Orthid		
Camborthid	Hodgins silty clay loam	141
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Orthid		
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Ultisol		
Udult		
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SAN PATRICIO COUNTY		
Alfisol		
Aqualf		
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	Series not designated	23
	Series not designated	25
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Ustert		
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Alfisol		
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Aridisol		
Orthid		
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Ustoll		
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Ultisol		
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Burleson clay	S62TX-43-3	Pellustert	315
Burleson clay	S62TX-43-4	Pellustert	317
Burleson silty clay	S63TX-26-90	Pellustert	319
Conroe gravelly loamy fine sand	S64TX-170-5	Paleudult	253
Crawford silty clay	S63TX-50-5	Chromustert	293
Crawford silty clay	S63TX-155-1	Chromustert	295
Crockett fine sandy loam	S62TX-129-3	Paleustalf	111
Crockett fine sandy loam	S63TX-175-90	Paleustalf	113
Crockett loamy fine sand	S62TX-89-90	Paleustalf	115
Darco fine sand	S54TX-234-90	Paleudult	255
Edna loam	S55TX-79-92	Albaqualf	5
Francitas silty clay loam	S70TX-29-25	Pelludert	275
Francitas clay loam	S70TX-29-27	Pelludert	277
Grandfield fine sandy loam	S57TX-12-90	Haplustalf	75
Hoban silty clay loam	S58TX-195-90	Calciorthid	133
Hoban loam	S61TX-195-2	Calciorthid	135
Hodgins silty clay loam	S61TX-186-1	Camborthid	141
Hodgins silt loam	S61TX-186-2	Camborthid	143
Houston Black clay	S53TX-70-1	Pellustert	321
Houston Black clay	S54TX-14-90	Pellustert	323
Katy fine sandy loam	S55TX-79-93	Paleudalf	63
Kenney fine sand	S54TX-37-90	Paleudalf	65
Kenney loamy fine sand	S54TX-37-91	Paleudalf	67
Knippa silty clay	S63TX-232-1	Calciustoll	219
Knippa clay	S63TX-232-2	Calciustoll	221
Krum silty clay	S57TX-18-90	Haplustoll	237
Lake Charles clay	S55TX-79-94	Pelludert	265
Lake Charles clay	S55TX-101-90	Pelludert	267
Lake Charles clay	S55TX-235-90	Pelludert	269
Lake Charles clay	S55TX-241-90	Pelludert	271
Lewisville clay loam	S63TX-14-2	Calciustoll	179
Lindy loam	S63TX-49-1	Haplustalf	79
Livia loam	S70TX-29-26	Natraqualf	13
Lufkin loam	S53TX-21-90	Albaqualf	7
Lufkin fine sandy loam	S54TX-21-91	Albaqualf	9
Lufkin silt loam	S54TX-80-90	Albaqualf	11

SOIL SERIES INDEX[1]

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Matagorda very fine sandy loam	S70TX-29-23	Natraqualf	17
Matagorda very fine sandy loam	S70TX-29-22	Natraqualf	15
Miles very fine sandy loam	S57TX-132-90	Paleustalf	121
Miles fine sandy loam	S57TX-138-90	Paleustalf	123
Miles fine sandy loam	S57TX-208-90	Paleustalf	125
Morey silt loam	S59TX-123-5	Argiaquoll	159
Morey silt loam	S59TX-123-6	Argiaquoll	161
Nacogdoches fine sandy loam	S57TX-203-91	Paleudult	261
Nimrod fine sand	S63TX-72-1	Paleustalf	85
Nimrod fine sand	S63TX-72-2	Paleustalf	87
Orelia fine sandy loam	S56TX-205-1	Ochraqualf	21
Patricia fine sand	S53TX-153-58	Paleustalf	99
Patricia fine sand	S53TX-153-64	Paleustalf	101
Portales fine sandy loam	S53TX-153-60	Calciustoll	189
Portales fine sandy loam	S53TX-153-61	Calciustoll	191
Reagan loam	S61TX-231-1	Calciorthid	137
Reagan clay loam	S61TX-231-2	Calciorthid	139
Reeves clay loam	S61TX-195-3	Gypsiorthid	145
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Segno loamy fine sand	S64TX-170-3	Paleudalf	69
Segno fine sandy loam	S64TX-170-4	Paleudalf	71
Sorter silt loam	S64TX-170-7	Ochraqualf	27
Sorter silt loam	S64TX-170-8	Ochraqualf	29
Splendora fine sandy loam	S64TX-170-1	Fragiudalf	41
Splendora fine sandy loam	S64TX-170-2	Fragiudalf	43
Stephen clay	S62TX-43-1	Haplustoll	231
Stephen silty clay	S62TX-43-2	Haplustoll	233
Tarrant cobbly clay	S64TX-155-1	Calciustoll	205
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Tillman silty clay loam	S57TX-99-90	Paleustoll	239
Tillman clay loam	S57TX-132-91	Paleustoll	241
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Uvalde clay loam	S63TX-254-1	Calciustoll	195
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Victoria clay	S55TX-178-91	Pellustert	299
Victoria clay	S55TX-205-90	Pellustert	301
Victoria clay	S56TX-178-3	Pellustert	303
Wichita silty clay loam	S57TX-104-90	Paleustalf	81
Wichita silty clay loam	S57TX-138-91	Paleustalf	83
Windthorst loamy fine sand	S61TX-67-90	Paleustalf	127
Wilson silt loam	S62TX-129-1	Ochraqualf	33
Wilson silt loam	S62TX-129-2	Ochraqualf	35
Wilson clay loam	S63TX-73-90	Ochraqualf	37
Wilson loam	S63TX-175-91	Ochraqualf	39
Woden loamy fine sand	S54TX-34-90	Paleudalf	55
Woden loamy fine sand	S54TX-34-91	Paleudalf	57
Woden fine sandy loam	S54TX-37-92	Paleudalf	59
Woden fine sandy loam	S54TX-37-93	Paleudalf	61

SOIL SERIES INDEX

1/ Soils without designated series are not included in this index.

2/ County numbers (the number following "TX" in the soil survey No.) are as follows:

11. Bastrop
12. Baylor
13. Bee
14. Bell
16. Blanco

18. Bosque
21. Brazos
25. Brown
26. Burleson
29. Calhoun

33. Carson
34. Cass
36. Chambers
37. Cherokee
43. Collin

49. Cooke
50. Coryell
58. Dawson
61. Denton
67. Eastland

70. Ellis
72. Erath
73. Falls
74. Fannin
75. Fayette

79. Fort Bend
80. Franklin
86. Gillespie
89. Gonzales
98. Hansford
99. Hardeman

101. Harris
104. Haskell
114. Howard
120. Jackson
123. Jefferson

125. Jim Wells
129. Kaufman
132. Kent
138. Knox
140. Lamb

153. Lynn
155. McLennan
164. Menard
169. Montague
170. Montgomery

174. Nacogdoches
175. Navarro
178. Nueces
186. Pecos
195. Reeves

203. San Augustine
205. San Patricio
208. Scurry
231. Upton
232. Uvalde

234. Van Zandt
235. Victoria
241. Wharton
246. Williamson
249. Wise
254. Zavala

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

     blank: analysis not run

     <: less than reported amount or none present
3. PARTICLE-SIZE ANALYSES
   - 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
   - B. Particles >2-mm
     1. Weight estimates
        - a. By field and laboratory weighing
        - b. From volume and weight estimates
     2. Volume estimates
4. FABRIC-RELATED ANALYSES
   - A. Bulk density
     1. Saran-coated clods
        - a. Field state
        - b. Airdry
        - c. 30-cm absorption
        - d. 1/3-bar desorption I
        - e. 1/3-bar desorption II
        - f. 1/3-bar desorption III
        - g. 1/10-bar desorption
        - h. Ovendry
   - B. Water retention
     1. Pressure-plate extraction (1/3 or 1/10 bar)
        - a. Sieved samples
        - b. Soil pieces
        - c. Natural clods
     2. Pressure-membrane extraction (15 bars)
        - a. Field-moist samples
     4. Field state
     5. Airdry
   - C. Water-retention difference
     1. 1/3 bar to 15 bars
     2. 1/10 bar to 15 bars
   - D. Linear extensibility
     1. Dry to moist
   - E. Micromorphology
     1. Thin sections
        - a. Preparation
        - b. Interpretation
        - c. Moved-clay percentage
   - F. Plasticity index
     1. Liquid limit
     2. Upper plastic limit
5. ION-EXCHANGE ANALYSES
   - A. Cation-exchange capacity
     1. NH_4OAc, pH 7.0
        - a. Direct distillation
     2. NaOAc, pH 8.2
        - a. Centrifuge method
     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
5. ION-EXCHANGE ANALYSES--Continued
   - B. Extractable bases
     1. NH_4OAc extraction
        - a. Uncorrected
        - b. Corrected (exchangeable)
        - c. See 5B4
     2. KCl-TEA extraction, pH 8.2
     3. KCl-TEA, pH 8.2 (revised)
        - a. Uncorrected
        - b. Corrected (exchangeable)
     4. NH_4ACc, pH 7.0 (modified)
        - a. Uncorrected
        - b. Corrected (exchangeable)
   - C. Base saturation
     1. NH_4ACc, 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
     1. NH_4OAc, pH 7.0
6. CHEMICAL ANALYSES
   - A. Organic carbon
     1. Acid-dichromate digestion
        - a. $FeSO_4$ titration
        - b. CO_2 evolution, gravimetric
   - B. Nitrogen
     1. Kjeldahl digestion
        - a. Ammonia distillation
   - C. Iron
     1. Dithionite extraction
        - a. Dichromate titration
        - b. EDTA titration
     2. Dithionite-citrate extraction
        - a. Orthophenanthroline colorimetry
        - b. Atomic absorption
     3. Dithionite-citrate-bicarbonate extraction
        - a. Potassium thiocyanate colorimetry
     5. Sodium-pyrophosphate extraction
        - a. Atomic absorption
     6. Ammonium oxalate extraction
        - a. Atomic absorption
   - E. Calcium carbonate
     1. HCl treatment
        - b. Manometric
        - c. Titrimetric
     3. H_2SO_4 treatment
        - a. Weight gain
   - F. Gypsum
     1. Water extract
        - a. Precipitation in acetone
        - b. Indirect estimate
   - G. Aluminum
     1. KCl extraction I, 30 min.
        - d. Fluoride titration
        - e. Atomic absorption
     5. Sodium pyrophosphate extraction
        - a. Atomic absorption
     6. Ammonium oxalate extraction
        - a. Atomic absorption
     7. Dithionite-citrate extraction
        - a. Atomic absorption
   - H. Extractable acidity
     1. $BaCl_2$-triethanolamine I
        - a. Back-titration with HCl
     2. $BaCl_2$-triethanolamine II
        - a. Back-titration with HCl
   - I. Carbonate
     1. Saturation extract
        - a. Acid titration
   - J. Bicarbonate
     1. Saturation extract
        - a. Acid titration
   - K. Chloride
     1. Saturation extract
        - a. Mohr titration
        - b. Potentiometric titration
   - L. Sulfate
     1. Saturation extract
        - a. Gravimetric, $BaSO_4$
        - b. EDTA titration

6. CHEMICAL ANALYSES--Continued
   M. Nitrate
      1. Saturation extract
         a. PDS acid colorimetry
         b. Diphenylamine
   N. Calcium
      1. Saturation extract
         a. EDTA titration
         b. Atomic absorption
      2. NH_4OAc extraction
         a. EDTA-alcohol separation
         b. Oxalate-permanganate I
         c. Oxalate-permanganate II Fe, Al, and Mn removed
         d. Oxalate-cerate
         e. Atomic absorption
      4. KCl-TEA extraction
         b. EDTA titration
         c. Atomic absorption
   O. Magnesium
      1. Saturation extract
         a. EDTA titration
         b. Atomic absorption
      2. NH_4OAc extraction
         a. EDTA-alcohol separation
         b. Phosphate titration
         d. Atomic absorption
      3. NH_4Cl-EtOH extraction
         a. EDTA titration
      4. KCl-TEA extraction
         a. Phosphate titration
         b. EDTA titration
         c. Atomic absorption
   P. Sodium
      1. Saturation extract
         a. Flame photometry
         b. Atomic absorption
      2. NH_4OAc extraction
         a. Flame photometry
         b. Atomic absorption
   Q. Potassium
      1. Saturation extract
         a. Flame photometry
         b. Atomic absorption
      2. NH_4OAc extraction
         a. Flame photometry
         b. Atomic absorption
   R. Sulfur
      1. $NaHCO_3$ extract, pH 8.5
         a. Methylene blue
      2. HCl release (sulfide)
         a. Iodine titration

6. CHEMICAL ANALYSES--Continued
   S. Total phosphorus
      1. Perchloric acid digestion
         a. Molybdovanadophosphoric acid colorimetry

7. MINERALOGY
   A. Instrumental analysis
      1. Preparation
         a. Carbonate removal
         b. Organic-matter removal
         c. Iron removal
         d. Particle-size fractionation
         e. PSDA pretreatment
      2. X-ray diffraction
         a. Thin film on glass, solution pretreatment
         b. Thin film on glass, resin pretreatment
   B. Optical analysis
      1. Grain studies
      2. Electron microscopy
   C. Total analysis
      1. Chemical
      2. X-ray emission spectrography
   D. Surface area
      1. Gylcerol retention
      2. Ethylene glycol retention*

8. MISCELLANEOUS
   A. Saturated paste, mixed
      1. Saturation extract
         a. Conductivity
         b. Conductivity, quick test
      2. Conductivity, saturated paste
   B. Saturated paste, capillary rise
      1. Saturation extract
         a. Conductivity
   C. pH
      1. Soil suspensions
         a. Water dilution
         b. Saturated paste
         c. KCl
         d. NaF
         e. $CaCl_2$
   D. Ratios and estimates
      1. To total clay
      2. To noncarbonate clay
      3. Ca to Mg (extractable)
      4. Estimated clay percentage
      5. Estimated total salt
   E. Soil resistivity
      1. Saturated paste

* Surface area, method used by TAES. Ethylene glycol retention: Apparatus--Weighing dishes, desiccators and 1 ml pipette. Reagents--Ethylene glycol. Procedure--Weigh out about 0.2 gm of carbonate-free clay or 2.1 gm of carbonate-free soil into weighing dishes and dry over P_2O_5 in an evacuated desiccator. Weigh samples to within 0.2 or 0.3 mg. Add sufficient glycol to moisten the samples, and allow to soak for several hours over dried $CaCl_2$ in a desiccator. Place a source of free glycol inside a desiccator and evacuate to 50 to 100 μm. Weigh samples until they agree to within 0.2 or 0.3 gm. Calculations--Results are expressed as mgm glycol/gm clay by the use of the average weight of glycol retained and the dry weight of clay. The weight of dry clay is determined as the equilibrium weight obtained in an evacuated desiccator over P_2O_5. References--R. T. Martin, SSSAP 19:160-163 (1955).

EXAMPLE DATA SHEET HEADINGS*

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B															RATIO		
		SAND	SILT	CLAY	FINE CLAY	SAND VCOS	SAND CORS	SAND MEDS	SAND FNES	SAND VFNS	SILT COSI	SILT FNSI	SILT VFSI	FAML TEXT	INTR II	FINE CLAY	NON-CO3-CLAY	8D1 15-BAR
		2-	.05-	LT	LT	2-	1-	.5-	.25-	.10-	.05	.02	.005-	SAND	.2-	TO		TO
IN		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	2-.1	.02	CLAY		CLAY
		PCT LT 2MM														PCT	PCT	

Depth (in.)	Horizon	Size class and particle diameter (mm)																
		Total				Sand					Silt							
		Sand (2-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Fine clay (<0.0002)	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)	(0.005-0.002)	Family texture sand (2-0.1	International II (0.2-0.02	Ratio fine clay to clay	Non-carbonate clay pct	Ratio 15-bar to clay
		Pct of < 2mm																
COLUMN																		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2						BULK DENSITY			WATER CONTENT				CARBONATE		PH	
	VOL.	WEIGHT					4A1D	4A1H	4D1	4B1C	4B1C	4B2	4C1	6E1B	3A1A	8C1A	8C1E
	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	1/10	1/3-	15-	WRD	LT	LT	1/1	1/2
	2	75			.074	PCT	BAR	ORY		BAR	BAR	BAR	CM/	2	.002	H2O	CACL
IN	PCT	PCT	PCT LT 75			LT20	G/CC	G/CC		PCT	PCT	PCT	CM	PCT	PCT		

Depth (in.)	Size class and particle diameter (mm)							Bulk density			Water content				Carbonate as $CaCO_3$		pH	
	Volume	Weight						1/3-bar	Oven-dry	COLE	1/10-bar	1/3-bar	15-bar	1/3-to 15-bar	< 2mm	<0.002 mm	(1:1) H_2O	(1:2) $CaCl_2$
	> 2	> 75	75-20	20-5	5-2	<0.074 Pass 200 mesh	<0.002											
	pct	pct	pct < 75mm				pct < 20	g/cc	g/cc		pct	pct	pct	cm/cm (in./in.)	pct	pct		
COLUMN																		
1	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38

DEPTH	ORGANIC MATTER			IRON	PHOS	EXTRACTABLE BASES 5B4A					ACTY	AL	(CAT EXCH)		RATIO	RATIO	CA	(BASE SAT)	
	6A1A ORGN CARB	6B1A NITG	C/N	6C2A EXT FE	6S1A TOTL	6N2E CA	6O2D MG	6P2A NA	6Q2A K	SUM EXTB	6H1A BACL TEA	6G1D KCL EXT	5A3A EXTB ACTY	5A6A NHAC	8D1 NHAC TO	8D3 CA TO	5F SAT NHAC	5C3 EXTB ACTY	5C1 NHAC
IN	PCT	PCT		PCT	PCT	MEQ / 100					G				CLAY	MG	PCT	PCT	PCT

Depth (in.)	Organic matter			Ext. iron as Fe	Total phosphorus	Extractable bases 5B					Ext. acidity	KCl ext. Al	Cat.exch.cap.		Ratio NH_4OAc to clay	Ratio Ca to Mg	Ca saturation NH_4OAc	Base saturation	
	Organic carbon	Nitrogen	C/N			Ca	Mg	Na	K	Sum extractable bases			Sum of bases plus acidity	NH_4OAc				Extractable acidity	NH_4OAc CEC
	pct	pct		pct	pct	meq/100g											pct	pct	pct
COLUMN																			
1	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57

DEPTH	SATURATED PASTE			NA	NA	SALT	GYP	SATURATION EXTRACT 8A1									ATTERBERG	
	8E1 REST OHM-	8C1B PH	8A H2O	5D2 ESP	5E SAR	8D5 TOTL SOLU	6F1A	8A1A EC	6N1B CA	6O1B MG	6P1A NA	6Q1A K	6I1A CO3	6J1A HCO3	6K1A CL	6L1A SO4	6M1A NO3	4F1 LQID LMIT	4F2 PLST INDX
IN	CM		PCT	PCT		PPM	PCT	MMHOS/ CM	MEQ / LITER									PCT	

Depth (in.)	Saturated paste			Exch. Na	Sodium adsorption ratio	Total soluble salt	Gypsum	Saturation extract										Atterberg	
	Resistivity	pH	Water at sat.					Electrical conductivity	Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO_4	NO_3	Liquid limit	Plastic index
	ohm-cm		pct	pct		ppm	pct	mmhos/cm	meq/liter										
COLUMN																			
1	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76

*This page alternates computer data sheet headings with printed data sheet headings and column numbers. Column numbers refer to more complete column headings on the following pages.

COLUMN HEADINGS FOR COMPUTER
PRINTED DATA SHEETS

Column	
1	Depth in inches
2	Horizon
	Columns 3 through 16 - percentage of total weight of particles 2 millimeters or less in size
3	Total sand (particles range from .05 to 2 millimeters)
4	Total silt (particles range from .002 to .05 millimeter)
5	Total clay (particles are smaller than .002 millimeter)
6	Total fine clay (particles are smaller than .0002 millimeter)
7	Very coarse sand (particles range from 1 to 2 millimeters)
8	Coarse sand (particles range from 0.5 to 1 millimeter)
9	Medium sand (particles range from 0.25 to 0.5 millimeter)
10	Fine sand (particles range from 0.1 to 0.25 millimeter)
11	Very fine sand (particles range from .05 to 0.1 millimeter)
12	Coarse silt (particles range from .02 to .05 millimeter)
13	Fine silt (particles range from .002 to .02 millimeter; these limits also define the range of total silt on the International Soil Science Society Scale)
14	Very fine silt (particles range from .002 to .005 millimeter)
15	Family texture sand (particles range from 0.1 to 2 millimeters)
16	International II (particles range from .02 to 0.2 millimeter; these limits define the range of fine sand on the International Soil Science Society Scale)
17	Fine clay to clay (this is the ratio of fine clay to total clay expressed as percent)
18	Noncarbonate clay (this is the percentage of clay in the 2 millimeter or smaller material which remains after treatment with 6N HCl)
19	Ratio of 15-bar water percentage to total clay percentage
20	Volume of material greater than 2 millimeters given as a percent of total sample volume
21	Greater than 75 millimeter material given as a percent of total sample weight
22	Particle size range from 20 to 75 millimeters given as a weight percent of all material 75 millimeters or less in the sample
23	Particle size range from 5 to 20 millimeters given as a weight percent of all material 75 millimeters or less in the sample
24	Particle size range from 2 to 5 millimeters given as a weight percent of all material 75 millimeters or less in the sample
25	Particle size range less than .074 millimeter given as a weight percent of all material 75 millimeters or less
26	Particle size range from 2 to 20 millimeters given as a weight percent of all material 20 millimeters or less
27	Bulk density of soil desorbed to 1/3-bar given in grams per cubic centimeter
28	Bulk density of oven dry soil given in grams per cubic centimeter
29	Coefficient of linear extensibility
30	Water content of soil desorbed to 1/10-bar given as a percent of oven dry weight
31	Water content of soil desorbed to 1/3-bar given as a percent of oven dry weight
32	Water content of soil fragments desorbed to 15 bars given as a percent of oven dry weight
33	Water retention difference given in centimeter per centimeter
34	Column used for any water content measurement different from those given in columns 30 through 33
35	Carbonate content of the material 2 millimeters or less given as a percent
36	Carbonate content of the material .002 millimeter or less given as a percent
37	pH of a 1:1 suspension of soil in distilled water
38	pH of a 1:2 suspension of soil in .01 M $CaCl_2$
39	Organic carbon given as a percent
40	Nitrogen given as a percent
41	Organic carbon to nitrogen ratio
42	Extractable iron given as a percent
43	Total phosphorus given as a percent
44	Extractable calcium given in milliequivalents per 100 grams of soil
45	Extractable magnesium given in milliequivalents per 100 grams of soil
46	Extractable sodium given in milliequivalents per 100 grams of soil
47	Extractable potassium given in milliequivalents per 100 grams of soil
48	Sum of the extractable bases given in milliequivalents per 100 grams of soil
49	Acidity - barium chloride with triethanolamine measurement - given in milliequivalents per 100 grams of soil
50	Aluminum - potassium chloride extraction - given in milliequivalents per 100 grams of soil
51	Cation exchange capacity by sum of the extractable bases plus the acidity given in milliequivalents per 100 grams of soil
52	Cation exchange capacity as measured by ammonium acetate given in milliequivalents per 100 grams of soil
53	Ratio of ammonium acetate cation exchange capacity to total clay
54	Ratio of extractable calcium to extractable magnesium
55	Calcium saturation of the ammonium acetate cation exchange capacity given as a percent
56	Base saturation - sum of the extractable bases divided by the acidity plus the sum of the extractable bases - given as a percent
57	Base saturation - sum of the extractable bases divided by the ammonium acetate cation exchange capacity - given as a percent
58	Saturated paste (soil plus water) resistivity given in ohm-cm
59	Saturated paste (soil plus water) pH
60	Saturated paste (soil plus water) water content given as a percent
61	Exchangeable sodium percentage
62	Sodium adsorption ratio
63	Total soluble salt given in parts per million

COLUMN HEADINGS FOR COMPUTER
PRINTED DATA SHEETS (Continued)

Column	
64	Gypsum given in percent
65	Electrical conductivity of the saturation extract given in mmhos (reciprocal of milliohms) per centimeter
66	Calcium content of the saturation extract given in milliequivalents per liter
67	Magnesium content of the saturation extract given in milliequivalents per liter
68	Sodium content of the saturation extract given in milliequivalents per liter
69	Potassium content of the saturation extract given in milliequivalents per liter
70	Carbonate (CO_3) content of the saturation extract given in milliequivalents per liter
71	Bicarbonate (HCO_3) content of the saturation extract given in milliequivalents per liter
72	Chloride content of the saturation extract given in milliequivalents per liter
73	Sulfate (SO_4) content of the saturation extract given in milliequivalents per liter
74	Nitrate (NO_3) content of the saturation extract given in milliequivalents per liter
75	Liquid limit given as percent water - percentage basis is soil material less than 0.4 millimeter
76	Plastic index

EXAMPLE DATA SHEET HEADINGS*

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3AI									PARTICLE SIZE ANALYSIS					ETHYLENE GLYCOL RETAINED			BULK DEN
		SAND	SILT	CLAY	VCOS	CORS	MEDS	FNES	VFNS	SAND	SAND	SILT	CLAY	CRSE CLAY	FINE CLAY	LT	LT	LT	4A3A
		2- .05	.05- .002	LT .002	2- 1	1- .5	.5- .25	.25- .10	.10- .05	2- .05	.05- .002	LT .002		.002- .0002	LT .0002	2 MM	.002 MM	.0002 MM	
IN		PCT LT 2MM									PCT LT .002					MG/G			G/CC

Depth (in.)	Horizon	Size class and particle diameter (mm)								Size class & particle diameter(mm)			Ethylene glycol retained			Bulk density (oven-dry)
		Total			Sand					Sand	Silt	Clay	Coarse clay	Fine clay				
		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)	(2-.05)	(.05-.002)	(<.002)	(.002-.0002)	(<.0002)	< 2mm	< .002 mm	< .0002 mm	g/cc
		pct < 2mm											pct < .002mm		mg/g			
COLUMN																		
1A	2A	3A	4A	5A	6A	7A	8A	9A	10A	11A	12A	13A	14A	15A	16A	17A	18A	19A

DEPTH	ORGANIC MATTER			IRON	PHOS	EXTRACTABLE BASES 5B1A					CAT EXC CAP 5A2A			BASE SAT	RATIO	CA	PH		
	6A1A ORGN CARB	6B1A NITG	C/N	6C3 EXT FE	6S1A TOTL	6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	LT 2 MM	LT .002 MM	LT .0002 MM	5C2	8D3 CA TO	6E1E EQ MG	1/1 H20	1/2 KCL	1/2 CACL
IN	PCT	PCT		PCT	PCT	MEQ / 100G								PCT		PCT			

Depth (in.)	Organic matter			Ext. iron as Fe	Total phosphorus	Extractable bases					Cat.exch.cap. NaOAc			Base sat. NaOAc CEC	Ratio Ca to Mg	$CaCO_3$ equivalent	pH		
	Organic carbon	Nitrogen	C/N			Ca	Mg	Na	K	Sum extractable bases	<2mm	<.002mm	<.0002 mm				(1:1) H_2O	(1:2) KCl	(1:2) $CaCl_2$
	pct	pct		pct	pct	meq/100g								pct		pct			
COLUMN																			
1A	20A	21A	22A	23A	24A	25A	26A	27A	28A	29A	30A	31A	32A	33A	34A	35A	36A	37A	38A

DEPTH	SATURATED PASTE			NA	NA	SALT	GYP	SATURATION EXTRACT 8A1									ATTERBERG	
	8E1 REST OHM-CN	8C1B PH	8A H2O	5D2 ESP	5E SAR	8D5 TOTL SOLU PPM	6F1A PCT	8A1A EC MMHOS/CM	6N1B CA	6O1B MG	6P1A NA	6Q1A K	6I1A CO3	6J1A HCO3	6K1B CL	6L1A SO4	6M1A NO3	4F1 LQID LMIT	4F2 PLST INDX
IN			PCT	PCT			PCT		MEQ / LITER									PCT	

Depth (in.)	Saturated paste			Exch. Na	Sodium adsorption ratio	Total soluble salt	Gypsum	Saturation extract									Atterberg	
	Resistivity	pH	Water at sat.					Electrical conductivity	Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO_4	NO_3	Liquid limit	Plastic index
	ohm-cm		pct	pct		ppm	pct	mmhos/cm	meq/liter										
COLUMN																			
1A	39A	40A	41A	42A	43A	44A	45A	46A	47A	48A	49A	50A	51A	52A	53A	54A	55A	56A	57A

*This page alternates computer data sheet headings with printed data sheet headings and column numbers. Column numbers refer to more complete column headings on the following page.

COLUMN HEADINGS FOR COMPUTER
PRINTED DATA SHEETS

Column	
1A	Depth in inches
2A	Horizon
	Columns 3A through 13A - percentage of total weight of particles 2 millimeters or less in size
3A	Total sand (particles range from .05 to 2 millimeters)
4A	Total silt (particles range from .002 to .05 millimeter)
5A	Total clay (particles are smaller than .002 millimeter)
6A	Very coarse sand (particles range from 1 to 2 millimeters)
7A	Coarse sand (particles range from 0.5 to 1 millimeter)
8A	Medium sand (particles range from 0.25 to 0.5 millimeter)
9A	Fine sand (particles range from 0.1 to 0.25 millimeter)
10A	Very fine sand (particles range from .05 to 0.1 millimeter)
11A	Total sand
12A	Total silt
13A	Total clay
14A	Coarse clay (particles range from .002 to .0002 millimeter) given as a percent of the total clay
15A	Fine clay (particles are less than .0002 millimeter) given as a percent of the total clay
16A	Ethylene glycol retained by the soil material less than 2 millimeters given as milligrams per gram of soil material
17A	Ethylene glycol retained by the soil material less than .002 millimeter given as milligrams per gram of soil material
18A	Ethylene glycol retained by the soil material less than .0002 millimeter given as milligrams per gram of soil material
19A	Bulk density given as grams per cubic centimeter
20A	Organic carbon given as a percent
21A	Nitrogen given as a percent
22A	Organic carbon to nitrogen ratio
23A	Extractable iron given as a percent
24A	Total phosphorus given as a percent
	Columns 25A through 29A report extractable bases on most data sheets; a few of the data sheets report exchangeable bases as indicated in column headings.
25A	Calcium given in milliequivalents per 100 grams of soil
26A	Magnesium given in milliequivalents per 100 grams of soil
27A	Sodium given in milliequivalents per 100 grams of soil
28A	Potassium given in milliequivalents per 100 grams of soil
29A	Sum of the bases given in milliequivalents per 100 grams of soil
30A	Cation exchange capactiy of the less than 2 millimeters material as measured by sodium acetate given in milliequivalents per 100 grams of soil material
31A	Cation exchange capacity of the less than .002 millimeter material as measured by sodium acetate given in milliequivalents per 100 grams of soil material
32A	Cation exchange capacity of the less than .0002 millimeter material as measured by sodium acetate given in milliequivalents per 100 grams of soil material
33A	Base saturation - sum of the bases divided by the sodium acetate cation exchange capacity - given as a percent
34A	Ratio of extractable (or exchangeable) calcium to extractable (or exchangeable) magnesium
35A	Calcium carbonate equivalent of the material 2 millimeters or less given as a percent
36A	pH of a 1 to 1 suspension of soil in distilled water
37A	pH of a 1 to 2 suspension of soil in .01 molar potassium chloride
38A	pH of a 1 to 2 suspension of soil in .01 molar calcium chloride
39A	Saturated paste (soil plus water) resistivity given in ohms per centimeter
40A	Saturated paste (soil plus water) pH
41A	Saturated paste (soil plus water) water content given as a percent
42A	Exchangeable sodium percentage
43A	Sodium adsorption ratio
44A	Total soluble salt given in parts per million
45A	Gypsum given in percent
46A	Electrical conductivity of the saturation extract given in mmhos (reciprocal of milliohms) per centimeter
47A	Calcium content of the saturation extract given in milliequivalents per liter
48A	Magnesium content of the saturation extract given in milliequivalents per liter
49A	Sodium content of the saturation extract given in milliequivalents per liter
50A	Potassium content of the saturation extract given in milliequivalents per liter
51A	Carbonate (CO_3) content of the saturation extract given in milliequivalents per liter
52A	Bicarbonate (HCO_3) content of the saturation extract given in milliequivalents per liter
53A	Chloride content of the saturation extract given in milliequivalents per liter
54A	Sulfate (SO_4) content of the saturation extract given in milliequivalents per liter
55A	Nitrate (NO_3) content of the saturation extract given in milliequivalents per liter
56A	Liquid limit given as percent water - percentage basis is soil material less than 0.4 millimeters
57A	Plastic index

SOIL CLASSIFICATION- TYPIC ALBAQUALF
FINE-LOAMY, MIXED, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION

SERIES - - - - - - -SERIES NOT DESIGNATED

COLLEGE STATION, TEXAS

SOIL NO - - - - - - S54TX-75-91 COUNTY - - - FAYETTE

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K166-171

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1									PARTICLE SIZE ANALYSIS (A)			(ETHYLENE GLYCOL)			BULK
		SAND			VCOS	CORS	MEDS	FINS	VFNS	SAND	SILT	CLAY	CRSE CLAY	FINE CLAY	RETAINED			DEN
		2- .05	.05- .002	LT .002	2- 1	1- .5	.5- .25	.25- .10	.10- .05	2- .05	.05- .002	LT .002	.002- .0002	LT .0002	2 MM	.002 MM	.0002 MM	
IN		PCT LT 2MM											PCT LT.002)		MG/G			G/CC
000-5	A1	61.3	32.6	6.2									48	52				
005-8	A2	60.6	33.1	6.4														
008-22	B21TG	39.1	25.9	35.1									13	87				
022-38	B22TG	44.4	26.8	28.9														
038-62	B3G	41.7	28.3	30.1														
062-84	C	58.2	16.9	23.9									40	60				

DEPTH	ORGANIC MATTER			IRON	PHOS	EXTRACTABLE BASES 5B1A					CAT EXC CAP 5A2A			BASE SAT	RATIO MG	CA	PH		
	6A1A ORGN CARB	6B1A NITG	C/N	6C3 EXT FE	6S1A TOTL	6N2E CA	6Q2D MG	6P1A NA	6Q2A K	SUM EXTB	LT 2 MM	LT .002 MM	LT .0002 MM	SAT 5C2	8D3 CA TO MG	CARB EQ 6E1E	8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	MEQ / 100G								PCT		PCT			
000-5	0.93					2.3	1.0	0.2	0.3	3.8	6.2	53A	102A	61	2.3		6.2		
005-8	0.29					1.5	0.6	0.1	0.2	2.4	4.6			52	2.5		5.0		
008-22	0.35					15.4	4.6	2.2	0.3	22.5	26.0	77A	104A	87	3.4		4.6		
022-38	0.12						2.7	3.2	0.4		22.3						7.1		
038-62	0.17						4.3	2.7	0.3		26.0						6.8		
062-84	0.12						3.9	2.6	0.3		25.2	71A	103A				7.2		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S54TX-75-91

DEPTH	SAND	SILT	CLAY	COARSE CLAY	FINE CLAY
INCHES	2 - 0.05MM	0.05 - 0.002MM	LESS THAN 0.002MM	0.002 - 0.0002MM	LT 0.0002MM
0-5	QZ1 FD2	QZ1 FD2 CR3		QZ1 KK2 MT3	MT1 KK3
5-8	QZ1 FD2	QZ1 FD2 CR3	MT1 KK2 QZ3		
8-22	QZ1	QZ1 FD2 CR3		QZ1 KK2 MT3	MT1 KK3
22-38	QZ1 FD2	QZ1 FD2 CR3 KK3 MI3	MT1 KK2 QZ3		
38-62	QZ1	QZ1 FD2 CR3 MI3	MT1 KK2 QZ3		
62-84+	QZ1	QZ1 FD2 CR3 MI3 KK3		KK1 MT1 QZ3	MT1 KK3

RELATIVE ABUNDANCE- 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, CR=CRISTABOLITE.

(A) BY CENTRIFUGATION (METHOD 3A1B1). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Typic Albaqualf; fine-loamy, mixed,thermic.
Soil: Series not designated.
Soil Nos.: S54TX-75-91; K166-171.
Location: Fayette County, Texas. Ten miles north of highway intersection in LaGrange on U.S. Highway 77; 300 yards east of highway along field road through woods on J. P. Kunze farm, 100 yards east of small creek (gully) crossing. Cover: Native area thickly covered with small post oak trees.
Topography: Level upland with less than 1 percent gradient.
Sampled by: I. C. Mowery, April 1954.
Described by: I. C. Mowery.

A1 K166 0 to 5 inches. Grayish brown (10YR 5/2; 4/2 when moist) fine sandy loam; massive; very friable, very hard, porous; moderately abundant small tree roots; smooth clear boundary.

A2 K167 5 to 8 inches. Light gray (10YR 6.5/2; 5/2 when moist) fine sandy loam with a few small faint brownish yellow spots; massive; very friable, very hard, porous; a few ferruginous concretions and a few small chert gravel; tree roots moderately abundant; abrupt wavy boundary.

B21tg K168 8 to 22 inches. Grayish brown (10YR 5/2; 4/2 when moist) clay loam; common medium faint reddish brown mottles in upper 6 inches; moderate medium blocky; extremely firm, extremely hard, very sticky; few coarser tree roots; occasional ferruginous concretion; diffuse smooth boundary.

B22tg K169 22 to 38 inches. Light brownish gray (10YR 6/2; 5/1.5 when moist) clay loam; weak coarse blocky, extremely firm, extremely hard, very sticky; pressure faces can be discerned; ferruginous concretions present throughout, but more concentrated at 32 to 38 inches; clear smooth boundary.

B3g K170 38 to 62 inches. Mottled white (10YR 8/2; 7/2 when moist) and pale yellow (2.5Y 8/4; 7/4 when moist) clay loam; weak coarse blocky; extremely firm; extremely hard; very sticky; contains numerous gypsum crystals; sand that has sifted down through cracks from the A horizon very noticeable; pressure faces can be discerned; clear smooth boundary.

C K171 62 to 84 inches plus. Pale yellow (2.5Y 8/3; 7/3 when moist) sandy clay loam stratified with sandy clay and with common distinct medium brownish yellow mottles; massive; firm; the upper 3 to 4 inches is weakly cemented.

Remarks: 1. Pedon was sampled as Lufkin series. The soil is outside the range of the Lufkin series in being fine-loamy in the 10-to 40-inch control section. It is of Typic Albaqualfs instead of Vertic Albaqualfs, and the mineralogy is mixed based on the silt and sand fraction.

2. Textures above agree with laboratory data. Field textures where different are given below:

B21tg - clay
B22tg - clay
B3g - sandy clay

SOIL CLASSIFICATION-VERTIC ALBAQUALF
FINE, MONTMORILLONITIC, THERMIC

SERIES - - - - - - -EDNA

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S55TX-79-92 COUNTY - - - FORT BEND

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K277-282

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (SAND) SAND 2-.05 MM	SILT .05-.002 MM	CLAY LT .002 MM	VCOS 2-1 MM	CRS 1-.5 MM	MEDS .5-.25 MM	FNES .25-.10 MM	VFNS .10-.05 MM	PARTICLE SIZE ANALYSIS (B) SAND 2-.05 MM	SILT .05-.002 MM	CLAY LT .002 MM	CRSE CLAY .002-.0002 MM	FINE CLAY LT .0002 MM	ETHYLENE GLYCOL RETAINED LT 2 MM	LT .002 MM	LT .0002 MM	BULK DEN 4A3A
IN		(- - - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - - -)								(PCT LT.002)					(- - MG/G - - -)			G/CC
000-5	A1	37.1	47.0	15.9			1.0A	10.8	25.3				33	67				
005-14	B21TG	22.2	34.9	42.9			0.7A	6.0	15.5				18	82				
014-34	B22TG	22.9	36.6	40.5			0.4A	6.3	16.0				16	84				
034-54	B23TCA	20.6	36.8	42.6			1.5A	6.1	13.1				22	78				
054-73	C1CA	13.4	35.3	51.4			1.5A	3.3	8.6				30	70				
073-86	2C2	8.4	38.1	53.6			0.5A	1.3	6.6				35	65				

DEPTH	ORGANIC MATTER 6A1A ORGN	6B1A TTG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	EXTRACTABLE BASES 5B1A- CA	MG	NA	K	CAT EXC CAP 5A2A) SUM	BASE SAT 5C2	RATIO CA TO MG	CA EQ	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
	CARB									EXTB			6E1E			
IN	PCT	PCT		PCT	PCT	(- - - - - - - - MEQ / 100G - - - - - - - -)					PCT		MG			
000-5	1.74					7.0	2.9	0.3	0.2	10.4	70B	100B	75	2.4	6.0	
005-14	0.87					10.6	10.2	1.8	0.3	22.9	86B	101B	75	1.0	5.7	
014-34	0.58					11.2	11.9	3.3	0.3	26.7	84B	103B	86	0.9	6.8	
034-54	0.23						12.6	4.5	0.4		82B	102B			7.7	
054-73	0.17						15.1	5.1	0.6		81B	102B			7.8	
073-86	0.17						13.2	4.6	0.6		70B	90B			7.9	

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S55TX-79-92

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-5	QZ1	QZ1 FD3		QZ1 MI2 KK2	MT1 KK3
5-14	QZ1 FD3	QZ1 FD3		QZ2 MI2 KK2	MT1 KK3
14-34	QZ1 FD3	QZ1 FD3 MI3		QZ2 MI2 KK2	MT1 KK3
34-54	QZ1 FD3	QZ1 MI3 FD3		QZ2 MI2 KK2 CL3 VR3	MT1 KK3
54-73	QZ1 FD3	QZ1 MI2 KK3 FD3		MI2 QZ2 KK2 VR3 CL3	MT1 KK3
73-86	QZ1 FD3	QZ2 MI2 KK2 FD3		MI1 KK2 QZ2 VR2 CL3	MT1 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT. 2 = 10 - 40 PCT. 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, VR=VERMICULITE, CL=CHLORITE.

(A) THE VERY COARSE, COARSE, AND MEDIUM SAND FRACTIONS HAVE BEEN COMBINED.
(B) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Vertic Albaqualf; fine, montmorillonitic, thermic.
Soil: Edna loam.
Soil Nos.: S55TX-79-92; K277-282.
Location: Fort Bend County, Texas. Two and a half miles southeast of Rosenberg; 100 feet south of cemetery and 200 feet northwest of county road. Cover: Brown-seeded paspalum, smutgrass, wild barley, aristidae, panicum and a thick overstory of huisache bushes.
Topography: Nearly level upland.
Sampled by: I. C. Mowery, May 1955.
Described by: I. C. Mowery.

A1 K277 0 to 5 inches. Gray (10YR 5/1.5; 4/1.5 when moist) loam with numerous fine faint dark yellowish brown spots; very weakly granular; porous; friable when moist, very hard when dry; occasional fine ferromanganese concretions; pH 6.3; grass roots numerous; light gray coatings on aggregates in lower inch; abrupt wavy boundary.

B21tg K278 5 to 14 inches. Gray (10YR 5/1.5; 4/1.5 when moist) clay with fine faint yellowish brown spots; compound moderate medium prismatic and moderate medium blocky; very firm when moist, extremely hard when dry, very sticky when wet; light gray coatings in upper part; pH 6.0; few roots penetrate peds; occasional ferromanganese concretions; gradual wavy boundary.

B22tg K279 14 to 34 inches. Grayish brown (2.5YR 5/2; 4/2 when moist) clay; moderate coarse blocky; occasional slickenside; very firm, extremely hard, very sticky; pH 8.0; ferromanganese concretions more numerous; few roots in peds; gradual wavy boundary.

B23tca K280 34 to 54 inches. Pale yellow (5 Y 7/3; 6/3 when moist) clay; weak coarse blocky; very firm, extremely hard, very sticky; contains ferromanaganese concretions and a few soft lumps and small hard $CaCO_3$ concretions; gradual smooth boundary.

C1ca K281 54 to 73 inches. Mottled reddish yellow (6YR 6/8; 5/8 when moist) and light gray (2.5Y 7/2; 6/2 when moist) clay; very firm, very hard, very sticky; massive; contains soft lumps and hard concretions of $CaCO_3$. Changes gradually to horizon below.

IIC2 K282 73 to 86 inches. Yellowish red (5YR 5/8; 4/8 when moist) clay with occasional fine light gray spots; occasional $CaCO_3$ concretions.

Remarks: 1. The soil was sampled in the part of the pedon where the A horizon was thinnest (over the crest of the B21tg horizon which has very wavy boundary with the A1 horizon). In the thick part of A horizon in this pedon, a thin A2 occurs.

2. Textures above agree with laboratory data. Field textures where different are given below:

A1 - very fine sandy loam.

SOIL CLASSIFICATION-VERTIC ALBAQUALF
FINE, MONTMORILLONITIC, THERMIC

SERIES - - - - - - -LUFKIN

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S53TX-21-90 COUNTY - - - BRAZOS

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K114-120

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 SAND								PARTICLE SIZE ANALYSIS (A)				(ETHYLENE GLYCOL) RETAINED			BULK DEN
		SAND 2-.05	SILT .05-.002	CLAY LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	LT 2 MM	LT .002 MM	LT .0002 MM	4A3A
IN		PCT LT 2MM								PCT LT.002)					(- - MG/G - - -)			G/CC
000-8	A1	47.5	39.5	13.1									25	75				
008-11	B21TG	30.9	26.2	42.9									8	92				
011-23	B21TG	32.7	27.1	40.3														
023-35	B22TG	35.7	31.1	33.2														
035-47	B3G	39.3	30.8	30.0														
047-64	C1G	38.0	32.9	29.2									22	78				
064-74	C2G	27.6	33.6	38.9														

DEPTH	ORGANIC MATTER 6A1A ORGN CARB	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	EXTRACTABLE BASES 5B1A 6N2E CA	6Q2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO CA TO MG	CA EQ 6E1E	PH 1/1 H20	PH 1/2 KCL	PH 1/2 CACL
IN	PCT	PCT		PCT	PCT	(- - - - - - - - MEQ / 100G - - - - - - - - -)								PCT		PCT			
000-8	1.04					6.0	1.6	0.4	0.1	8.1	11.5	57A	101A	71	3.8		6.3		
008-11	0.87					15.8	6.0	0.2	0.2	22.2	29.8	72A	95A	74	2.6		5.3		
011-23	0.52					17.9	5.2	2.5	0.2	25.8	29.0			89	3.4		5.6		
023-35	0.41					17.4	5.0	3.3	0.2	25.9	26.9			97	3.5		7.0		
035-47	0.17						5.1	3.7	0.2		24.6					1.8	7.9		
047-64	0.06						4.9	3.9	0.2		22.7	78A	104A			2.7	8.0		
064-74	0.06						5.9	5.2	0.2		28.9					3.4	7.7		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S53TX-21-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-8	QZ1 FD3	QZ1 FD3		QZ1 KK2	MT1 KK3
8-11	QZ1	QZ1 FD3 CR3		QZ1 KK2 MI3 VR3	MT1 KK3
11-23	QZ1	QZ1 FD3	MT1 KK2 QZ3		
23-35	QZ1	QZ1 FD2 CR3	MT1 KK2 QZ3		
35-47	QZ1	QZ1 FD2 CR3 MI3	MT1 KK2 QZ3		
47-64	QZ1	QZ1 FD2 CR3 MI3		QZ2 KK2 MT2	MT1 KK3
64-74+	QZ1	QZ1 FD2 CR3 KK3 MI3	MT1 KK2 QZ3		

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, VR=VERMICULITE, CR=CRISTABOLITE.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Vertic Albaqualf; fine, montmorillonitic, thermic.
Soil: Lufkin loam.
Soil Nos.: S53TX-21-90; K114-120.
Location: Brazos County, Texas. West of College Station, ½ mile west of railroad track along road to college dairy, 200 yards south of road in veterinary pasture. Cover: Sparse stand of post oak and grass.
Topography: Smooth; less than 1 percent gradient.
Sampled by: E. H. Templin, June 23, 1953.
Described by: E. H. Templin.

A1 K114 0 to 8 inches. Grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) when moist; thin weak platy light gray surface crust 1 to 2 mm thick and weak granular below to depth of 1 to 2 inches; structureless below; friable, very hard; slightly acid. An erratic thin light gray A2 horizon 1 to 2 inches thick occurs where the A horizon is thickest over the microvalleys of the wavy Bt horizon; abrupt wavy boundary.

B21tg K115 & K116 8 to 23 inches. Gray (10YR 5/1) clay; with a few fine distinct yellowish brown mottles; very dark gray (10YR 3.5/1) when moist; weak prismatic and moderate medium, angular blocky structure; peds in upper 4 to 6 inches have continuous dark gray clay films, below they are above one-half value darker than interiors of peds and not continuous; very few fine pores; grass roots mainly between peds; extremely hard and extremely firm; very plastic; strongly acid; gradual wavy boundary.

B22tg K117 23 to 35 inches. Gray (10YR 5/1) clay loam; dark gray (10YR 4/1) when moist; moderate coarse blocky structure; few clay films; few very fine pores, grass roots between peds only; extremely hard; very firm; strongly acid; gradual smooth boundary.

B3g K118 35 to 47 inches. Light brownish gray (10YR 6/2) clay loam or loam with few faint yellowish brown mottles; grayish brown (10YR 5/2) when moist; weak blocky structure, no apparent clay films; no pores; occasional fine grass roots between peds; very hard, firm; slightly acid. Diffuse smooth boundary.

C1g K119 47 to 64 inches. Light gray (10YR 7/2) loam; noticeably more sandy than above; structureless; very hard, slightly plastic; mildly alkaline; diffuse smooth boundary.

C2g K120 64 to 74 inches plus. White (10YR 8/2) loam, structureless and of similar consistence to above horizon; mildly alkaline.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

B22tg - heavy clay loam
B3g - clay loam
C1g - clay loam
C2g - clay loam

SOIL CLASSIFICATION-VERTIC ALBAQUALF
FINE, MONTMORILLONITIC, THERMIC

SERIES - - - - - - -LUFKIN

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S54TX-21-91 COUNTY - - - BRAZOS

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K182-187

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 SAND 2-.05	SILT .05-.002	CLAY LT .002	SAND VCOS 2-1	SAND CORS 1-.5	SAND MEDS .5-.25	SAND FNES .25-.10	SAND VFNS .10-.05	PARTICLE SIZE ANALYSIS (A) SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	(ETHYLENE GLYCOL) RETAINED LT 2 MM	LT .002 MM	LT .0002 MM	BULK DEN 4A3A
		(- - - - - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - - - - -)											(PCT LT.002)		(- - MG/G - -)			G/CC
000-5	A1	49.9	43.3	6.8									32	68				
005-07	A2	50.5	42.8	6.7														
007-21	B21TG	22.0	29.7	48.3									16	84				
021-35	B22TG	19.4	33.8	46.8														
035-46	B3G	9.1	47.3	43.6														
046-70	C	2.4	43.6	54.0									47	53				

DEPTH IN	ORGANIC MATTER 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON 6C3 EXT FE PCT	PHOS 6S1A TOTL PCT	EXTRACTABLE BASES 5B1A- 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO CA TO MG	CA EQ 6E1E PCT	PH 8C1A 1/1 H20	8C1C 1/2 KCL	8C1E 1/2 CACL
						(- - - - - - - - - - MEQ / 100G - - - - - - - - - -)								PCT					
000-5	1.28				3.7	0.6	0.2	0.4	4.9	6.9	57A	103A		71	6.2		5.8		
005-07	0.52				2.3	0.7	0.2	0.2	3.4	6.1				56	3.3		5.3		
007-21	0.70				16.1	6.7	3.3	0.3	26.4	35.4	75A	104A		75	2.4		4.6		
021-35	0.52					8.0	4.7	0.3		37.6							4.6		
035-46	0.29					4.4	7.4	0.5		34.1							4.7		
046-70	0.23					12.0	8.7	0.5		46.9	62A	104A					4.7		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S54TX-21-91

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-5	QZ1	QZ1 FD3 CR3		QZ1 KK2 CR3 MT3	MT1 KK3
5-7	QZ1 FD3	QZ1 FD2 CR3	MT1 KK2 QZ3		
7-21	QZ1 FD3	QZ1 CR3 FD3 KK3 MI3		KK1 QZ2 CR3 MT3	MT1 KK3
21-35	QZ1	QZ1 CR3 FD3 KK3 MI3	MT1 KK2 QZ3		
35-46	QZ1 CR3	QZ1 CR3 KK3 MI3	MT1 KK2 QZ3		
46-70+		QZ1 CR2 FD3 KK3 MI3		KK1 MT2 CR3 QZ3	MT1 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, CR=CRISTABOLITE.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Vertic Albaqualf; fine, montmorillonitic, thermic.
Soil: Lufkin fine sandy loam.
Soil Nos.: S54TX-21-91; K182-187.
Location: Brazos County, Texas. 7.4 miles southeast of College Station 1.2 miles south of Wellborn where county road crosses railroad; 100 feet west of railroad track and 100 feet north of county road. Cover: Native area covered by thick growth of brushy hardwood trees (post oak, black jack).
Topography: Nearly level upland, less than ½ percent gradient, very weakly convex surface.
Sampled by: I. C. Mowery, February 11, 1954.
Described by: I. C. Mowery.

A1 K182 0 to 5 inches. Light brownish gray (10YR 6/2; 4/2 when moist) fine sandy loam; massive; very hard, friable; few roundish quarzite gravel ½ to 1 inch in diameter; moderately numerous grass and tree roots; clear wavy boundary.

A2 K183 5 to 7 inches. Light gray (10YR 7/1.5; 5/2 when moist) fine sandy loam; massive; friable, very hard; finely porous; about 33 percent of volume is roundish quartzite gravel; ½ to 1½ inches in diameter; moderately numerous grass and tree roots; abrupt wavy boundary.

B21tg K184 7 to 21 inches. Grayish brown (10YR 5/2; 4/2 when moist) clay; very firm, extremely hard, very sticky; massive when wet; but shiny structural faces can be discerned when mass is broken; weak coarse to very coarse blocky when moist or dry; few gravel 1/8 to 3/4 inch in diameter; few tree roots; very slowly permeable; gradual wavy boundary.

B22tg K185 21 to 35 inches. Light brownish gray (10YR 6/2; 5/2 when moist) clay with a few medium weak yellowish brown spots in lower 4 to 6 inches; consistence and structure same as above; gravel present but less abundant; few tree roots; fine crystals of gypsum present in clusters; gradual wavy boundary.

B3g K186 35 to 46 inches. Faintly mottled white (10YR 8/2; 7/2 when moist) and light gray (10YR 7/2; 6/2 when moist) silty clay with a few fine distinct yellow mottles; massive; consistence same as above; clusters of fine gypsum crystals; small fragments of unweathered parent material in lower 6 inches; very few roots; clear smooth boundary.

C K187 46 to 70 inches plus. Very pale brown (10YR 8/4; 7/4 when moist) silty clay with a few medium distinct brownish yellow mottles; easily crumbled when moist; strongly laminated, with dark coatings on faces of laminae; fine roots numerous in fractures between laminae; few fine gypsum crystals.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

B3g - clay

SOIL CLASSIFICATION-VERTIC ALBAQUALF
FINE, MONTMORILLONITIC, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SERIES - - - - - - -LUFKIN

SOIL NO - - - - - - S54TX-80-90 COUNTY - - - FRANKLIN

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K203-208

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 SAND 2-.05	SAND .05-.002	SILT LT .002	CLAY	SAND VCOS 2-1	SAND CORS 1-.5	SAND MEDS .5-.25	SAND FNES .25-.10	SAND VFNS .10-.05	PARTICLE SIZE ANALYSIS (A) SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	(ETHYLENE GLYCOL) RETAINED 2 MM	RETAINED .002 MM	RETAINED .0002 MM	BULK DEN 4A3A
IN		(- - - - - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - - - - -)									(PCT LT.002)					(- - MG/G - - -)			G/CC
000-5	A1	29.1	62.4	8.6										51	49				
005-7	A2	32.3	59.6	8.2															
007-26	B21TG	17.6	44.3	38.1										21	79				
026-44	B22TG	19.4	43.6	37.1															
044-57	B3G	25.1	38.2	36.7															
057-72	CG	43.9	25.1	31.0										26	74				

DEPTH	6A1A ORGN CARB	6B1A NITG	C/N	6C3 EXT FE	6S1A TOTL	(- -EXTRACTABLE BASES 5B1A- -)(CAT EXC CAP 5A2A) 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	BASE LT 2 MM	LT .002 MM	LT .0002 MM	RATIO SAT 5C2	CA TO	CA EQ 6E1E	PH 8C1A 1/1 H20	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	(- - - - - - - - MEQ / 100G - - - - - - - - -)								PCT	MG	PCT			
000-5	0.81					2.1	0.9	0.1	0.2	3.3	6.9	55A	98A	48	2.3		5.3		
005-7	0.41					1.4	0.9	0.2	0.1	2.6	6.2			42	1.6		4.9		
007-26	0.70					12.2	10.1	3.4	0.2	25.9	29.2	71A	100A	89	1.2		5.6		
026-44	0.35					11.0	8.7	3.3	0.3	23.3	24.7			94	1.3		5.6		
044-57	0.29					11.6	10.1	3.4	0.3	25.4	29.3			87	1.2		5.1		
057-72	0.12					11.6	10.1	2.8	0.3	24.8	23.9	76A	108A	104	1.2		5.3		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S54TX-80-90

DEPTH	SAND	SILT	CLAY	COARSE CLAY	FINE CLAY
INCHES	2 - 0.05MM	0.05 - 0.002MM	LESS THAN 0.002MM	0.002 - 0.0002MM	LT 0.0002MM
0-5	QZ1	QZ1 FD3 MI3		QZ1 KK2	MT1 KK3 MI3
5-7	QZ1	QZ1 FD3	MT1 KK2 MI3		
7-26	QZ1 FD2	QZ1 MI3		QZ1 KK2 MI2	MT1
26-44	QZ1 FD3	QZ1 FD3	MT1 KK3 QZ3 MI3		
44-57	QZ1 FD3	QZ1 FD2 MI3	MT1 KK3 QZ3 MI3		
57-72+	QZ1 FD3	QZ1 MI3 FD3 KK3 CR3		KK2 MT2 QZ2 MI2	MT1

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, CR=CRISTABOLITE.

(A) BY CENTRIFUGATION (METHOD 3A1B1). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Vertic Albaqualf; fine, montmorillonitic, thermic.
Soil: Lufkin silt loam.
Soil Nos.: S54TX-80-90; K203-208.
Location: Franklin County, Texas. 1.4 miles north of Mt. Vernon along east side of State Highway 37; 1,000 feet north of house on west side of highway and 200 feet south of stock pens on east side of highway. Cover: Native area sparsely covered with hardwoods and moderate cover of grass.
Topography: Level upland with less than 1 percent gradient; occasional low sand mounds are present.
Sampled by: I. C. Mowery, March 1, 1954.
Described by: I. C. Mowery.

A1 K203 0 to 5½ inches. Light brownish gray (10YR 6/2; 4.5/2 when moist) silt loam with a few small brownish yellow specks in the lower part; massive; friable, very hard; few tree roots; clear wavy boundary.

A2 K204 5½ to 7 inches. Light gray (10YR 7/1.5; 5/2 when moist) silt loam; brownish yellow specks less numerous; porous-massive; friable, very hard; few tree roots; abrupt wavy boundary.

B21tg K205 7 to 26 inches. Gray (10YR 5/1.5; 3/2 when moist) silty clay loam with small brown spots; strong medium blocky; very firm, extremely hard, very sticky; few tree roots; gradual wavy boundary.

B22tg K206 26 to 44 inches. Grayish brown (10YR 5/2, 4/2 when moist) silty clay loam with a few small brown spots; massive; consistence same as B21tg; few small gypsum crystals; few small round ferromanganese concretions; gradual wavy boundary.

B3g K207 44 to 57 inches. Light brownish gray (10YR 6/2.5; 5/2 when moist) clay loam with numerous brownish yellow specks; massive; consistence same; black stainings of manganese in crevices, especially in lower part; shot-like ferromanganese concretions few; gradual wavy boundary.

Cg K208 57 to 72 inches. Light gray (10YR 7/2; 6/2 when moist) clay loam with common distinct coarse brownish yellow (10YR 6/6; 5/6 when moist) mottles, very firm, extremely hard, sticky; heavy stainings of manganese in crevices.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

A1 - very fine sandy loam
A2 - very fine sandy loam
B21tg - clay
B22tg - clay
B3g - clay
Cg - sandy clay

SOIL CLASSIFICATION-TYPIC NATRAQUALF
FINE, MONTMORILLONITIC, HYPERTHERMIC
SERIES - - - - - - -LIVIA

SOIL NO - - - - - - S70TX-29-26 COUNTY - - - CALHOUN

GENERAL METHODS- - -1A,1B1B,2A1,2B SAMPLE NOS. 70L166-70L173

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE MRTSC
SOIL SURVEY INVESTIGATIONS UNIT
LINCOLN, NEBRASKA

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B														RATIO
		SAND 2-.05	SILT .05-.002	CLAY LT .002	FINE CLAY LT .0002	SAND VCOS 2-1	SAND CORS 1-.5	SAND MEDS .5-.25	SAND FNES .25-.10	SAND VFNS .10-.05	SILT COSI .05-.02	SILT FNSI .02-.002	SILT VFSI .005-.002	FAML TEXT SAND 2-.1	INTR II .2-.02	FINE CLAY TO CLAY	NON-CO3-CLAY	8D1 15-BAR TO CLAY
IN		PCT LT 2MM														PCT	PCT	
000-5	A1	39.5	48.7	11.8		0.1	0.3	0.4	13.2	25.6	30.5	18.2		13.9	67.8		12	0.49
005-13	B21TG	29.6	32.9	37.5		0.0	0.1	0.2	10.6	18.7	20.7	12.2		10.9	48.7		38	0.50
013-26	B22TG	25.9	35.6	38.5		0.9	0.4	0.2	8.6	15.8	18.9	16.7		10.1	42.3		39	0.48
026-46	B23TG	25.5	34.4	40.1		1.7	1.0	0.4	8.5	14.0	16.9	17.5		11.5	38.3		40	0.47
046-60	B24TG	25.3	34.4	40.3		1.2	0.7	0.4	8.6	14.5	16.6	17.8		10.8	38.6		41	0.44
060-75	B25TG	21.0	37.6	41.4		0.4	0.4	0.3	6.9	13.0	16.4	21.2		8.0	35.5		41	0.44
075-95	C1	4.7	36.4	58.9		0.1	0.1	0.1	0.8	3.5	8.0	28.4		1.1	12.3		55	0.41
095-115+	C2	5.8	29.0	65.2		0.1	0.1	0.1	1.2	4.3	6.7	22.3		1.5	12.1		61	0.42

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2 VOL.	WEIGHT						BULK DENSITY			WATER CONTENT			CARBONATE		PH	
	GT 2	GT 75	75-20	20-5	5-2	LT .074	20-2	4A1D 1/3-BAR OVEN DRY	4A1H COLE	4D1	4B1C 1/10 BAR	4B1C 1/3-BAR	482 15-BAR	4C1 WRD CM/CM	6E1B LT 2	3A1A LT .002	8C1A 1/1 H2O	8C1E 1/2 CACL
IN	PCT	PCT	PCT LT 75				LT20	G/CC			PCT	PCT	PCT		PCT	PCT		
000-5	0	0	0	0	0	74	0						5.8		0		6.5	5.8
005-13	0	0	0	0	0	80	0						18.7		0		6.7	6.6
013-26	0	0	0	0	0	83	0						18.5		1		7.7	7.7
026-46	TR	0	0	TR	TR	82	TR						18.7		3	0	7.8	7.8
046-60	TR	0	0	TR	TR	82	TR						17.7		3	0	8.0	7.8
060-75	TR	0	0	TR	TR	86	TR						18.4		6	TR	8.0	7.9
075-95	TR	0	0	TR	TR	98	TR						24.3		15	4	7.8	7.8
095-115+	TR	0	0	0	TR	97	TR						27.2		12	4	7.9	7.8

DEPTH	ORGANIC MATTER 6A1A ORGN CARB	6B1A NITG	C/N	IRON 6G2A EXT FE	PHOS 6S1A TOTL	EXTRACTABLE BASES 5B4A- 6N2E CA	6Q2D MG	6P2A NA	6Q2A K	SUM EXTB	ACTY 6H1A BACL TEA	AL 6G1D KCL EXT	(CAT EXCH) 5A3A EXTB ACTY	5A6A NHAC	RATIO 8D1 NHAC TO CLAY	RATIO 8D3 CA TO MG	CA 5F SAT NHAC	(BASE SAT) 5C3 EXTB ACTY	5C1 NHAC
IN	PCT	PCT		PCT	PCT	MEQ / 100 G-											PCT	PCT	PCT
000-5	1.00	.075	13	0.2		3.9	2.8	1.5	0.4	8.6	3.2		11.8	9.1	0.77	1.4	43	73	95
005-13	1.10	.098	11	0.3		10.9	9.9	12.1	1.0	33.9	3.9		37.8	29.7	0.79	1.1	37	90	114
013-26	0.42	.030		0.2		12.5A	12.8A	19.8	0.8	45.9				30.2	0.78				
026-46	0.23	.014		0.1		16.3A	13.2A	20.7	0.8	51.0				30.8	0.77				
046-60	0.13	.013		0.2		17.6A	10.9A	16.9	0.7	46.1				29.0	0.72				
060-75	0.10	.011		0.2		18.4A	9.8A	16.2	0.7	45.1				28.9	0.70				
075-95	0.05	.013		0.4		33.9A	12.6A	19.6	1.0	67.1				36.3	0.62				
095-115+	0.05	.015		0.7		33.5A	13.2A	21.1	1.2	69.0				40.1	0.62				

DEPTH	SATURATED PASTE 8E1 REST OHM-	8C1B PH	8A H2O	NA 5D2 ESP	NA 5E SAR	SALT 8D5 TOTL SOLU	GYP 6F1A	SATURATION EXTRACT 8A1- 8A1A EC	6N1B CA	6Q1B MG	6P1A NA	6Q1A K	6I1A CO3	6J1A HCO3	6K1A CL	6L1A SO4	6M1A NO3	ATTERBERG 4F1 LQID LMIT	4F2 PLST INDX
IN	CM		PCT	PCT		PPM	PCT	MMHOS/CM	MEQ / LITER									PCT	
000-5	1000	6.4	30.7			350		1.72										248	6
005-13	210	6.3	61.5	22	26	5700		11.80	11.5	13.5	92.0							538	34
013-26	110	7.3	55.3	18	37	11000		23.70	42.3	60.0	262.0								
026-46	90	7.6	59.4	10	40	12000		23.70	50.0	62.5	298.0							588	41
046-60	130	7.7	58.5	15	37	11000		22.50	33.5	33.8	215.0								
060-75	160	7.8	66.3	21	31	9600		17.60	26.3	23.3	154.0								
075-95	190	7.7	80.7	14	26	9300		14.40	57.5	37.3	178.0							788	55
095-115+	200	7.7	89.3	16	25	14000		18.90	52.5	33.8	162.0								

(A) METHODS 6N4C FOR CA AND 6Q4C FOR MG.
(B) DETERMINED BY TEXAS HIGHWAY DEPT.

Soil classification: Typic Natraqualf; fine, montmorillonitic, hyperthermic.
Soil: Livia loam.
Soil Nos.: S70TX489-26; 70L166-70L173.
Location: Five miles southwest and southeast of Port Lavaca on Texas Highway 238 to intersection with Texas Highway 316; 2.8 miles southeast and east on Texas Highway 316; 1.1 miles southeast on gravel farm road to old house site; 0.5 mile southwest of house; 456 feet southeast of fence and 480 feet northeast of fence in overgrazed native range.
Area: Calhoun County, Texas.
Vegetation and use: Site of pedon described is in native range predominantly of Gulf cordgrass with some seashore saltgrass. Part of the more than 500 acres represented by the pedon is farmed to rice.
Moisture: Dry colors given unless otherwise stated.
Drainage and permeability: Poorly drained. Runoff is slow. Very slowly permeable. Water table at 95 inches. Tides of 10 to 12 feet were over the area during Hurricane Carla.
Parent material: The soil is believed to be developed in the Beaumont geological formation. Sands and silts are deposited on the surface by storm tides. This soil is developed in strongly alkaline loams, clay loams and silty clay loams within 5 to 7 miles of the bays. It has been affected by salts from the bays.
Slope and land form: The area is nearly level. Approximate elevation above sea level is 8 feet. The site is about 2.9 miles west-southwest of Matagorda Bay (saline).
Collected and described by: Irvin C. Mowery, February 9, 1970, from wall of pit dug with a backhoe in wet field conditions.

A1 70L166 0 to 5 inches. Light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; massive; hard, friable, slightly sticky; many fine roots; medium acid (pH 6.0); abrupt smooth boundary.

B21tg 70L167 5 to 13 inches. Dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; more brownish when crushed; strong medium blocky structure; very hard, firm, sticky; many fine roots; continuous clay films; neutral (pH 7.2); gradual smooth boundary.

B22tg 70L168 13 to 26 inches. Dark gray (10YR 4.5/1) clay loam, very dark gray (10YR 3.5/1) moist; moderate to strong medium and coarse blocky structure; very hard, very firm, very sticky; few to common fine roots; continuous clay films; occasional coarse (1-inch) $CaCO_3$ concretions; saline; moderately alkaline but noncalcareous (pH 8.0); gradual smooth boundary.

B23tg 70L169 26 to 46 inches. Gray (10YR 5/1) light clay, dark gray (10YR 4/1) moist; moderate coarse blocky structure; very hard, very firm, very sticky; few fine roots; occasional slickenside in lower part; continuous clay films; 5 percent coarse (3/4-inch) and very fine (1/16-inch) $CaCO_3$ concretions; saline; weakly calcareous; moderately alkaline; gradual smooth boundary.

B24tg 70L170 46 to 60 inches. Gray (10YR 6/1) light clay, same color (10YR 5/1) moist; moderate fine angular blocky structure; hard, firm, sticky; no roots observed; continuous clay films; 7 percent very fine (1/32- and 1/8-inch) $CaCO_3$ concretions; occasional Fe-Mn concretion; saline; weakly calcareous; moderately alkaline; gradual smooth boundary.

B25tg 70L171 60 to 75 inches. Light gray (10YR 6/1) light clay, gray (10YR 5/1) moist, with common fine faint very pale brown (10YR 7/3) and a few fine faint brownish yellow (10YR 6/6) mottles; moderate fine angular blocky structure; hard, firm, sticky; patchy clay films; 1 percent small soft lumps and concretions of $CaCO_3$; few Fe-Mn concretions; saline; strongly calcareous; moderately alkaline; gradual smooth boundary.

C1 70L172 75 to 95 inches. Yellow (10YR 7/5) clay, brownish yellow (10YR 6/5) moist, with a few medium faint yellow (10YR 7/8) and common medium faint light gray (10YR 7/1) streaks and mottles; strong angular blocky structure; hard, firm, sticky; distinct intersecting slickensides; shiny ped surfaces; seams of dark material fill a few old cracks; occasional $CaCO_3$ concretions; occasional Fe-Mn concretions; saline; strongly calcareous; moderately alkaline; gradual smooth boundary.

C2 70L173 95 to 115 inches plus. White (10YR 8/2) clay, light gray (10YR 7/2) moist, with common fine distinct light yellowish brown (10YR 6/4) mottles; strong angular blocky structure; hard, firm, very sticky; shiny faces on peds; saline; strongly calcareous; moderately alkaline.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

A1 - silt loam
B21tg - silty clay loam
B22tg - light clay
B24tg - heavy clay loam
B25tg - silty clay loam
C1 - silty clay loam
C2 - silty clay loam

SOIL CLASSIFICATION-TYPIC NATRAQUALF
FINE, MIXED, HYPERTHERMIC
SERIES - - - - - - -MATAGORDA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE MRTSC
SOIL SURVEY INVESTIGATIONS UNIT
LINCOLN, NEBRASKA

SOIL NO - - - - - - S70TX-29-22 COUNTY - - - CALHOUN

GENERAL METHODS- - -1A,1B1B,2A1,2B SAMPLE NOS. 70L147-70L152

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B															RATIO
					FINE	SAND						SILT			FAML	INTR	FINE	NON-	8D1
		SAND	SILT	CLAY	CLAY	VCOS	CORS	MEDS	FNES	VFNS	COSI	FNSI	VFSI	TEXT	II	CLAY	CO3-	15-
		2-	.05-	LT	LT	2-	1-	.5-	.25-	.10-	.05	.02	.005-	SAND	.2-	TO	CLAY	BAR
IN		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	2-.1	.02	CLAY	PCT	TO
		PCT LT 2MM																CLAY
000-10	A1	58.6	38.7	2.7		0.0	0.0	0.2	16.0	42.4	28.8	9.9		16.2	86.5			0.74
010-19	B21T	43.5	18.3	38.2		0.1	0.1	0.2	14.5	28.7	10.5	7.8		14.8	52.9			0.51
019-31	B22T	39.7	16.7	43.6		0.0	0.0	0.2	15.2	24.3	8.6	8.1		15.4	47.4			0.50
031-47	B3T	52.7	18.9	28.4		0.1	0.1	0.2	19.1	33.2	10.3	8.6		19.5	61.7			0.50
047-76	C1	50.7	18.2	31.1		0.0	0.0	0.2	18.3	32.0	9.3	8.9		18.6	59.0			0.47
076-96+	2C2	73.3	9.3	17.4		0.0	0.0	0.3	36.0	36.9	4.9	4.4		36.4	76.8			0.52

DEPTH	(PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2)						BULK DENSITY			WATER CONTENT			CARBONATE		PH	
	VOL.	WEIGHT					4A1D	4A1H	4D1	4B1C	4B1C	4B2	4C1	6E1B	3A1A	8C1A	8C1E
	GT	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	1/10	1/3-	15-	WRD	LT	LT	1/1	1/2
	2	75				.074	PCT	BAR	DRY		BAR	BAR	BAR	CM/	2	.002	H2O	CACL
IN	PCT	PCT	PCT LT 75				LT20	G/CC	G/CC		PCT	PCT	PCT	CM	PCT	PCT		
000-10	TR	0	0	0	TR	59	TR						2.0		0		6.7	6.3
010-19	TR	0	0	0	TR	65	TR						19.4		0		7.1	6.6
019-31	TR	0	0	0	TR	68	TR						21.6		0		7.2	7.0
031-47	TR	0	0	0	TR	57	TR						14.3		TR		7.9	7.5
047-76	0	0	0	0	0	58	0						14.6		TR		7.8	7.6
076-96+	0	0	0	0	0	34	0						9.0		TR		7.7	7.4

DEPTH	(ORGANIC MATTER)			IRON	PHOS	(EXTRACTABLE BASES 5B4A-)					ACTY	AL	(CAT EXCH)		RATIO	RATIO	CA	(BASE SAT)	
	6A1A	6B1A		6C2A	6S1A	6NZE	6O2D	6P2A	6Q2A		6H1A	6G1D	5A3A	5A6A	8D1	8D3	5F	5C3	5C1
	ORGN	NITG		EXT	TOTL	CA	MG	NA	K	SUM	BACL	KCL	EXTB	NHAC	NHAC	CA	SAT	EXTB	NHAC
	CARB			FE						EXTB	TEA	EXT	ACTY		TO	TO	NHAC	ACTY	
IN	PCT	PCT	C/N	PCT	PCT	(- - - - - - - - - - - -MEQ / 100 G- - - - - - - - - - -)									CLAY	MG	PCT	PCT	PCT
000-10	0.35	.037	9	0.1		2.1	0.5	0.1	0.3	3.0	1.6		4.6	3.1	1.15	4.2	68	65	97
010-19	0.76	.086	9	0.8		5.6	8.6	6.8	1.1	22.1	3.3		25.4	21.9	0.57	0.7	26	87	101
019-31	0.40	.051	8	0.8		5.3	10.	11.7	1.2	28.5	2.4		30.9	25.1	0.58	0.5	21	92	114
031-47	0.12	.023		0.3		3.6A	6.8A	8.7	0.8	19.9				17.1	0.60				
047-76	0.04	.C15		0.3		3.8A	7.4A	9.9	0.9	22.0				19.2	0.62				
076-96+	0.02	.CC9		0.4		2.6A	5.0A	9.7	0.5	17.8				11.8	0.68				

DEPTH	(SATURATED PASTE)			NA	NA	SALT	GYP	(SATURATION EXTRACT 8A1-									ATTERBERG	
	8E1	8C1B	8A	5D2	5E	8D5	6F1A	8A1A	6N1B	6O1B	6P1A	6Q1A	6I1A	6J1A	6K1A	6L1A	6M1A	4F1	4F2
	REST					TOTL		EC	CA	MG	NA	K	CO3	HCO3	CL	SO4	NO3	LQID	PLST
	OHM-	PH	H2O	ESP	SAR	SOLU		MMHOS/										LMIT	INDX
IN	CM		PCT	PCT		PPM	PCT	CM	(- - - - - - - - - - MEQ / LITER - - - - - - - - - -)									PCT	
000-10	11000	7.0	82.7			200		0.37										248	3
010-19	660	6.9	62.7	24	21	1400		3.29	1.2	2.1	27.5								
019-31	340	7.2	82.8	28	28	4300		7.06	2.5	5.5	56.5							548	38
031-47	310	7.5	44.5			2700		7.90											
047-76	310	7.6	48.6			2300		6.32										468	31
076-96+	210	7.4	35.7			5600		18.90											

(A) METHODS 6N4C FOR CA AND 6O4C FOR MG.
(B) DETERMINED BY TEXAS HIGHWAY DEPT.

Soil classification: Typic Natraqualf; fine, mixed, hyperthermic.
Soil: Matagorda very fine sandy loam.
Soil Nos.: S70TX-29-22; 70L147-70L152.
Location: Five miles southwest and southeast of Port Lavaca on Texas Highway 238 to intersection with Texas Highway 316; 7.3 miles southeast on Texas Highway 316 to paved county road going to Indianola; 1.3 miles south and southeast on paved road toward Indianola to the paved road going to the Indianola cemetery, said road being 0.2 mile from the bay; 0.75 mile south on paved road; 0.67 mile west through aluminum gate on shell ranch road; 300 feet east of fence and 100 feet north of road in overgrazed native range.
Area: Calhoun County, Texas.
Vegetation and use: Thin stand of Gulf cordgrass (Spartina spartinae), red lovegrass (Eragrostis oxylepis) and a few small mesquite bushes. Nearby, it has been farmed to rice.
Moisture: Dry colors given unless otherwise stated.
Drainage and permeability: Somewhat poorly drained. Surface runoff is slow. Permeability is slow.
Parent material: This geological formation is questionable. Possibly outcrops of the Lissie Formation in the Beaumont Formation. This soil is developed in alkaline loams, clay loams and silty clay loams near the coast. It has been affected by salts from the bays.
Slope and land form: The area is nearly level but with a slight convex surface. Approximate elevation above sea level is 6 feet, and the site is 0.77 mile northwest of Powder Horn Lake (saline) and 1.2 miles southwest of Matagorda Bay. Tides of Hurricane Carla were 10 to 12 feet deep over this area. This pedon is in an area of about 100 acres.
Collected and described by: Irvin C. Mowery, January 28, 1970, from the wall of a pit dug with a backhoe.

A1 70L147 0 to 10 inches. Pale brown (10YR 6/3) very fine sandy loam, brown (10YR 5/3) moist; massive; hard, friable; few fine roots; thickness of A ranges from 10 to 18 inches in wave of Bt horizon, in thicker parts the A2 is light gray (10YR 7/2); neutral (pH 6.8); abrupt wavy boundary.

B21t 70L148 10 to 19 inches. Light yellowish brown (10YR 6/4) clay loam, yellowish brown (10YR 5/4) moist, with common medium and fine faint brownish yellow (10YR 6/6) and a few fine faint brown (7.5YR 5/4) mottles; strong medium and coarse blocky structure; very hard, firm, very sticky; common fine roots; continuous thick, black (10YR 2/1) coatings on peds; mildly alkaline (pH 7.8); gradual wavy boundary.

B22t 70L149 19 to 31 inches. Yellow (2.5Y 7/5) clay, olive yellow (2.5Y 6/5) moist, with a few, fine, faint olive yellow (2.5Y 5/6) mottles; moderate coarse blocky structure; very hard, firm, very sticky; few fine roots; thick continuous clay films but not black as above; few black shot-like concretions; saline; moderately alkaline but not calcareous (pH 8.0); gradual smooth boundary.

B3t 70L150 31 to 47 inches. Pale yellow (2.5Y 7/4) sandy clay loam, light yellowish brown (2.5Y 6/4) moist, with a few fine distinct reddish yellow (7.5YR 6/6) mottles; weak coarse blocky structure; hard, firm, sticky; few fine root channels; common small black shot-like concretions; patchy clay films; pockets of loamy fine sand and old cracks 1/4-inch wide filled with sand; saline; moderately alkaline but noncalcareous (pH 8.0); gradual smooth boundary.

C1 70L151 47 to 76 inches. White (2.5Y 8/2) sandy clay loam, light gray (2.5Y 7/2) moist, with a few fine and medium prominent reddish yellow (5YR 6/6) mottles; structure undetermined but shiny surfaces observed; hard, firm, sticky; few tree root channels; contains strata of silty clay; thin sand-filled cracks; saline; moderately alkaline but noncalcareous (pH 8.0); clear smooth boundary.

IIC2 70L152 76 to 96 inches plus. Yellow (7.5YR 6/6) very fine sandy loam, same color, moist; massive; few dark spots that appear to be segregated iron; saline; weakly calcareous; moderately alkaline.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

B21t - light clay
B22t - sandy clay
B3t - heavy silty clay loam
C1 - sandy clay
IIC2 - loam

SOIL CLASSIFICATION-TYPIC NATRAQUALF
FINE, MIXED, HYPERTHERMIC
SERIES - - - - - - -MATAGORDA

SOIL NO - - - - - - - S70TX-29-23 COUNTY - - - CALHOUN

GENERAL METHODS- - -1A,1B1B,2A1,2B SAMPLE NOS. 70L153-70L158

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE MRTSC
SOIL SURVEY INVESTIGATIONS UNIT
LINCOLN, NEBRASKA

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B (PCT LT 2MM) SAND 2-.05	SILT .05-.002	CLAY LT .002	FINE CLAY .0002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	COSI .05-.02	FNSI .02-.002	VFSI .005-.002	FAML SAND .2-.02	INTR TEXT 2-.1	FINE CLAY .02 TO CLAY	NON-CO3 CLAY PCT	RATIO 8D1 15-BAR TO CLAY PCT
000-10	A1	72.4	23.8	3.8	1.3	TR	.2	.4	31.6	40.2	14.1	9.7		32.2	82.8	34	4	.50
010-15	B21T	48.7	10.9	40.4	33.6	.0	.1	.3	22.6	25.7	6.0	4.9		23.0	51.8	83	40	.49
015-32	B22T	54.7	12.0	33.3	27.1	.0	.1	.2	26.3	28.1	6.0	6.0		26.6	57.7	81	33	.52
032-45	B23T	64.5	12.0	23.5	19.4	TR	TR	.2	32.8	31.5	5.5	6.5		33.0	66.8	83	24	.52
045-58	B3T	56.2	13.6	30.2	21.0	.0	TR	.2	29.3	26.7	6.4	7.2		29.5	59.4	70	30	.47
058-74+	C	49.1	27.4	23.5	13.4	4.2	2.1	1.0	21.7	20.1	5.1	22.3		29.0	44.4	57	24	.46

DEPTH IN	(PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2) VOL. GT 2 MM PCT	WEIGHT GT 75 PCT	75-20 PCT	20-5 PCT	5-2 PCT	LT .074 PCT	BULK DENSITY 4A1D 20-2 MM PCT	4A1H 1/3-BAR OVEN DRY G/CC	4D1 COLE LT20 G/CC	4B1C 1/10 BAR PCT	4B1C 1/3-BAR PCT	WATER CONTENT 4B2 15-BAR PCT	4C1 WRD CM/CM	CARBONATE 6E1B LT 2 MM PCT	3A1A CT .002 PCT	PH 8C1A 1/1 H2O	8C1E 1/2 CACL
000-10	0	0	0	0	0	43	0					1.9		0		5.5	5.4
010-15	0	0	0	0	0	60	0					19.8		0		5.5	5.4
015-32	0	0	0	0	0	55	0					17.4		0		6.4	6.2
032-45	0	0	0	0	0	46	0					12.2		0		7.4	7.1
045-58	0	0	0	0	0	53	0					16.2		TR		7.8	7.5
058-74+		0	TR	5	5	51	10					10.8		28	0	8.3	8.1

DEPTH IN	(ORGANIC MATTER) 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON 6C2A EXT FE PCT	PHOS 6S1A TOTL PCT	(EXTRACTABLE BASES 5B4A) 6N2E CA MEQ	6Q2D MG	6P2A NA	6Q2A K	SUM EXTB / 100 G	ACTY 6H1A BACL TEA	AL 6G1D KCL EXT	(CAT EXCH) 5A3A EXTB ACTY	5A6A NHAC	RATIO 8D1 NHAC TO CLAY	RATIO CA TO MG	CA SAT NHAC PCT	(BASE SAT) 5C3 EXTB ACTY PCT	5C1 NHAC PCT
000-10	0.34					0.9	0.6	0.2	0.2	1.9	1.8		3.7	2.7		1.5	33	51	70
010-15	0.78					5.0	9.4	4.8	1.0	20.3	6.9		27.2	23.8		0.5	21	75	85
015-32	0.36					4.2	8.7	7.5	0.9	21.3	3.3		24.6	20.3		0.5	21	87	105
032-45	0.04					2.9A	6.4A	7.8	0.6	17.7				15.8					
045-58	0.03					3.4A	7.2A	8.9	0.8	20.3				18.4					
058-74+	0.01					12.2A	5.1A	8.4	0.6	26.3				13.1					

DEPTH IN	(SATURATED PASTE) 8E1 REST OHM-CM	8C1B PH	8A1 H2O PCT	NA 5D2 ESP PCT	NA 5E SAR	SALT 8D5 TOTL SOLU PPM	GYP 6F1A PCT	(SATURATION EXTRACT 8A1) 8A1A EC MMHOS/CM	6N1B CA	6O1B MG	6P1A NA	6Q1A K	6I1A CO3	6J1A HCO3	6K1A CL	6L1A SO4	6M1A NO3	ATTERBERG 4F1 LQID LMIT PCT	4F2 PLST INDX
									MEQ / LITER										
000-10	13000	5.7	24.8			30		0.21											
010-15	920	5.4	60.6	17	16	890		2.15	0.6	1.2	15.5								
015-32	500	6.4	67.1	25	24	2200		4.49	1.4	3.2	36.5								
032-45	380	7.3	5010			2100		5.74											
045-58	350	7.6	44.4			3100		8.87											
058-74+	340	7.9	42.7			3700		10.70											

(A) METHODS 6N&C FOR CA AND 6O4C FOR MG.

Soil classification: Typic Natraqualf; fine, mixed, hyperthermic.
Soil: Matagorda very fine sandy loam.
Soil Nos.: S70TX-29-23; 70L153-70L158.
Location: Five miles southwest and southeast of Port Lavaca on Texas Highway 238 to the intersection with Texas Highway 316; 2.8 miles southeast and east on Texas Highway 316; 1.1 miles southeast on a gravel field road to an old house; 2.8 miles on shell field road to the southwest, northwest and southeast, this point being 0.4 mile past an intersection of field roads; 0.2 mile north on a sand ridge.
Area: Calhoun County, Texas.
Vegetation and use: The area represented by the pedon native range but badly overgrazed. Present vegetation is thin stand of Gulf cordgrass (Spartina spartinae), red lovegrass (Eragrostis oxylepis), some marsh hay cordgrass. Nearby areas are farmed to rice.
Moisture: Dry colors given unless otherwise stated.
Drainage and permeability: Somewhat poorly drained. Surface runoff is slow. Permeability is slow. Water table rose to 56 inches.
Parent material: The geological formation is questionable. Possibly outcrops of the Lissie Formation in the Beaumont. This soil is developed in alkaline to strongly alkaline loams, clay loams and silty clay loams near the coast. It has been affected by salts from the bays.
Slope and land form: The area represented by the pedon is nearly level but with a slight convex surface. Approximate elevation above sea level is 8 feet, and the site is 2.4 miles southwest of Matagorda Bay and 2.3 miles northwest of Powder Horn Lake (saline). Tides of Hurricane Carla were 10 to 12 feet deep at this site. This pedon is in an area of about 200 acres.
Collected and described by: Irvin C. Mowery, January 28, 1970, from the wall of a pit dug with a backhoe.

A1 70L153 0 to 10 inches. Pale brown (10YR 6/3) very fine sandy loam, brown (10YR 5/3) moist; massive; hard, friable; few fine roots; very strongly acid (pH 5.0); abrupt wavy boundary.

B21t 70L154 10 to 15 inches. Very pale brown (10YR 7/4) sandy clay with a few fine faint reddish yellow (7.5YR 6/6) and a few fine light brownish gray (10YR 6/2) mottles; strong medium and coarse blocky structure; very hard, firm, very sticky; common fine roots, thick very dark gray coatings on peds; sand-filled cracks 1/4-inch wide extend down from low part of subsoil wave; medium acid (pH 6.0); gradual wavy boundary.

B22t 70L155 15 to 32 inches. Light brownish gray (2.5Y 6/2) sandy clay loam, grayish brown (2.5Y 5/2) moist; moderate coarse blocky structure; very hard, firm, sticky; few fine root channels; thick continuous clay films; sand-filled cracks 1/8-inch wide; peds adjacent to cracks have dark coatings as in the B21t horizon; few Fe-Mn concretions; slightly acid (pH 6.5); gradual smooth boundary.

B23t 70L156 32 to 45 inches. Light gray (10YR 7/1) sandy clay loam, same color, moist, with common medium faint very pale brown (10YR 7/3) and common fine distinct reddish yellow (5YR 6/6) mottles; weak coarse blocky structure; few fine root channels; patchy clay films; common fine pores; common Fe-Mn concretions; few thin sand-filled cracks; saline; moderately alkaline but noncalcareous (pH 8.0); gradual smooth boundary.

B3t 70L157 45 to 58 inches. Light brownish gray (10YR 6/2) sandy clay loam, grayish brown (10YR 5/2) moist, with common medium distinct reddish yellow (7.5YR 6/6) mottles; weak coarse blocky structure; very hard, firm, sticky; few Fe-Mn concretions; saline; moderately alkaline but noncalcareous (pH 8.0); gradual smooth boundary.

C 70L158 58 to 74 inches plus. Pinkish gray (7.5YR 7/2) sandy clay loam with a few medium distinct yellowish red (5YR 5/6) mottles; massive; very hard, firm, sticky; few soft lumps and hard concretions of $CaCO_3$; few Fe-Mn concretions; few fine pores; saline; strongly calcareous; moderately alkaline.

Remarks: Water table rose to 56 inches.

Textures above agree with laboratory data. Field textures where different are given below:

B22t - light clay
B23t - sandy clay
B3t - sandy clay
C - silty clay loam

SOIL CLASSIFICATION-ALBIC NATRAQUALF
FINE, MONTMORILLONITIC, HYPERTHERMIC
SERIES - - - - - - -SERIES NOT DESIGNATED (A)

SOIL NO - - - - - - S70TX-29-24 COUNTY - - - CALHOUN

GENERAL METHODS- - -1A,1B1B,2A1,2B SAMPLE NOS. 70L159-70L165

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE MRTSC
SOIL SURVEY INVESTIGATIONS UNIT
LINCOLN, NEBRASKA

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B															RATIO
		SAND 2-.05	SILT .05-.002	CLAY LT .002	FINE CLAY LT .0002	SAND VCOS 2-1	SAND CORS 1-.5	SAND MEDS .5-.25	SAND FNES .25-.10	SAND VFNS .10-.05	SILT COSI .05-.02	SILT FNSI .02-.002	SILT VFSI .005-.002	FAML TEXT SAND 2-.1	INTR II .2-.02	FINE CLAY TO CLAY	NON-CO3-CLAY	8D1 15-BAR TO CLAY
IN		PCT LT 2MM														PCT	PCT	CLAY
000-6	AP	27.3	60.4	12.3		0.0	0.1	0.3	8.9	18.0	37.4	23.0		9.3	62.9		12	0.47
006-15	B21TG	18.3	40.6	41.1		0.0	0.1	0.2	6.0	12.0	25.7	14.9		6.3	42.8		41	0.48
015-32	B22TG	18.3	45.4	36.3		0.0	0.2	0.1	5.9	12.2	27.0	18.4		6.1	44.2		36	0.50
032-43	B31TG	20.6	45.9	33.5		1.9	1.0	0.4	5.7	11.6	26.8	19.1		9.0	43.1		34	0.48
043-56	B32TG	15.7	51.5	32.8		0.9	0.8	0.3	4.1	9.6	23.5	28.0		6.1	36.5		31	0.48
056-72	C11	10.4	59.4	30.2		1.0	1.2	0.5	1.9	5.8	25.3	34.1		4.6	32.6		28	0.45
072-96+	C12	5.0	50.1	44.9		0.1	0.2	0.1	1.1	3.5	15.8	34.3		1.5	20.2		41	0.39

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2 VOL. GT 2	WEIGHT GT 75	75-20	20-5	5-2	LT .074	20-2 PCT LT20	BULK DENSITY 4A1D 1/3-BAR	4A1H OVEN DRY	4D1 COLE	WATER CONTENT 4B1C 1/10 BAR	4B1C 1/3-BAR	4B2 15-BAR	4C1 WRD CM/CM	CARBONATE 6E1B LT 2	6E1B LT .002	3A1A PCT	PH 8C1A 1/1 H2O	8C1E 1/2 CACL
IN	PCT	PCT	PCT LT 75				LT20	G/CC	G/CC		PCT	PCT	PCT	CM	PCT		PCT		
000-6	0	0	0	0	0	83	0						5.8		0			7.0	6.5
006-15	0	0	0	0	0	89	0						19.8		0			7.2	6.6
015-32	TR	0	0	TR	0	89	TR						18.2		0			7.9	7.7
032-43	TR	0	0	TR	TR	86	TR						16.0		3		0	8.1	7.9
043-56	TR	0	0	0	TR	90	TR						15.6		14		2	8.2	7.9
056-72	TR	0	0	TR	TR	94	TR						13.6		24		2	8.2	7.9
072-96+	TR	0	0	TR	TR	97	TR						17.3		11		4	8.2	7.9

DEPTH	ORGANIC MATTER 6A1A ORGN CARB	6B1A NITG	C/N	IRON 6C2A EXT FE	PHOS 6S1A TOTL	EXTRACTABLE BASES 5B4A- 6N2E CA	6O2D MG	6P2A NA	6Q2A K	SUM EXTB	ACTY 6H1A BACL TEA	AL 6G1D KCL EXT	CAT EXCH 5A3A EXTB ACTY	5A6A NHAC	RATIO 8D1 NHAC TO CLAY	RATIO 8D3 CA TO MG	CA 5F SAT NHAC	BASE SAT 5C3 EXTB ACTY	5C1 NHAC
IN	PCT	PCT		PCT	PCT	MEQ / 100 G											PCT	PCT	PCT
000-6	0.81	.071	11	0.2		6.5	2.3	0.4	0.2	9.4	2.2		11.6	9.4	0.76	2.8	69	81	100
006-15	1.00	.093	11	0.5		13.0	11.4	4.1	0.6	29.1	5.1		34.2	31.0	0.75	1.1	42	85	94
015-32	0.34	.037	9	0.3		8.8B	11.6B	6.9	0.5	27.8				28.5	0.79				
032-43	0.09	.017		0.3		13.1B	10.6B	7.9	0.5	32.1				24.4	0.73				
043-56	0.03	.015		0.2		15.5B	9.8B	7.9	0.5	33.7				21.5	0.66				
056-72	0.03	.011		0.5		15.4B	8.2B	6.9	0.4	30.9				18.4	0.61				
072-96+	0.01	.019		1.0		17.1B	10.1B	7.6	0.6	35.4				23.4	0.52				

DEPTH	SATURATED PASTE 8E1 REST OHM-	8C1B PH	8A H2O	NA 5D2 ESP	NA 5E SAR	SALT 8D5 TOTL SOLU	GYP 6F1A	SATURATION EXTRACT 8A1- 8A1A EC MMHOS/	6N1B CA	6O1B MG	6P1A NA	6Q1A K	6I1A CO3	6J1A HCO3	6K1A CL	6L1A SO4	6M1A NO3	ATTERBERG 4F1 LQID LMIT	4F2 PLST INDX
IN	CM		PCT	PCT		PPM	PCT	CM	MEQ / LITER									PCT	
000-6	4300	7.1	27.2			120		0.72											
006-15	1300	6.5	51.7	12	11	310		0.95	0.7	0.6	8.6								
015-32	720	7.6	66.6	20	18	1100		2.35	1.0	1.4	19.5								
032-43	430	7.4	58.1			1100		2.64											
043-56	300	7.9	55.4			3500		8.13											
056-72	280	7.9	50.0			3800		9.76											
072-96+	300	7.9	35.6			1500		5.74											

(A) TAXADJUNCT TO LIVIA SERIES.
(B) METHODS 6N4C FOR CA AND 6O4C FOR MG.

Soil classification: Albic Natraqualf; fine, montmorillonitic, hyperthermic.
Soil: Series not designated.
Soil Nos.: S70TX-29-24; 70L159-70L165.
Location: 9.3 miles east-northeast of Port Lavaca on Texas Highway 35 to intersection with Farm Road 2143; 4.6 miles east on Farm Road 2143 to intersection with Texas Highway 172; 1.0 mile east on paved county road; 2.5 miles south on paved county road and shell road; 400 feet east on field turn row; 80 feet south of turn row in old field.
Area: Calhoun County, Texas.
Vegetation and use: Site of the pedon described is in an old field now in common bermudagrass. Native area nearby has Gulf cordgrass with a moderate overstory of small mesquite trees.
Moisture: Dry colors given unless otherwise stated.
Drainage and permeability: Poorly drained. Runoff is slow. Very slowly permeable. Water table rose to 82 inches.
Parent material: The soil is believed to be developed in the Beaumont geological formation. This soil is developed in strongly alkaline loams, clay loams and silty clay loams within 5 to 7 miles of the bays. It has been affected by salt in various degrees.
Slope and land form: The area of the pedon is nearly level. Approximate elevation above sea level is 13 feet. The site is 0.9 mile west of Carancuhua Bay (saline). The pedon represents about 80 acres.
Collected and described by: Irvin C. Mowery, January 27, 1970, from wall of pit dug with a backhoe in wet field conditions.

Ap 70L159 0 to 6 inches. Light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; massive; hard, friable; many fine roots; slightly acid (pH 6.5); abrupt smooth boundary.

B21tg 70L160 6 to 15 inches. Dark gray (10YR 4/1) light silty clay, very dark gray (10YR 3/1) moist, with a few fine prominent reddish brown (2.5YR 4/4) mottles; moderate fine angular blocky structure; very hard, very firm, very sticky; common fine roots; common fine pores; continuous clay films; moderately alkaline but noncalcareous (pH 8.0); gradual smooth boundary.

B22tg 70L161 15 to 32 inches. Grayish brown (10YR 5/2) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate medium and fine angular blocky structure; very hard, very firm very sticky; few fine roots; few fine pores; occasional slickenside in lower part; continuous clay films; moderately alkaline but noncalcareous (pH 8.0); gradual smooth boundary.

B31tg 70L162 32 to 43 inches. Light brownish gray (10YR 6/2) clay loam, grayish brown (10YR 5/2) moist; weak medium blocky structure; very hard, very firm, very sticky; few fine roots; 5 percent small $CaCO_3$ concretions; few small Fe-Mn concretions; patchy clay films; common fine pores; mildly alkaline; weakly calcareous; gradual smooth boundary.

B32tg 70L163 43 to 56 inches. Light brownish gray (10YR 6.5/2.5) silty clay loam, grayish brown (10YR 5.5/2.5) moist; weak medium blocky structure; very hard, very firm, very sticky; few fine roots; patchy clay films; soft lumps and concretions of $CaCO_3$ comprise 6 to 8 percent of mass; occasional Fe-Mn concretions; saline; strongly calcareous; moderately blocky; gradual smooth boundary.

C11 70L164 56 to 72 inches. Light reddish brown (5YR 6/4) silty clay loam, reddish brown (5YR 5/4) moist, with a few fine distinct light gray (10YR 7/2) streaks; massive; very hard, very firm, very sticky; few fine roots; patchy clay films; few $CaCO_3$ concretions; occasional Fe-Mn concretions; saline; strongly calcareous; moderately alkaline; gradual smooth boundary.

C12 70L165 72 to 96 inches plus. Reddish yellow (5YR 6/6) silty clay loam, yellowish red (5YR 5/6) moist with a few medium distinct light gray (5Y 6/1) mottles; massive; very hard, very firm, very sticky; few fine roots; few shiny surfaces on peds; few $CaCO_3$ concretions; few Fe-Mn concretions; saline; strongly calcareous; moderately alkaline.

Remarks: This pedon was sampled as Livia silt loam; the sodium content and SAR in the upper part of the natric horizon are too low for a Typic Natraqualf.

Textures above agree with laboratory data. Field textures where different are given below:

B22tg - light clay
B31tg - light clay
B32tg - light clay
C12 - heavy silty clay loam

SOIL CLASSIFICATION Typic Ochraqualf; fine-loamy, mixed, hyperthermic

SOIL Orelia fine sandy loam LOCATION San Patricio County, Texas

SOIL NOS. S56TX-205-1 LAB. NOS. 5002-5009

SOIL SURVEY LABORATORY Lincoln, Nebraska DATE April 3, 1958

GENERAL METHODS 1A, 1B1a, 2A1, 2B

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	
0-7	Ap	-	0.6	4.8	37.1	24.0	14.8	18.7	59.3	6.4	-	fsl
7-12	B21t	-	0.6	3.8	29.3	19.1	12.6	34.6	46.7	6.4	-	scl
12-17	B22t	-	0.6	4.0	29.8	19.3	13.0	33.3	47.0	6.7	-	scl
17-23	B23t	-	0.6	3.8	30.0	19.9	13.3	32.4	48.7	6.8	-	scl
23-30	B31ca	0.2	0.7	3.8	29.1	19.6	14.5	32.1	47.7	7.9	-	scl
30-38	B32ca	0.2	0.8	3.3	29.0	19.5	15.3	31.9	46.3	8.1	-	scl
38-50	C1ca	0.6	0.9	3.0	28.2	19.6	15.4	32.3	45.8	8.2	-	scl
50-66	C2ca	0.3	0.7	3.0a	28.3a	20.5a	15.1	32.1	46.9	7.7	-	scl

DEPTH INCHES	pH 8C1a		ORGANIC MATTER			8A2	ELECTRICAL CONDUCTIVITY EC x10³ MILLIMHOS PER CM 8A1a	6E1a		MOISTURE TENSIONS		
	1:5	1:10	6A1a ORGANIC CARBON	6B1a NITROGEN	C/N	EST% SALT (BUREAU CUP)		$CaCO_3$ equivalent	GYPSUM me./100g. SOIL	1/10 ATMOS.	1/3 ATMOS.	4B2 15 ATMOS.
1:1			%	%				%		%	%	%
6.3	6.3	6.4	0.66	.053	12	<0.20	1.0	-				6.8
6.8	7.0	7.1	0.69	.060	12	<0.20	1.2	-				15.2
7.3	7.5	7.6	0.62	.053	12	<0.20	1.4	-				14.2
7.9	8.3	8.5	0.41	.034	12	<0.20	2.0	-				12.8
8.0	8.4	8.6	0.27	.024	11	<0.20	2.6	1				13.5
8.0	8.4	8.6	0.19			0.24	3.2	2				13.8
8.0	8.4	8.6	0.09			0.29	4.0	2				14.4
7.9	8.3	8.5	0.05			0.33	5.0	1				14.4

DEPTH INCHES	5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K	5D2 EXCH. Na %	8A1 SATURATION EXTRACT SOLUBLE 6P1a Na	6Q1a K	6J1a HCO_3	6K1a Cl	6L1a SO_4	8A MOISTURE AT SATURATION
	← milliequivalents per 100g. soil →							← milliequivalents per liter →					%
0-7	12.9	8.8	3.2	2.3	0.5	0.5	3	3.6	0.3				32.4
7-12	24.3	16.8	6.3	2.0	2.0	0.5	6	7.0	0.1				59.4
12-17	24.0	16.4	6.2	1.2	2.3	0.4	8	8.3	0.1				56.6
17-23	22.1	18.9	6.1	-	2.9	0.4	10	12.0	0.1				58.8
23-30	21.4				3.5	0.4	12	17.0	0.1				58.0
30-38	21.2				3.9	0.5	13	21.6	0.1				56.7
38-50	20.1				4.2	0.6	13	27.5	0.2	2.8	27.5	8.7	56.6
50-66	19.4				4.2	0.6	12	34.5	0.3				55.4

a. Few $CaCO_3$ concr.

Soil classification: Typic Ochraqualf; fine-loamy, mixed, hyperthermic.
Soil: Orelia fine sandy loam.
Soil Nos.: S56TX-205-1; 5002-5009.
Location: 8.25 miles west of Sinton on FM Road 894; 120 feet south of road in cultivated field on Lee Herman farm.
Area: San Patricio County, Texas.
Cover: None; plowed; used mainly for cotton and grain sorghums.
Parent material: Light gray alkaline sandy clay of Pleistocene age (Beaumont clay).
Topography: Nearly level, gradient of less than 0.5 percent.
Landscape position: Flat plain (Coastal terrace).
Moisture when sampled: Dry through B22t horizon; only slightly moist below.
Collected by: J. S. Allen, J. R. Coover, R. E. Daniell, H. C. Dean, G. Darby, G. E. Franki and H. Oakes.
Described by: H. Oakes, November 6, 1956.

Ap 5002 0 to 7 inches. Dark gray (10YR 3.5/1, 3/1 moist) fine sandy loam; light gray weak platy surface crust 3 to 5 mm thick; below this for ½ inch the soil is a mass of weak medium and fine very hard granules when moist, massive when dry; weak granular below when moist, very hard dry; friable moist; pH 6.0 by field test; abrupt smooth boundary.

B21t 5003 7 to 12 inches. Very dark gray (10YR 3/1, 2.5/1 moist) sandy clay loam containing considerable fine sand; weak to moderate medium blocky; thin patchy clay skins; few fine pores; very firm moist; extremely hard dry; noncalcareous but pH 8.0 by field test; clear smooth boundary.

B22t 5004 12 to 17 inches. Very dark gray (10YR 3/1, 2.5/1) sandy clay loam; moderate medium blocky; firm; extremely hard dry; plastic wet; thin patchy clay skins; few fine pores; noncalcareous by field test; clear smooth boundary.

B23t 5005 17 to 23 inches. Dark gray (10YR 4/1, 3/1) sandy clay loam; moderate medium and coarse blocky; firm; extremely hard dry; few thin patchy clay skins; few fine pores; few roots through and between peds; noncalcareous but pH 8.0 by field test; clear smooth boundary.

B31ca 5006 23 to 30 inches. Gray (10YR 5/1, 4/1) sandy clay loam with some staining or splotches of dark gray; weak blocky; no apparent clay skins; firm; very hard dry; noncalcareous; contains an estimated 5 percent by volume of soft and hard concretions of $CaCO_3$ ranging up to 10 mm in diameter; gradual boundary.

B32ca 5007 30 to 38 inches. Gray (10YR 5.5/1, 5/1) sandy clay loam; weak blocky; very few thin patchy clay skins; common fine pores; firm to friable; hard dry, noncalcareous; contains an estimated 2 to 3 percent by volume of small soft and hard lumps of $CaCO_3$ mostly less than 5 mm in diameter; gradual boundary.

C1ca 5008 38 to 50 inches. Light gray (2.5Y 7/2, 6/2) sandy clay loam with few grayish brown splotches or stains in upper part; friable; slightly hard dry; noncalcareous; few small soft lumps and hard concretions of $CaCO_3$; gradual smooth boundary.

C2ca 5009 50 to 66 inches. Light gray (2.5Y 7/2 dry) sandy clay loam with few soft lumps and hard concretions of $CaCO_3$; friable and apparently moderately permeable; noncalcareous but pH 8.0 by field test. This material continues to a depth of 7 feet or more.

Remarks: All horizons, except the Ap, contain a few nests of wormcasts.

Textures above agree with laboratory data. Field textures where different are given below:

Ap - clay loam
B21t - clay
B22t - clay
B23t - fine sandy clay
B31ca - fine sandy clay
B32ca - light fine sandy clay
C1ca - light fine sandy clay
C2ca - light fine sandy clay

SOIL SURVEY LABORATORY Typic Ochraqualf; fine-loamy, mixed, hyperthermic

SOIL Series not designated — LOCATION San Patricio County, Texas

SOIL NOS. S56TX-205-2 — LAB. NOS. 5010-5017

SOIL SURVEY LABORATORY Lincoln, Nebraska — DATE April 3, 1958

GENERAL METHODS 1A, 1B1a, 2A1, 2B

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	TEXTURAL CLASS
0-6	Ap	-	0.6	4.0	37.2	21.4	15.1	21.7	54.5	6.7	-	scl
6-12	B21t	0.2	0.7	4.1	34.0	18.5	14.4	28.1	47.7	7.2	-	scl
12-19	B22t	-	0.6	3.7	34.6	18.2	14.3	28.6	47.7	7.4	-	scl
19-26	B23tca	0.7a	0.8a	3.6a	33.4a	18.7a	14.0	28.8	47.8	6.9	-	scl
26-37	B24tca	0.4a	0.8a	3.7a	33.6a	18.6a	14.5	28.4	48.0	7.2	-	scl
37-43	B3ca	0.2	0.8	4.0	32.5	18.2	15.3	29.0	49.6	7.1	-	scl
43-55	C1	0.4	0.7	3.6	27.3	15.8	23.1	29.1	44.6	13.5	-	scl
55-64	C2	0.6	0.7	3.7	28.0	15.5	22.0	29.5	42.4	15.2	-	scl

DEPTH INCHES	pH 8C1a 1:1	1:5	1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	8A2 EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC x10³ MILLIMHOS PER CM 8A1a	6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
0-6	6.4	6.5	6.7	0.54	.047	12	<0.20	0.6	-				8.4
6-12	6.3	6.5	6.6	0.51	.051	10	<0.20	0.7	-				12.3
12-19	7.4	7.7	7.8	0.36	.031	12	<0.20	0.7	-				13.1
19-26	8.2	8.4	8.7	0.22	.019		<0.20	1.1	1				12.2
26-37	8.2	8.6	8.8	0.15			<0.20	1.2	1				12.0
37-43	8.4	8.7	9.0	0.08			<0.20	1.1	1				12.9
43-55	8.5	9.0	9.1	0.08			<0.20	0.9	12				13.3
55-64	8.7	9.0	9.1	0.04			<0.20	0.9	11				15.3

DEPTH INCHES	5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K	5D2 EXCH. Na %	SATURATION EXTRACT SOLUBLE 8A1 6P1a Na	6Q1a K	8A MOISTURE AT SATURATION %
		milliequivalents per 100g. soil						milliequivalents per liter		
0-6	14.3	9.3	4.0	2.7	0.3	0.6	1	1.9	0.3	36.1
6-12	18.3	12.2	4.9	2.3	0.7	0.4	3	2.8	0.2	47.4
12-19	19.6		6.0	0.8	1.0	0.4	4	3.6	0.1	49.6
19-26	19.6				1.6	0.4	7	6.0	0.1	49.0
26-37	19.4				2.0	0.4	8	7.6	0.1	54.5
37-43	19.7				2.5	0.5	10	8.4	0.1	56.1
43-55	19.4				2.8	0.5	12	7.5	0.1	57.0
55-64	18.5				3.1	0.5	14	7.4	0.1	61.3

a. Few $CaCO_3$ concr.

Soil classification: Typic Ochraqualf; fine-loamy, mixed, hyperthermic.
Soil: Series not designated.
Soil Nos.: S56TX-205-2; 5010-5017.
Location: 6.4 miles southwest of Sinton, in San Patricio County, at a point 0.45 mile west and 250 feet south of intersection of U.S. Highway No. 77 and FM Road 630; site is in a cultivated field on the C. B. Ellis farm.
Cover: None; plowed field.
Parent material: Light brownish gray slightly calcareous light clay or sandy clay of Pleistocene age (Beaumont clay).
Topography: Nearly level; gradient less than 0.5 percent.
Landscape position: Flat plain (Coastal terrace).
Moisture when sampled: Dry through the B24tca; only slightly moist below.
Collected by: J. S. Allen, J. R. Coover, R. E. Daniell, H. C. Dean, G. Darby, G. E. Franki, and H. Oakes.
Described by: H. Oakes, November 6, 1956.

Ap 5010 0 to 6 inches. Dark gray (10YR 4/1, 3/1 moist) sandy clay loam; thin light gray weak platy surface crust 3 mm thick; moderate medium granular for 1/2 inch and massive below; friable; very hard dry; pH 6.0 by field test; abrupt smooth boundary.

B21t 5011 6 to 12 inches. Very dark gray (10YR 3.5/1, 2.5/1) sandy clay loam with considerable fine sand; weak blocky; firm; extremely hard; plastic when wet; few fine pores; few small dark shot-like concretions, probably of ferromanganese; pH 6.5 by field test; clear smooth boundary.

B22t 5012 12 to 19 inches. Very dark gray (10YR 3.5/1 dry) sandy clay loam; moderate medium and coarse blocky; thin patchy clay skins; few fine pores; firm; extremely hard dry; noncalcareous but pH 8.0 by field test; clear smooth boundary.

B23tca 5013 19 to 26 inches. Dark gray (10YR 4.5/1, 3.5/1) sandy clay loam; moderate medium blocky; thin patchy clay skins; few fine pores; firm; extremely hard dry; slightly calcareous; contains an estimated 5 percent by volume of soft and hard lumps of $CaCO_3$ ranging up to 8 mm in diameter; clear smooth boundary.

B24tca 5014 26 to 37 inches. Coarsely mottled light gray (10YR 6/1 dry) and gray (10YR 5/1 dry) sandy clay loam; moderate medium blocky; few thin patchy clay skins; very few fine pores; firm; calcareous; contains an estimated 3 percent by volume of soft and hard concretions of $CaCO_3$; gradual boundary.

B3ca 5015 37 to 43 inches. Mottled light gray (10YR 7/2 dry) and grayish brown (10YR 5.5/2 dry) sandy clay loam; weak blocky; firm; very hard dry; calcareous; contains an estimated 5 percent by volume of soft lumps and hard concretions of $CaCO_3$; few nests of insect casts; gradual boundary.

C1 5016 43 to 55 inches. Light brownish gray (2.5Y 6/2 dry or moist) sandy clay loam; apparently massive; friable; hard when dry; calcareous; contains an estimated 10 percent by volume of soft lumps of $CaCO_3$ ranging up to 1½ inches in diameter and a few nests of insect casts; gradual boundary.

C2 5017 55 to 64 inches. Similar to above in all features. Separated for sampling purposes. This material extends to a depth of 9 feet or more.

Remarks: This pedon was sampled as Orelia and appears as Orelia in the Soil Survey of Nueces County, Texas, issued June 1965. This pedon description is on page 58; some of the data are on pages 56 and 57. The Orelia series is in the fine-loamy, mixed, hyperthermic family of Typic Ochraqualfs.

Textures above agree with laboratory data. Field textures where different are given below:

Ap - clay loam
B21t - light clay
B22t - light clay
B23tca - light clay
B24tca - light clay
B3ca - fine sandy clay
C1 - light sandy clay
C2 - light sandy clay

SOIL CLASSIFICATION Typic Ochraqualf; fine-loamy, mixed, hyperthermic

SOIL Series not designated | LOCATION San Patricio County, Texas

SOIL NOS. S56TX-205-3 | LAB. NOS. 5048-5054

SOIL SURVEY LABORATORY Lincoln, Nebraska | DATE April 3, 1958

GENERAL METHODS 1A, 1B1a, 2A1, 2B

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	TEXTURAL CLASS
0-6	Ap	0.1	0.8	6.2	42.5	24.8	13.9	11.7	59.5	5.3	-	fsl
6-12	B21t	-	0.6	5.4	32.5	20.0	15.2	26.3	47.9	6.7	-	scl
12-20	B22t	-	0.7	5.2	28.9	17.4	15.6	32.2	42.7	7.5	-	scl
20-26	B23t	0.1	0.7	5.4	29.6	17.6	16.0	30.6	43.0	8.0	-	scl
26-32	B24tca	1.2	1.0	4.9	29.1	17.9	17.7	28.2	43.8	9.2	-	scl
32-44	B3ca	0.6	1.0	4.4	26.7	18.5	18.9	29.9	43.8	9.7	-	scl
44-60	C	0.2	0.8	3.9	24.7	17.6	21.3	31.5	42.0	12.1	-	scl

DEPTH INCHES	pH 8C1a 1:1	1:5	1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	8A2 EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC x10³ MILLIMHOS PER CM 8A1a	6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
0-6	6.6	6.5	6.5	0.45	.041	11	<0.20	0.9	-				4.9
6-12	7.2	7.3	7.4	0.50	.047	11	<0.20	1.2	-				11.3
12-20	7.7	7.8	8.0	0.48	.045	11	<0.20	1.1	-				13.9
20-26	8.0	8.4	8.5	0.30	.028	11	<0.20	1.6	1				13.0
26-32	8.3	8.7	8.9	0.19			<0.20	2.1	3				11.8
32-44	8.1	8.7	9.0	0.14			<0.20	2.6	5				12.8
44-60	8.1	8.7	8.9	0.07			0.23	3.4	7				13.0

DEPTH INCHES	5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K	5D2 EXCH. Na %	8A1 SATURATION EXTRACT SOLUBLE 6P1a Na	6Q1a K	8A MOISTURE AT SATURATION %
	← milliequivalents per 100g. soil →							← milliequivalents per liter →		
0-6	9.0	5.9	1.8	1.5	0.3	0.4	2	3.0	0.4	27.9
6-12	21.1	14.5	5.2	2.0	1.6	0.4	6	8.4	0.1	46.2
12-20	25.6	17.3	6.5	1.2	2.5	0.4	8	7.5	0.1	57.4
20-26	24.9	17.6	6.3	0.8	3.2	0.4	10	11.0	0.1	58.4
26-32	21.2				3.2	0.4	11	14.3	0.1	55.1
32-44	22.0				3.8	0.5	13	17.1	0.1	56.0
44-60	21.1				4.2	0.5	13	23.0	0.1	60.0

Soil classification: Typic Ochraqualf; fine-loamy, mixed, hyperthermic.
Soil: Series not designated.
Soil Nos.: S56TX-205-3; 5048-5054.
Location: 3.85 miles north of FM Road 630 in Sinton on U.S. Highway 77; then west to Tice farm.
Area: San Patricio County, Texas.
Collected by: J. S. Allen, J. R. Coover, R. E. Daniell, H. C. Dean, G. Darby, G. E. Franki, and H. Oakes.
Described by: R. E. Daniell, November 7, 1956.

Ap 5048 0 to 6 inches. Dark gray (10YR 4.5/1, 3.5/1 moist) heavy fine sandy loam; contains small clods of fine sandy clay plowed from the B horizon that are massive when dry; friable moist; hard dry; surface crust 1/4 inch thick with 1/2 inch immediately below of weak granular and subangular blocky structure when moist; noncalcareous; abrupt boundary.

B21t 5049 6 to 12 inches. Very dark gray (10YR 3.5/1, 2.5/1 moist) sandy clay loam; weak medium blocky; surfaces of peds have thin patchy clay skins; very firm moist; extremely hard dry; no visible pores; noncalcareous; clear boundary.

B22t 5050 12 to 20 inches. Same color, texture and consistence as B21t; moderate medium blocky; thin clay skins on ped surfaces; few small faint grayish brown mottles (10YR 4/2 moist); noncalcareous; clear boundary.

B23t 5051 20 to 26 inches. Dark gray (10YR 4/1, 3/1 moist) sandy clay loam; moderate medium and coarse blocky; nearly continuous clay skins on ped surfaces; very firm moist; extremely hard dry; very sticky and plastic wet; few fine and very fine pores; few shot-like concretions of ferromagnesium; noncalcareous; clear boundary.

B24tca 5052 26 to 32 inches. Gray (10YR 5/1.5, 4/1.5 moist) sandy clay loam; moderate coarse blocky; nearly continuous clay skins; very sticky and plastic wet; extremely hard dry; an estimated 3 to 5 percent by volume of soft and hard $CaCO_3$ concretions up to 6 mm in diameter; calcareous.

B3ca 5053 32 to 44 inches. Light brownish gray (10YR 6/2, 5/3 moist) sandy clay loam; weak blocky and subangular blocky; firm moist; extremely hard dry; estimated 5 percent by volume of nests of worm and insect activity; few to common fine and very fine pores; 10 to 15 percent by volume of soft lumps of $CaCO_3$ up to 3/4 inch in diameter.

C 5054 44 to 60 inches. Light gray (10YR 7/2, 6/2 moist) sandy clay loam but less clay than 32- to 44-inch layer; calcareous; few nests of wormcasts; 3 to 5 percent by volume of soft lumps of $CaCO_3$.

Remarks: This nearly level area (about 0.2 percent gradient) has a plane surface. It has been cultivated since about 1910.

Textures above agree with laboratory data. Field textures where different are given below:

B21t - fine sandy clay
B22t - fine sandy clay
B23t - fine sandy clay
B24tca - fine sandy clay
B3ca - fine sandy clay
C - fine sany clay

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Typic Ochraqualf; coarse-loamy, siliceous, thermic

SOIL Sorter silt loam SOIL Nos. S64TX-170-7 LOCATION Montgomery County, Texas

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 64295-64302

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

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: (0.05–0.002)	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3B2 Cm	Coarse fragments 3B1: 2A2 ≥ 2 (<76) Pct.	2 – 19 Pct. of < 76mm	19 – 76 Pct. of < 76mm
		Pct. of < 2 mm															
0-3	A1	39.0	57.9	3.1	0.1	1.4	3.3	19.9	14.3	16.6	41.3	43.8	24.7	1.00	tr	tr	-
3-19	A2g	44.6	51.8	3.6	0.1	0.7	2.4	19.5	21.9	4.2	47.6	39.5	22.7	1.00	tr	tr	-
19-29	B&A	37.5	57.9	4.6	0.4	0.6	2.1	16.1	18.3	19.1	38.8	48.6	19.2	1.00	tr	tr	-
29-42	B21tg	39.3	51.0	9.7	0.1	0.6	2.1	17.5	19.0	2.7	48.3	33.8	20.3	1.00	tr	-	-
42-58	B22tg	28.0	64.7	7.3	0.1	0.6	1.5	11.8	14.0	16.4	48.3	38.6	14.0	1.00	tr	-	-
58-79	B23tg	40.5	52.1	7.4	0.2	0.5	1.8	17.9	20.1	17.6	34.5	50.1	20.4	1.00	tr	tr	-
79-93	B24tg	46.6	39.4	14.0	tr	0.4	1.6	22.4	22.2	17.8	21.6	56.1	24.4	1.00	tr	-	-
93-110+	B25tg	67.6	17.9	14.5	-	0.2	1.4	39.2	26.8	10.3	7.6	66.1	40.8	1.00	tr	-	-

Depth (in.)	6A1a Organic carbon Pct.	6B2a Nitrogen Pct.	C/N	Carbonate as $CaCO_3$ Pct.	6C2a Ext. iron as Fe Pct.	Bulk density: 4A1f ⅓ bar g/cc	Bulk density: 4A1h Oven dry g/cc	4D1 COLE	Water content: Pct.	Water content: 4B1c ⅓ bar Pct.	Water content: 4B2 15 bar Pct.	4C1 WRD in/in	pH: 8C1c (1:1) 1NKCl	pH: 8C1a (1:1) H_2O
0-3	1.50	0.069	22		tr								4.2	4.2
3-19	0.11				tr	1.73	1.77	0.007		15.4	1.7	0.24	4.0	4.8
19-29	0.10				0.1	1.72	1.75	0.007		14.5	2.1	0.21	3.9	4.7
29-42	0.08				0.1	1.70	1.75	0.010		15.5	4.0	0.20	4.0	5.0
42-58	0.06				0.1	1.75	1.79	0.009		15.9	3.7	0.21	4.0	4.9
58-79	0.04				0.2	1.86	1.88	0.003		12.6	3.5	0.17	4.3	5.7
79-93	0.04				0.1	1.78	1.90	0.022		14.8	6.0	0.16	4.5	5.5
93-110+	-				-	1.76	1.89	0.024		13.8	5.6	0.14	4.6	5.5

Depth (in.)	Extractable bases 5B1a: 6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	6H2a Ext. acidity	CEC: 5A2a Sum cations	6G1d Ext. Al	Ratios to clay: CEC Sum	Ratios to clay: Ext. iron	Ratios to clay: 15-bar water (8D1)	8D3 Ca/Mg	Base saturation: 5C3 Sum cations Pct.	Base saturation: 5C1 NH_4OAc Pct.
	meq/100 g													
0-3	3.1	0.8	tr	tr	3.9	4.0	7.9	0.1	2.5	tr			49	
3-19	1.3	0.4	0.1	0.1	1.9	0.9	2.8	0.3	0.78	tr	0.47		68	
19-29	1.7	0.6	tr	0.1	2.4	0.9	3.3	0.1	0.72	0.02	0.46		73	
29-42	3.4	1.5	0.2	0.1	5.2	1.1	6.3	0.1	0.67	0.01	0.41	2.3	83	
42-58	3.6	1.4	0.3	0.1	5.4	0.9	6.3	0.1	0.86	0.01	0.51	2.6	86	
58-79	2.4	1.0	0.3	0.1	3.8	0.7	4.5	0.1	0.61	0.03	0.47	2.4	84	
79-93	3.4	1.5	0.5	0.1	5.5	0.7	6.2	tr	0.44	0.01	0.43	2.3	89	
93-110+	3.2	1.4	0.5	0.1	5.2	0.5	5.7	tr	0.39	-	0.39	2.3	91	

Depth (in.)	Clay Fraction Analysis 7A1b-d: Mt.	Chl	Vm.	Mi.	Int.	Qtz.	Kl. DTA %	Gibbsite
	7A2 X-ray						7A3	
0-3	xxxx					x	20	
3-19	xxxx					x	22	
19-29								
29-42	xxxx					x	27	
42-58								
58-79	xxx					x	34	
79-93								
93-110+								

Mt. = Montmorillonite, Chl. = chlorite, Vm. = Vermiculite, mi = mica, Int. = Interstratified layer, Qtz. = quartz, Kl. = Kaolinite

Relative amounts: blank = not determined, dash = not detected, tr. = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant.

Soil classification: Typic Ochraqualf; coarse-loamy, siliceous, thermic.
Soil: Sorter silt loam.
Soil Nos.: S64TX-170-7; 64295-64302.
Location: Montgomery County, Texas. About 14-1/2 miles south of east from Conroe, Texas; 50 feet south of Splendora-Grangerland Highway (a county asphalt road), from a point 5.75 miles east by road of its intersection with FM Road 1485, which intersection is 7.3 miles southeast of the intersection of FM Road 1485 and Texas Highway 105, which is 4.0 miles east of the intersection of Texas Highway 105 and U.S. Highway 75 at Conroe, Texas; NE part of photo AWU-12W-78.
Vegetation and use: Mixed stand of loblolly pine, water oak, willow oak, sweetgum, blackgum and occasional shortleaf pine; understory of blackgum, sweetgum, water oak, willow oak, wax myrtle, and uniola-grass.
Topography: Level to nearly level area consisting of about 2,000 to 3,000 acres; 4 to 7 feet above intermittent drain to the east; elevation is about 130 feet above sea level. This area probably is in the upper part of the Citronelle Formation, and probably less than 5 miles inland from the Lissie Formation.
Drainage and permeability: Poorly drained. Very slow runoff. Slowly permeable.
Parent material: Moderately silty continental sediments, probably of the Citronelle geological formation, which is of Late Pliocene or Early Pleistocene geologic age.
Collected by: J. G. Cady, H. Oakes, G. S. McKee, W. R. McClintock, H. A. Moncrief, May 13, 1964.
Described by: G. S. McKee and H. Oakes.

A1 64295 0 to 3 inches. Light brownish gray (10YR 6/1.5) silt loam, grayish brown (10YR 5/1.5) when moist, with occasional faint yellow mottles; structureless but contains many fine pores; contains a few wormcasts; friable, slightly sticky but nonplastic, hard when dry; contains plentiful tree, shrub, grass and sedge roots; contains occasional very fine (about 1- to 2-mm diameter) black, weakly cemented ferromanganese or iron concretions; pH 5.5; clear irregular boundary.

A2g 64296 3 to 19 inches. White (10YR 8/2) silt loam, light gray (10YR 7/2) when moist, with occasional faint fine yellow mottles; structureless but contains many fine pores; very friable, slightly sticky but nonplastic, hard when dry; has occasional sandy loam lenses or small pockets about 1-inch diameter that are filled crayfish holes; contains very few black, weakly cemented Fe-Mn concretions; plentiful roots; pH 5.5; gradual boundary.

B&A 64297 19 to 29 inches. Light gray (10YR 7/2) silt loam, light brownish gray (10YR 6/2) when moist, with occasional coatings of dark gray clay about 1 mm thick in the crevices; structureless; friable, slightly sticky but nonplastic, very hard; contains a few thin lenses and small pockets of very fine sandy loam up to 1-1/2-inch diameter that apparently are filled crayfish or root holes; very porous, the pores are fine; contains occasional wormcasts; few Fe-Mn concretions as in layers above; pH 5.2; diffuse boundary.

B21tg 64298 29 to 42 inches. Similar to layer just above, but contains slightly more clay coatings in the crevices that are mostly vertical; also organic stainings in crevices; few, mostly fine roots, and many of the roots are in clusters along cleavage planes; few Fe-Mn concretions but larger than in layers above (up to 1-cm diameter); pH 5.5; diffuse boundary.

B22tg 64299 42 to 58 inches. Similar to the two horizons just above, but contains fewer dark gray clay coatings and organic stains on faces of the cleavage planes; has few yellowish brown (when moist) and yellow medium-sized mottles; also few very fine strong brown mottles in fine root channels; pH 5.0; diffuse boundary.

B23tg 64300 58 to 79 inches. White (10YR 8/2) silt loam, light gray (10YR 7/2) when moist, with common distinct yellow and brownish yellow mottles; has few lenses of heavy silt loam and occasional small pockets and lenses of very fine sandy loam; structureless; friable, slightly sticky but nonplastic; occasional small tree roots; common fine pores; occasional fine, slightly cemented Fe-Mn concretions; pH 6.0; diffuse boundary.

B24tg 64301 79 to 93 inches. Same base color as layer just above, but loam with few coarse brownish yellow (10YR 6/6) mottles and irregular lumps of light sandy clay loam up to 2 or 3 inches across the longer axes; weak coarse prismatic structure with apparent very fine sand coatings on outsides of prisms; friable, slightly sticky; also contains occasional small pockets of fine sandy loam; pH 6.0; diffuse boundary.

B25tg 64302 93 to 110 inches plus. White (10YR 8/2) fine sandy loam with a few distinct coarse brownish yellow mottles, some of which have reddish yellow centers; few lumps of sandy clay loam up to 3 inches across the longer axes; structureless or weak coarse prismatic; contains occasional fine roots; friable in the fine sandy loam portion and firm in the sandy clay loam portion; has occasional very fine sand pockets up to about 1-1/2-inch diameter; pH 6.0.

Remarks: Colors are for dry soils unless otherwise indicated. Adjoining soils are: Segno fine sandy loam in a low ridgetop position to the north, some 3 to 5 feet higher; to the south is a slightly higher area of Splendora fine sandy loam; to the southeast is an area of Fuquay loamy fine sand, which is a few feet higher. Depth to permanent water table is about 10 feet. Seasonal water table is at or near the soil surface during the cool, moist season, usually over 3 months of the year. A few roundish mounds occur in the area and they are about 50- to 100-feet diameter and 12 to 30 inches higher than intermounds. The A horizon of mounds is less gleyed and thicker than in pedon described. Measured trees at the site indicate that the forest site index for loblolly pine is 90 feet for trees of age 50 years. Textures above agree with laboratory data. Field textures where different are given below:

A1 - very fine sandy loam
A2g - very fine sandy loam
B24tg - very fine sandy loam

Sand mineralogy (Method 7B1). Examination of coarse silt and very fine sand fractions indicates less than 1 percent weatherable minerals. Fractions are principally quartz with accessory zircon, tourmaline, and iron oxides. Family mineralogy is siliceous.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Typic Ochraqualf; coarse-loamy, siliceous, thermic

SOIL Sorter silt loam SOIL Nos. S64TX-170-8 LOCATION Montgomery County, Texas

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 64303-64309

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

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)	3B2 Cm	Coarse fragments 3B1: 2A2 > 2 (<76) Pct.	2–19 Pct. of < 76mm	19–76 Pct. of < 76mm
		Pct. of < 2 mm															
0-3	A1	47.6	49.9	2.5	0.7	3.4	6.0	27.9	9.6	19.1	30.8	44.1	38.0		-	-	-
3-20	A2g	48.2	48.9	2.9	0.1	0.6	2.6	24.4	20.5	19.6	29.3	55.5	27.7	1.00	tr	tr	-
20-37	B&A	37.3	54.1	8.6	-	0.6	1.9	17.6	17.2	16.2	37.9	45.1	20.1	1.00	tr	tr	-
37-55	B21tg	37.6	53.3	9.1	0.2	0.5	2.0	17.2	17.7	17.0	36.3	46.6	19.9	1.00	tr	tr	-
55-71	B22tg	42.9	49.7	7.4	0.1	0.4	2.0	19.9	20.5	18.8	30.9	52.8	42.9	1.00	tr	tr	-
71-82	B23tg	49.5	42.6	7.9	tr	0.3	2.1	24.0	23.1	18.4	24.2	57.9	26.4	1.00	tr	tr	-
82-112	B24tg	56.5	34.7	8.8	tr	0.4	2.4	27.8	25.9	18.1	16.6	62.9	30.6	1.00	tr	tr	-

Depth (In.)	6A1a Organic carbon	6B2a Nitrogen	C/N		Carbonate as $CaCO_3$	6C2a Ext. iron as Fe	Bulk density: g/cc	4A1f ⅓ bar	4A1h Oven dry	4D1 COLE	Water content: Pct	4B1c ⅓ bar	4B2 15 bar	4C1 WRD	pH: 8C1c (1:1) 1N KCl	8C1a (1:1) H_2O
	Pct	Pct.			Pct.	Pct.	g/cc	g/cc	g/cc		Pct	Pct	Pct.	in/in		
0-3	1.70	0.079	22			tr									3.5	4.0
3-20	0.12					0.1		1.82	1.84	0.004		12.3	1.5	0.20	4.0	5.2
20-37	0.05					0.1		1.80	1.83	0.006		14.6	4.6	0.18	5.6	6.6
37-55	0.02					0.1		1.86	1.88	0.004		13.5	4.4	0.17	5.8	7.6
55-71	-					0.2		1.85	1.88	0.005		12.6	3.6	0.17	5.9	7.0
71-82	0.02					0.2		1.75	1.76	0.002		12.6	4.0	0.15	5.9	7.0
82-112	0.02					0.3		1.71	1.76	0.005		13.2	4.6	0.15	5.6	6.8

Depth (In.)	Extractable bases 5B1a: 6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	6H2a Ext. acidity	CEC: 5A3a Sum cations		6G1d Ext. Al	Ratios to clay 8D1: CEC Sum	Ext. iron	15-bar water	8D3 Ca/Mg	Base saturation: 5C3 Sum cations Pct.	5C1 NH_4OAc Pct.
	meq/100 g														
0-3	1.9	0.7	0.1	0.1	2.8	4.8	7.6		0.6			3.04	tr			37	
3-20	1.2	0.5	tr	tr	1.7	0.7	2.4		0.1			0.96	0.03	0.52		71	
20-37	3.9	1.8	0.9	0.1	6.7	0.5	7.2		tr			0.84	0.01	0.53	2.2	93	
37-55	3.4	1.6	1.3	0.1	6.4	0.3	6.7		tr			0.74	0.01	0.48	2.1	96	
55-71	3.9	1.3	1.2	0.1	6.5	0.2	6.7		tr			0.90	0.03	0.49	3.0	97	
71-82	3.3	1.6	1.3	0.1	6.3	0.2	6.5		tr			0.82	0.02	0.51	2.1	97	
82-112	4.0	2.0	1.2	0.1	7.3	0.3	7.5		tr			0.85	0.03	0.52	2.0	96	

Depth (In.)	Clay Fraction Analysis 7Alb-d: Mt.	Chl.	Vm	Mi	Int	Qtz.	KI. DTA	Gibbsite
	7A2 X-ray						% 7A3	
0-3	xxxx					x	23	
3-20	xxxx					x	23	
20-37								
37-55	xxxx					x	27	
55-71								
71-82	xxxx					x	23	
82-112								

Mt = Montmorillonite, Chl. = chlorite, Vm. = Vermiculite, mi = mica, Int = Interstratified layer, Qtz = quartz, Kl. = Kaolinite

Relative amounts: blank = not determined, dash = not detected, tr = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant.

Soil classification: Typic Ochraqualf; coarse-loamy, siliceous, thermic.
Soil: Sorter silt loam.
Soil Nos.: S64TX-170-8; 64303-64309 .
Location: Montgomery County, Texas. About 15-1/2 miles southeast of Conroe, Texas (measured on road map); 100 feet east of a compartment road and 770 feet south of a private road, and 1.6 mile west of intersection of the private road and the New Caney-Conroe Highway (FM Road 1314 part of the way), which intersection is 16.5 miles (by road measurement) southeast of intersection of the New Caney-Conroe Highway and Texas Highway 105, which is 2.6 miles east of intersection of Texas Highway 105 and U.S. Highway 75 at Conroe, Texas; NC part of photo AWU-7W-146.
Vegetation and use: Approximately 90 percent loblolly pine and 10 percent willow oak; understory of blackgum, willow oak, water oak, mainly.
Topography: Level to nearly level, with intermittent drainage about 2 or 3 feet lower. Elevation is about 115 feet above sea level.
Drainage and permeability: Poorly drained. Very slow runoff. Slowly permeable.
Parent material: Moderately silty sediments of the Lissie geologic formation, which is Pleistocene geologic age.
Sampled by and date: J. G. Cady, H. Oakes, G. S. McKee, W. R. McClintock and H. A. Monorief, May 14, 1964.
Described by: G. S. McKee and H. Oakes.

01 1/2 to 0 inch. Dark brown partially decomposed plants.

A1 64303 0 to 3 inches. Light brownish gray (10YR 6/2) fine sandy loam, grayish brown (10YR 5/2) when moist; structureless but slightly cohesive and contains many fine pores and a few wormcasts; very friable, nonsticky, very hard when dry; contains plentiful tree, shrub, and sedge roots; upper 1/2 inch is slightly darker; pH 5.0; clear irregular boundary.

A2g 64304 3 to 20 inches. Light gray (10YR 7/2) fine sandy loam, light brownish gray (10YR 6/2) when moist, with few distinct fine dark brown and yellowish brown mottles; structureless but very porous (fine); very friable, nonsticky, very hard; common number of tree and sedge roots; pH 6.0; gradual irregular boundary.

B&A 64305 20 to 37 inches. Grayish brown (10YR 5/2) when moist, silt loam; nearly structureless but has distinct dark gray coatings up to 1 mm thick of clay in the crevices and along some root channels; friable, slightly sticky but nonplastic, very hard when dry; contains some small pockets of pale brown fine or very fine sandy loam; many fine pores; common number of dark brown, weakly-cemented, roundish, apparently Fe-Mn concretions up to about 1 cm diameter, with black centers; on the outside walls of some of the small sandy pockets are thin clay coatings that can be seen with the naked eye; contains few roots; pH 6.5 at 36 inches; diffuse boundary.

B21tg 64306 37 to 55 inches. White (10YR 8/2) silt loam, light brownish gray (10YR 6/2) when moist, with fewer coatings of dark gray clay in the crevices than in layer above; few distinct fine yellow mottles that are associated with the Fe-Mn concretions that are as numerous as in layer just above; pH 7.8 at 48 inches; otherwise same as layer above; diffuse boundary.

B22tg 64307 55 to 71 inches. White (10YR 8/2) loam, light gray (10YR 7/2) when moist, with lenses of clay loam or sandy clay loam and a few small pockets of pale brown fine sandy loam; few distinct yellow and brownish yellow medium-sized mottles; structureless; friable, slightly sticky, very hard; contains few Fe-Mn concretions; contains occasional dark gray clay coatings but fewer with depth; very porous; few tree roots; pH 7.8 at 60 inches; diffuse boundary.

B23tg 64308 71 to 82 inches. Very pale brown (10YR 7/3) loam, pale brown (10YR 6/3) when moist, with lumps of loam and clay loam or sandy clay loam; common distinct yellowish medium-sized mottles; structureless; very friable in loam part and firm in the more clayey lumps; contains only occasional Fe-Mn concretions up to 1-cm diameter; only occasional dark gray clay films along crevices; pH 7.8; diffuse boundary.

B24tg 64309 82 to 112 inches plus. About same colors as layer above, but fine sandy loam with few distinct coarse yellow mottles; weak coarse prismatic structure; friable, sticky and slightly plastic, very hard when dry; pH 7.8; noncalcareous.

Remarks: Colors are for dry soil unless otherwise indicated. This pedon differs from S64Tex-170-7 in having a mildly alkaline reaction below depth of 4 feet and only pH 6.5 at 36 inches, whereas the other sample was medium acid throughout. The above-described pedon is from the Lissie geologic formation, which does not particularly have acid sediments. The other pedon was from the Citronelle group, which is of older, generally less alkaline sediments. The pH in the Sorter soils developed in the Lissie formation is, however, erratic and varies from medium acid to mildly alkaline in the lower horizons. Adjoining soil mainly is Splendora fine sandy loam, which lies slightly higher. One small area of Segno fine sandy loam adjoins the area on the east. Depth to permanent water table is about 10 feet. Seasonal water table is at or near the soil surface during the cool, moist season, usually over 3 months of the year. A few roundish sandy mounds occur in the area, and they are about 50 to 100 feet diameter and about 12 to 30 inches higher than intermounds. The A horizon of mounds is less gleyed and is thicker than in pedon described. Measured trees at the site indicate that the forest site index for loblolly pine is 90 feet for trees of age 50 years.

SOIL CLASSIFICATION Aeric Ochraqualf; fine-loamy, mixed, hyperthermic

SOIL Series not designated | LOCATION San Patricio County, Texas

SOIL NOS. S56TX-205-6 | LAB. NOS. 5059-5065

SOIL SURVEY LABORATORY Lincoln, Nebraska | DATE April 3, 1958

GENERAL METHODS 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE-SIZE DISTRIBUTION (in m.m.) (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	Ap	0.1	0.4	2.8	34.4	25.4	18.9	18.0	64.5	6.7	-	fsl
6-11	B21t	-	0.3	2.3	28.4	21.1	18.0	29.9	53.9	7.3	-	scl
11-19	B22t	-	0.3	2.3	29.3	21.5	18.2	28.4	55.3	7.8	-	scl
19-26	B23tca	0.2	0.4	2.2	28.3	21.4	19.1	28.4	54.1	8.4	-	scl
26-35	B24tca	0.5	0.5	1.8	25.9	20.6	20.9	29.8	50.9	9.8	-	scl
35-46	B3ca	-	0.3	1.5	24.1	19.9	23.8	30.4	48.5	13.2	-	scl
46-60	Cca	0.2	0.3	1.5	24.3	19.2	23.4	31.1	47.2	13.5	-	scl

	pH 8C1a 1:1	1:5	1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	8A2 EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC x10³ MILLIMHOS PER CM 8A1a	6E1a $CaCO_3$ equivalent %	GYPSUM ma./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
	6.5	6.6	6.8	0.55	.046	12	<0.20	0.6	-				6.8
	7.1	7.2	7.3	0.57	.056	10	<0.20	0.9	-				12.4
	8.1	8.3	8.6	0.42	.035	12	<0.20	1.0	-				12.1
	8.4	8.8	8.9	0.28	.025	11	<0.20	1.2	2				12.0
	8.3	9.0	9.1	0.15			<0.20	1.4	4				12.7
	8.4	9.1	9.3	0.08			<0.20	1.6	8				12.4
	8.3	9.0	9.3	0.04			<0.20	2.4	8				12.4

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K	5B1a 5D2 EXCH. Na %	8A1 SATURATION EXTRACT SOLUBLE 6P1a Na	6Q1a K	8A MOISTURE AT SATURATION %
	← milliequivalents per 100g. soil →						← milliequivalents per liter →		
14.3	9.3	3.9	1.9	0.4	0.4	2	2.5	0.2	33.9
23.7	16.4	6.5	2.0	1.2	0.5	4	4.7	0.1	53.2
23.0	20.7	6.7	-	1.6	0.4	6	6.0	0.1	52.9
20.6				2.2	0.4	9	7.6	0.1	55.1
21.0				3.0	0.4	11	10.2	0.1	57.1
19.8				3.8	0.4	15	11.9	0.1	63.9
19.8				4.1	0.4	15	17.2	0.1	67.2

Soil classification: Aeric Ochraqualf; fine-loamy, mixed, hyperthermic.
Soil: Series not designated.
Soil Nos.: S56TX-205-6; 5059-5065.
Location: Five miles south of FM Road 630 in Sinton on U.S. Highway 77; 100 yards west of the highway in cultivated field.
Area: San Patricio County, Texas.
Collected by: J. S. Allen, J. R. Coover, R. E. Daniell, H. C. Dean, G. Darby, G. E. Franki, and H. Oakes.
Described by: R. E. Daniell, November 7, 1956.

Ap 5059 0 to 6 inches. Dark gray (10YR 4/1, 3/1 moist) heavy fine sandy loam; contains small clods of fine sandy clay plowed from the B21t horizon; 1/4-inch surface crust is light gray; weak granular with some subangular blocks when moist; massive when dry; the bulk is friable moist, hard when dry; noncalcareous; pH 6.0; abrupt boundary.

B21t 5060 6 to 11 inches. Very dark gray (10YR 3/1, 2.5/1 moist) sandy clay loam; weak to moderate medium blocky; discontinuous clay skins; very firm moist; extremely hard dry; very few fine and very fine pores; noncalcareous; pH 8.0; clear boundary.

B22t 5061 11 to 19 inches. Same color, texture and consistence as B21t; moderate medium blocky; nearly continuous clay skins; few fine and very fine pores; noncalcareous; clear boundary.

B23tca 5062 19 to 26 inches. Mottled gray (10YR 5/1, 4/1) and grayish brown (10YR 5/2, 4/2) sandy clay loam; weak to moderate medium blocky; firm moist; extremely hard dry; spots of soil mass slightly calcareous; 5 to 8 percent by volume of soft and hard lumps of $CaCO_3$; clear boundary.

B24tca 5063 26 to 35 inches. Light brownish gray (10YR 6/2, 5/2 moist) sandy clay loam with few medium distinct dark gray mottles; weak subangular blocky and blocky; firm moist; very hard dry; contains about 2 percent by volume of nests of wormcasts; about 12 percent by volume of soft and hard lumps of $CaCO_3$; calcareous; gradual boundary.

B3ca 5064 35 to 46 inches. Light gray (10YR 7/2, 6/2 moist) sandy clay loam with few coarse faint mottles of grayish brown (10YR 5/2 dry); weak blocky with some subangular blocky; plastic and sticky wet; extremely hard dry; calcareous; estimated 12 to 15 percent by volume of soft and few hard lumps of $CaCO_3$.

Cca 5065 46 to 60 inches. Light gray (10YR 7/2, 6/2 moist) sandy clay loam; weak angular blocky; sticky and plastic wet; extremely hard dry; calcareous; about 12 to 15 percent by volume of soft and hard lumps of $CaCO_3$.

Remarks: This nearly level area (about 0.3 percent gradient) has a plane surface. It is cultivated.

Textures above agree with laboratory data. Field textures where different are given below:

B21t - fine sandy clay
B22t - fine sandy clay
B23tca - fine sandy clay
B24tca - fine sandy clay
B3ca - fine sandy clay
Cca - fine sandy clay

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Vertic Ochraqualf; fine, montmorillonitic, thermic

SOIL Wilson silt loam SOIL Nos. S62TX-129-1 LOCATION Kaufman County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 17788-17793 May 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05) a	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 Clay to Clay d	Fine Clay to Clay d	Coarse fragments 2A2: 3B1 > 2	2 – 19	19 – 76
		Pct. of < 2 mm												Pct.	Pct.	Pct.	Pct. of < 76 mm	
0-5	Ap	14.3	59.8	25.9	0.1	0.2	0.4	3.1	10.5	30.2	29.6	43.0	3.8	30	70	tr		
5-20	B21tg	9.0	51.8	39.2	-	0.1	0.2	1.8	6.9	21.4	30.4	29.6	2.1	29	71	tr		
20-32	B22tg	8.0	51.4	40.6	-	0.1	0.1	1.6	6.2	20.1	31.3	27.5	1.8	28	72	tr		
32-50	B23t	7.5	47.5	45.0	0.2	0.3	0.3	1.5	5.2	19.2	28.3	25.5	2.3	30	70	tr		
50-65	B24tcsca	8.5	46.9	44.6	0.2	0.3	0.2	1.6	6.2	20.3	26.6	27.7	2.3	29	71	tr		
65-77	C1	4.7	41.0	54.3	-	0.1	0.1	1.0	3.5	14.6	26.4	18.8	1.2	31	69	tr		

Depth (in.)	6A1a Organic carbon b	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E2a Carbonate as $CaCO_3$	Bulk density: 4A1a Field-State	4A1d 1/3-Bar	4A1b Air-Dry	4D1 COLE	Water content: 4B4 Field-State	4B1c 1/3-Bar	4B2 15-Bar	4C1 1/3-to 15-Bar	pH: 8C1b Sat. Paste	8C1a 1:1	8C1a 1:10
	Pct.	Pct.		Pct.	Pct.	g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.			
0-5	0.94	0.070	13	0.4		1.46	1.44	1.57	0.028	16.1	19.5	11.6	0.11	5.2	5.6	5.6
5-20	0.62	0.041	15	0.3	-(s)	1.64	1.52	1.88	0.073	17.3	21.1	15.7	0.08	5.3	6.1	6.8
20-32	0.53	0.033	16	0.4	-(s)		1.5c					17.4		6.4	6.4	7.0
32-50	0.24			0.4	tr(s)	1.72	1.50	1.92	0.087	16.4	24.7	19.2	0.08	7.4	7.4	7.4
50-65	0.08			0.6	-(s)	1.67	1.46	1.90	0.092	18.4	27.0	19.4	0.11	7.2	7.3	7.5
65-77	0.10			1.1								22.2		7.3	7.4	7.5

Depth (in.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum	6H1a Ext. Acidity	Cat. Exch. Cap.: 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	6L1a SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0-5	12.6	5.9	0.5	0.4	19.4	4.7	21.1	19.9	1.6	0.7	1.8	0.1		-	0.8	0.7	2.3	0.52
5-20	18.6	8.7	2.2	0.4	29.9	4.3	30.0	28.8	0.9	0.5	4.4	tr		-	1.3	4.4	1.1	0.78
20-32		9.0	4.2	0.4		1.9	30.0	29.6	7.6	4.4	21.2	0.1		-	2.3	26.9	7.6	3.60
32-50		11.0	5.4	0.5			31.1	30.5	31.7	16.4	38.6	0.2		-	2.3	37.8	53.8	7.1
50-65		10.7	5.8	0.6			29.5	27.9	29.8	16.0	40.9	0.2		-	1.8	41.7	50.6	7.3
65-77		11.9	7.0	0.8			34.7	32.2	22.8	12.4	38.6	0.3		-	1.5	38.8	39.1	6.4

Depth (in.)	8A Water at Saturation	5D1 Exchangeable Na	5C1 Base Sat. NH_4OAc CEC	6F1a Gypsum	Ratios to Clay 8D1: NH_4OAc CEC	Ext. Iron	15-Bar Water
	Pct.	Pct.	Pct.	Pct.			
0-5	41.7	2	97		0.77	0.02	0.45
5-20	59.2	6	104		0.73	0.01	0.40
20-32	59.7	10		tr	0.73	0.01	0.43
32-50	65.1	9		1.3	0.68	0.01	0.43
50-65	65.9	10		0.2	0.62	0.01	0.43
65-77	80.6	11		tr	0.59	0.02	0.41

a. Fe-Mn nodules comprise more than 50 percent of the very coarse and coarse sand.
b. 10 kg/m^2 to 60 inches (Method 6A).
c. Estimated.
d. Soil treated to remove $CaCO_3$ if present.

Soil classification: Vertic Ochraqualf; fine, montmorillonitic, thermic.
Soil: Wilson silt loam.
Soil Nos.: S62TX-129-1; 17788-17793.
Location: Four miles southeast of intersection of Texas Highway 34 and U.S. 175 at Kaufman on U.S. 175; 0.15 mile northeast and 0.2 mile southeast on county road, 150 feet southwest of road in cultivated field.
Area: Kaufman County, Texas.
Cover: Cultivated field, annual weeds.
Parent material: Parent material is of clayey materials, the origin of which is obscure; could be clayey alluvium or clayey residuum or both.
Topography: Nearly level to level broad plain having plane surfaces and gradients less than 1 percent.
Moisture at sampling: About 40 percent field capacity to the third horizon; considerably drier below.
Sampled by: J. A. DeMent and R. L. Juve, September 12, 1962.
Described by: M. Stout and W. R. Elder.

Ap 17788 0 to 5 inches. Gray (10YR 6/1) silt loam, dark gray (10YR 4/1) moist; weak granular structure moist, but massive when dry; light gray (10YR 7/1) seams and lenses are apparent and appear to be gypsum crystals rather than sand (particles crush between thumbnails); very hard; firm; few fine wormcasts; abrupt wavy lower boundary.

B21tg 17789 5 to 20 inches. Gray (10YR 5/1) silty clay loam, very dark gray (10YR 3/1) moist; weak to moderate very fine blocky structure; peds have shiny surfaces; extremely hard; extremely firm; plastic; soil mass is dense and compact; many light gray (10YR 6/1) thin streaks, streamers, lenses and masses which are less clayey, have no observable structure or shiny faces--presumed to be high in gypsum; few fine hard white noncalcareous particles throughout soil mass; arbitrary boundary for sampling purposes.

B22tg 17790 20 to 32 inches. Same as horizon above but silty clay and the structure appears to be coarser and more distinct because of drier moisture conditions; diffuse lower boundary.

B23t 17791 32 to 50 inches. Light brownish gray (2.5Y 6/2) silty clay, grayish brown (2.5Y 5/2) moist; moderate fine and medium blocky structure, dry; extremely hard; extremely firm; estimated 2 percent fine gypsum crystals visible; occasional $CaCO_3$ concretion; gradual lower boundary.

B24tcsca 17792 50 to 65 inches. Light brownish gray (2.5Y 6/2) silty clay, grayish brown (2.5Y 5.5/2) moist; common fine faint mottles of light olive brown; weak blocky structure; extremely hard; extremely firm; estimated 5 to 10 percent visible gypsum as fine crystals and about 1 percent $CaCO_3$ as soft masses; soil mass noncalcareous; clear smooth boundary.

C1 17793 65 to 77 inches. Light gray (5Y 7/2) silty clay, olive gray (5Y 5/2) moist; common distinct yellowish brown mottles; strong medium blocky structure having distinct shiny ped surfaces; extremely hard; extremely firm; few soft coarse silty calcareous masses of reddish brown (5YR 5/4) seemingly associated with siltstone or shale fragments (altered R); few coarse $CaCO_3$ masses.

C2 77 to 90 inches. Same as above, augered.

R 90 to 110 inches. Grayish brown (2.5Y 5/2) mildly calcareous shales or weakly cemented clays which are soft but firm and break into angular blocky, mostly along lines of cleavage; strong brown (7.5YR 5/8) coating between strata or partings. Augered.

Remarks: Occasional quartz pebbles are encountered throughout the pedon. Collectors unable to determine relationship between horizon R and remainder of pedon; may not be related.

Textures above agree with laboratory data. Field textures where different are given below:

Ap - silty clay loam
B21tg - light clay
B22tg - light clay
B23t - clay
B24tcsca - light clay
C1 - light clay

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Vertic Ochraqualf; fine, montmorillonitic, thermic

SOIL Wilson silt loam SOIL Nos. S62TX-129-2 LOCATION Kaufman County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 17794-17799 May 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (In.)	Horizon	Size class and particle diameter (mm) a/ 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 2A2: 3B1 > 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct	Pct. of < 76 mm	
0-5	Ap	19.2	54.0	26.8	0.1	0.2	0.5	3.8	14.6	31.3	22.7	48.8	4.6			tr		
5-18	B21tg	12.6	50.2	37.2	tr	0.2	0.3	2.7	9.4	24.3	25.9	35.7	3.2			tr		
18-30	B22tg	8.4	50.2	41.4	0.1	0.1	0.2	1.7	6.3	21.5	28.7	29.0	2.1			tr		
30-40	B23t	6.8	48.8	44.4	-	0.1	0.2	1.3	5.2	18.5	30.3	24.6	1.6			tr		
40-57	B24tcs	3.5	41.9	54.6	-	tr	tr	0.4	3.1	13.9	28.0	17.3	0.4			tr		
57-68	B25tcacs	1.8	31.7	66.5	tr	0.1	0.1	0.5	1.1	7.5	24.2	8.9	0.7			tr		

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	6E2a Carbonate as $CaCO_3$		Bulk density				Water content		4B2 15-Bar			pH: 8C1b Sat. Paste	8C1a 1:1	8C1a 1:10
	Pct.	Pct		Pct.	Pct.		g/cc	g/cc	g/cc		Pct.	Pct.	Pct.					
0-5	0.73	0.058	12	0.6									12.5			5.2	5.6	5.9
5-18	0.77	0.056	14	0.6									16.7			5.6	6.0	6.4
18-30	0.70	0.046	15	0.6	tr(s)								19.0			7.2	7.2	7.7
30-40	0.37			0.6	tr(s)								19.6			7.5	7.5	7.5
40-57	0.23			0.8	tr(s)								22.6			7.7	7.6	7.6
57-68	0.17			1.6	-(s)								25.4			7.2	7.2	7.2

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum	6H1a Ext. Acidity	Cat. Exch. Cap.: 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	6L1a SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0-5	13.6	7.1	1.0	0.4	22.1	5.0	23.3	21.4	0.5	0.3	2.0	0.1		-	1.3		0.3	0.36
5-18	19.0	10.4	2.9	0.4	32.7	3.8	31.9	29.7	0.9	0.6	6.0	tr		-	2.0	3.2	3.1	0.92
18-30		13.1	4.3	0.5			34.7	31.3	4.4	3.0	15.8	0.1		-	4.0	4.9	17.3	2.23
30-40		12.8	4.5	0.6			30.8	29.8	23.9	16.2	29.7	0.2		-	1.8	5.2	70.0	5.40
40-57			4.6	0.6			30.0	28.1	24.2	16.0	31.0	0.2		-	2.5	5.4	70.7	5.40
57-68		14.6	6.7	0.8			36.1	34.4	24.2	15.6	32.6	0.3		-	2.3	6.4	73.1	5.50

Depth (In.)	8A Water at Saturation	5D1 Exchangeable Na	5C1 Base Sat. NH_4OAc CEC	6F1a Gypsum	Ratios to Clay 8D1: NH_4OAc CEC	Ext. Iron	15-Bar Water
	Pct.	Pct.	Pct.	Pct			
0-5	40.6	4	103		0.80	0.02	0.47
5-18	52.9	8	110		0.80	0.02	0.45
18-30	60.8	10		tr	0.76	0.01	0.46
30-40	65.2	8		3.8	0.67	0.01	0.44
40-57	68.5	8		14	0.51	0.01	0.41
57-68	85.6	11		1.1	0.52	0.02	0.38

a/ 17797 and 17798: treated with pH 5 NH_4OAc buffer for removal of gypsum prior to particle-size analysis. 17799: gypsum removed by water washing.

Soil classification: Vertic Ochraqualf; fine, montmorillonitic, thermic.
Soil: Wilson silt loam.
Soil Nos.: S62TX-129-2; 17794-17799 .
Location: Four miles southeast of intersection of Texas Highway 34 and U.S. 175 at Kaufman on U.S. 175; 1.5 miles northeast on county road, 70 yards northwest of county road.
Area: Kaufman County, Texas.
Parent material: Parent materials are of clayey materials, the origin of which is vague; could be clayey alluvium or clayey residuum--or both.
Cover: Formerly cultivated; now in tame meadow.
Topography: Nearly level to gently sloping, plane to slightly convex surfaces having gradient of about 1 percent.
Moisture at sampling: Upper solum about 50 percent field capacity; lower solum much drier.
Collected by: J. A. DeMent and R. L. Juve, September 12, 1962.
Described by: M. Stout and W. R. Elder.

Ap 17794 0 to 5 inches. Gray (10YR 6/1) silt loam; very dark gray (10YR 3.5/1) moist; weak granular moist but breaks out cloddy dry; very hard; firm; many streaks and thin lenses of light gray (10YR 7/1), presumed to be gypsum; abrupt lower boundary.

B21tg 17795 5 to 18 inches. Gray (10YR 5/1) silty clay loam, very dark gray (10YR 3/1) moist; weak to moderate fine blocky structure; shiny surfaces on most peds; extremely hard; extremely firm; dense and compact; many thin streaks, lenses, and coatings of light gray (10YR 6/1) presumed to be gypsum; roots follow ped faces; arbitrary boundary for sampling purposes.

B22tg 17796 18 to 30 inches. Similar to above horizon, but silty clay and contains few faint brownish mottles; gradual lower boundary.

B23t 17797 30 to 40 inches. Gray (10YR 6/1) silty clay; few distinct medium mottles of dark yellowish brown; weak to moderate fine and medium blocky structure; extremely hard; extremely firm; estimated 3 to 5 percent fine and very fine gypsum crystals; about 2 percent soft $CaCO_3$ fine masses; clear lower boundary.

B24tcs 17798 40 to 57 inches. Olive brown (2.5Y 4/3) silty clay; common fine faint mottles of light olive brown; weak coarse blocky structure dry but breaks down to very fine blocky moist; extremely hard; extremely firm; estimated 10 to 20 percent gypsum crystals; few coarse soft $CaCO_3$ masses; soil mass is noncalcareous; clear lower boundary.

B25tcacs 17799 57 to 68 inches. Gray (5Y 5/1) and light olive brown (2.5Y 5/6) mottled shaly clay or altered shale having occasional seams of dark gray (5Y 4.5/1) which are calcareous; strong medium blocky structure with very shiny ped surfaces; extremely hard; extremely firm; few medium $CaCO_3$ masses and gypsum crystals in upper solum, and prominent thin lenses of soft $CaCO_3$ overlying a discontinuous lens of an unidentified rock, parts of which are calcareous; boundary is abrupt over the rock lenses and diffuse otherwise.

R 68 to 75 inches. Bed of soft shale or weakly cemented fines of grayish brown (2.5Y 5/2); breaks to an angular blocky fragment or platy cleavage; mildly calcareous in spots.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

Ap - silty clay loam
B21tg - light clay
B22tg - light clay
B23t - light clay
B24tcs - light clay or sandy clay

SOIL CLASSIFICATION-VERTIC OCHRAQUALF
FINE, MONTMORILLONITIC, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SERIES - - - - - - -WILSON

SOIL NO - - - - - - S63TX-73-90 COUNTY - - - FALLS

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K1407-1412

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (- - - - - SAND - - - - -)								PARTICLE SIZE ANALYSIS (A)			(ETHYLENE GLYCOL) RETAINED			BULK DEN
		SAND 2-.05	SILT .05-.002	CLAY LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	LT 2 MM	.002 MM	LT .0002 MM	4A3A
IN		(- - - - - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - - - - -)								(PCT LT.002)			(- - MG/G - - -)			G/CC
000-6	AP	20.6	51.8	27.7	0.0	0.3	0.3	9.5	10.3				25	75				
006-16	B21TG	13.0	48.8	38.3	0.0	0.2	0.2	5.0	7.5				35	65				
016-29	B22TG	12.0	47.1	40.9	0.1	0.2	0.0	3.8	7.6				31	69				
029-43	B23TG	11.5	46.4	42.1									30	70				
043-61	B24T	10.6	46.5	42.9									28	72				
061-72	B25T	9.5	46.5	44.0									32	68				

DEPTH	ORGANIC MATTER 6A1A ORGN CARB	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	(- -EXTRACTABLE BASES 5B1A- -) 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO CA 8D3 TO MG	CA CARB EQ 6E1E	(- - - PH - - -) 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	(- - - - - - - - MEQ / 100G - - - - - - - -)								PCT		PCT			
000-6	1.10					19.6	3.6	0.8	0.5	24.5	27.4	96A	121A	89	5.4		6.5		
006-16	1.30					23.8	4.4	1.8	0.3	30.3	37.1	97A	121A	82	5.4		6.1		
016-29	1.30					27.2	4.5	3.0	0.3	35.0	38.3	89A	117A	91	6.0		6.8		
029-43	1.10						4.7	4.7	0.4		40.4	93A	123A			7.7	7.5		
043-61	0.50						4.3	5.5	0.5		38.1	92A	124A			3.4	7.6		
061-72	0.20						4.7	6.1	0.6		40.9	91A	117A			3.7	7.7		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S63TX-73-90

DEPTH	SAND	SILT	CLAY		
INCHES	2 - 0.05MM	0.05 - 0.002MM	LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-6	QZ1	QZ1 FD3		MT2 KK2 QZ2 MI3 FD3	MT1 KK3
6-16	QZ1	QZ1 FD3		MT2 QZ2 MI3 KK3 FD3	MT1
16-29	QZ1 FD3	QZ1 FD3		MT2 KK2 QZ2 MI3 FD3	MT1
29-43	QZ1	QZ1 FD3		MT2 MI2 QZ2 KK3 FD3	MT1
43-61	QZ1	QZ1 FD3		MT2 MI2 QZ2 KK3 FD3	MT1
61-72	QZ1	QZ1 MI3 FD3		MI2 MT2 QZ2 KK3 FD3	MT1

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Vertic Ochraqualf; fine, montmorillonitic, thermic.
Soil: Wilson clay loam.
Soil Nos.: S63TX-73-90; K1407-1412.
Location: Falls County, Texas. Nine miles east from intersection of Highway 7 and FM 147 in Marlin on FM 147; thence 0.5 mile north on county road. Site is 75 feet east of road in level field (Johnson grass). Cover: Idle cropland.
Topography: Nearly level, slightly convex erosional upland with slope gradient of approximately 0.2 percent.
Sampled by: Hayward A. Moncrief, Jr., June 27, 1963.
Described by: Hayward A. Moncrief.

Ap K1407 0 to 6 inches. Gray (N5/0; 4/0 moist) clay loam; massive; very hard, dry; sticky and plastic, wet; few roots; pH 6.5; abrupt smooth boundary.

B21tg K1408 6 to 16 inches. Black (N2/0; 2/0 moist) silty clay loam; weak angular blocky structure; very hard, dry; very sticky and very plastic, wet; streaks of gray soil material; few roots; few wormholes and casts; pH 6.0; gradual smooth boundary.

B22tg K1409 16 to 29 inches. Black (N2/0; 2/0 moist) silty clay; thin clay films; moderate medium blocky; very hard, dry; very sticky and very plastic, wet; few roots; streaks of gray soil material along partially filled cracks; pH 6.5; gradual smooth boundary.

B23tg K1410 29 to 43 inches. Black (N2/0; 2/0 moist) silty clay; thin clay films; moderate medium angular blocky; very hard, dry; very sticky and very plastic, wet; few roots; few fine pores; thin streaks of gray soil material along partially filled cracks; alkaline; pH 8.0; gradual wavy boundary.

B24t K1411 43 to 61 inches. Gray (N5/0; 5/0 moist) silty clay; few fine faint light gray mottles; moderate medium blocky; very hard, dry; sticky and plastic, wet; few roots; occasional ¼ inch and less in diameter, hard $CaCO_3$ concretions; calcareous; pH 8.0; gradual wavy boundary.

B25t K1412 61 to 72 inches plus. Gray (10YR 5/1; 4/1 moist) silty clay; few fine faint light grayish brown mottles; moderate medium and coarse blocky; very hard, dry; sticky and very plastic, wet; about 2 percent by volume of ¼ inch and less in diameter of hard and soft $CaCO_3$ concretions; pH 8.0; calcareous.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

B21tg - clay
B22tg - clay
B23tg - clay
B24t - clay
B25t - clay

SOIL CLASSIFICATION-VERTIC OCHRAQUALF
FINE, MONTMORILLONITIC, THERMIC

SERIES - - - - - - -WILSON

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S63TX-175-91 COUNTY - - - NAVARRO

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K1400-1406

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (- SAND -)								PARTICLE SIZE ANALYSIS			CRSE CLAY	FINE CLAY	(A) (ETHYLENE GLYCOL) RETAINED			BULK DEN
		SAND 2-.05	SILT .05-.002	CLAY LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	SAND 2-.05	SILT .05-.002	CLAY LT .002	.002-.0002	LT .0002	2 MM	.002 MM	.0002 MM	4A3A
IN		(- - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - -)								(PCT LT.002)					(- - MG/G - - -)			G/CC
000-6	AP												7	93				
006-20	B21TG	29.5	33.9	36.6	0.5	0.1	0.1	7.8	21.4				34	66				
020-35	B22TG												26	74				
035-43	B23TCA	27.0	31.4	41.6	0.6	0.1	0.1	7.4	19.0				25	75				
043-53	B3CA	30.8	26.0	43.3	0.4	0.2	0.1	10.3	20.1				22	78				
053-70	2C1	52.0	16.2	31.8									29	71				
070-84	2C2	56.9	13.4	29.7									30	70				

DEPTH	ORGANIC MATTER 6A1A ORGN	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOT	(- EXTRACTABLE BASES 5B1A -) CA	MG	NA	K	SUM	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO CA EQ 6E1E	CA CARB TO	PH 8C1A 1/1 H20	8C1C 1/2 KCL	8C1E 1/2 CACL
	CARB									EXTB						MG	6E1E			
IN	PCT	PCT		PCT	PCT	(- - - - - - - - MEQ / 100G - - - - - - - -)								PCT			PCT			
000-6	1.10					18.0	3.3	0.5	0.3	22.1	25.0	100A	103A	88	5.5		6.3		
006-20	0.90					26.8	5.2	1.4	0.3	33.7	36.1	101A	120A	93	5.2		6.4		
020-35	0.70						6.1	2.7	0.4		39.3	99A	117A			2.0	7.7		
035-43	0.40						5.8	3.7	0.3		38.5	101A	117A			8.2	8.0		
043-53	0.20						6.6	4.6	0.5		42.9	108A	121A			7.3	8.0		
053-70	0.10						4.9	3.9	0.4		35.4	109A	129A			4.5	8.3		
070-84	0.10						4.1	3.6	0.2		32.1	109A	127A			1.4	8.3		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S63TX-175-91

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-6	QZ1	QZ1 VR3 FD3		MT2 KK2 QZ2 MI3 FD3	MT1
6-20	QZ1 FD3	QZ1 FD3		MT2 MI2 QZ2 KK3 FD3	MT1
20-35	QZ1	QZ1 VR3 FD3		MT1 KK2 MI3 QZ3 FD3	MT1
35-43	QZ1 FD3	QZ1 VR3 FD3		MT1 MI2 KK3 QZ3 FD3	MT1
43-53	QZ1 FD3	QZ1 VR3 FD3		MT1 MI3 KK3 QZ3	MT1
53-70	QZ1 FD3	QZ2 VR2 FD3		MT1 QZ3	MT1
70-84	QZ1 FD3	QZ1 VR3 FD3		MT1 QZ3	MT1

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, VR=VERMICULITE.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Vertic Ochraqualf; fine, montmorillonitic, thermic.
Soil: Wilson loam.
Soil Nos.: S63TX-175-91; K1400-1406.
Location: Navarro County, Texas. Two and a half miles west of courthouse in Corsicana on State Highway 22 to intersection of Farm Road 744; thence 70 feet south into cultivated field. Cover: Cultivated field; in oats.
Topography: Gently undulating, less than 1 percent gradient.
Sampled by: Harvey Oakes, June 5, 1963.
Described by: Harvey Oakes.

Ap K1400 0 to 6 inches. Dark gray (2.5Y 4/1) loam; very dark gray (2.5Y 3/1) moist; structureless; abrupt smooth boundary.

B21tg K1401 6 to 20 inches. Very dark gray (N 3/) clay loam black (N 2/) moist; moderate medium and coarse angular blocky breaking to medium and fine moderate angular blocky; extremely firm, very stiff and plastic; gradual wavy boundary.

B22tg K1402 20 to 35 inches. Very dark gray (2.5Y 3/1) clay loam black (2.5Y 2/1) moist; similar structure and consistence as above; gradual wavy boundary.

B23tca K1403 35 to 43 inches. Dark gray (5Y 4/1) clay; very dark gray (5Y 3/1) moist; consistence similar but structure weaker than above; contains 3 to 5 percent by volume of small concretions of $CaCO_3$; calcareous; weakly effervescent; few faint mottles of yellow in lower part; gradual wavy boundary.

B3ca K1404 43 to 53 inches. Mottled olive and olive gray (5Y 5/3 and 5/2) moist, calcareous clay with few fine concretions of $CaCO_3$; clear wavy boundary.

IIC1 K1405 53 to 70 inches. Thin-bedded olive yellow sandy clay and light brown gray sandy clay loam; calcareous; few $CaCO_3$ concretions; gradual smooth boundary.

IIC2 K1406 70 to 84 inches. Thin-bedded yellowish and light gray sandy earth of sandy clay loam; non-calcareous.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

Ap - clay loam
B21tg - clay
B22tg - clay
IIC2 - light sandy loam

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Glossaquic Fragiudalf; fine-loamy, siliceous, thermic

SOIL Splendora fine sandy loam **SOIL Nos.** S64TX-170-1 **LOCATION** Montgomery County, Texas

SOIL SURVEY LABORATORY Beltsville, Maryland **LAB. Nos.** 64239-64247

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

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)		3B2 Cm	Coarse fragments 3B1: 2A2 > 2 (<76) Pct.	2 – 19 Pct. of < 76mm	19 – 76 Pct. of < 76mm
		Pct. of < 2 mm																
0-4	A1	61.1	34.3	4.6	0.1	1.7	7.4	28.8	23.1	21.1	13.2	61.8	38.0			tr	tr	-
4-10	A2	61.2	34.4	4.4	-	1.6	7.6	29.3	22.7	20.9	13.5	61.4	38.5		1.00	tr	tr	-
10-20	B	53.2	29.0	17.8	0.2	1.4	6.0	25.1	20.5	17.6	11.4	53.2	32.7		1.00	tr	tr	-
20-32	Bx1	53.2	28.4	18.4	0.4	1.3	5.8	25.1	20.6	18.0	10.4	54.3	32.6		0.97	4	4	-
32-46	Bx2	53.0	28.8	18.2	0.3	1.3	5.7	24.6	21.1	18.2	10.6	54.5	31.9		0.97	5	5	-
46-56	Bx3	53.2	28.5	18.3	0.2	1.2	5.8	25.3	20.7	19.1	9.4	55.2	32.5		0.98	3	3	-
56-69	Bx4	53.0	29.0	18.0	0.2	1.4	6.2	25.2	20.0	18.8	10.2	54.7	33.0		1.00	tr	tr	-
69-81	Bx5	53.7	30.1	16.2	0.1	1.4	6.6	25.3	20.3	19.3	10.8	54.9	33.4		1.00	tr	tr	-
81-95+	Bx6	49.4	29.2	21.4	0.2	1.4	5.9	23.0	18.9	18.6	10.6	51.5	30.5		1.00	tr	tr	-

Depth (in.)	6A1a Organic carbon Pct.	6B2a Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct.	6C2a Ext. iron as Fe Pct.	Bulk density: 4A1f ⅓ bar g/cc	Bulk density: 4A1h Oven dry g/cc	4D1 COLE	Water content: Pct.	Water content: 4B1c ⅓ bar Pct.	Water content: 4B2 15 bar Pct.		4C1 WRD in/in	pH: 8C1c (1:1) 1N KCl	pH: 8C1a (1:1) H_2O
0-4	0.85	0.053	16			0.2									4.8	4.8
4-10	0.13					0.1	1.72	1.74	0.003		7.8	1.5		0.11	4.3	5.3
10-20	0.14					0.4	1.76	1.80	0.006		12.0	6.8		0.09	3.3	4.6
20-32	0.08					0.5	1.77	1.79	0.005		11.6	6.9		0.08	3.4	4.6
32-46	0.06					0.5	1.75	1.80	0.009		11.6	6.7		0.08	3.3	4.8
46-56	0.10					0.6	1.75	1.79	0.006		11.6	6.8		0.08	3.5	4.9
56-69	0.06					0.8	1.81	1.84	0.005		11.4	6.2		0.09	3.7	4.8
69-81	0.06					0.8	1.83	1.88	0.008		11.6	6.0		0.10	3.6	4.8
81-95+	0.02					1.2	1.78	1.88	0.018		12.1	8.1		0.07	3.6	4.6

Depth (in.)	Extractable bases 5B1a: 6N2d Ca	6O2b Mg	6P2b Na	6Q2a K	Sum	6H2a Ext. acidity	CEC: 5A3b Sum cations	6G1d Ext. Al	Ratios to clay 8D1: CEC Sum	Ext. iron	15-bar water	8D3 Ca/Mg	Base saturation: 5C3 Sum cations Pct	5C1 NH_4OAc Pct.
	meq/100 g													
0-4	2.5	0.9	tr	tr	3.4	2.8	6.2	0.1	1.35	0.04			54	
4-10	1.0	0.4	tr	tr	1.4	0.8	2.2	0.2	0.50	0.02	0.34		64	
10-20	1.6	1.5	tr	tr	3.1	3.8	6.9	1.2	0.39	0.02	0.38	1.1	45	
20-32	1.6	1.6	tr	tr	3.2	3.4	6.6	1.2	0.36	0.03	0.38	1.0	48	
32-46	1.5	1.8	0.1	0.1	3.5	2.9	6.4	0.8	0.35	0.03	0.37	0.8	55	
46-56	1.4	1.9	0.1	0.1	3.5	2.5	6.0	0.8	0.33	0.03	0.37	0.7	58	
56-69	1.3	2.0	0.1	0.1	3.5	2.3	5.8	0.6	0.32	0.04	0.34	0.6	60	
69-81	1.2	1.9	0.2	0.1	3.4	2.0	5.4	0.4	0.33	0.05	0.37	0.6	63	
81-95+	2.7	2.8	0.3	0.1	5.9	2.5	8.4	0.5	0.39	0.06	0.38	1.0	70	

Depth (in.)	Clay Fraction Analysis 7A1b-d: Mt.	Mt.–Chl. Int. a/	Vm.	Mi.	Int.	Qtz.	Kl. DTA	Gibbsite
	7A2 X-ray						% 7A3	
0-4	x	x					27	
4-10	tr	xx					21	
10-20	x	xx					34	
20-32	tr	xx					36	
32-46	tr	xx					38	
46-56	tr	x					33	
56-69	x	x					38	
69-81	x	xx					35	
81-95+	x	x					35	

Mt. = Montmorillonite, Chl. = chlorite, Vm. = Vermiculite, mi = mica, Int. = interstratified layer, Qtz. = quartz, Kl. = Kaolinite

Relative amounts: blank = not determined, dash = not detected, tr. = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant.

a. Montmorillonite-chlorite intergrade mineral.

Soil classification: Glossaquic Fragiudalf; fine-loamy, siliceous, thermic.
Soil: Splendora fine sandy loam.
Soil Nos.: S64TX-170-1; 64239-64247.
Location: Montgomery County, Texas. About 7 miles south-southwest of Conroe, Texas; 50 feet south of a compartment road and 1,750 feet east of the intersection of the compartment road and the north-south entrance road on the west side of W. Goodrich Jones State Forest, which intersection is 1.15 miles south of intersection of FM Road 1488 and the north-south entrance road, which is 2.55 miles west of intersection of FM 1488 and Interstate Highway 45, which is 6.1 miles south of intersection of Interstate 45 and Texas Highway 105 at Conroe, Texas. SC part of photo AWU-5W-127.
Vegetation and use: Mixed stand of loblolly pine and desirable hardwoods such as white oak, red oak, water oak, willow oak and sweetgum. Understory of blackgum, post oak, holly, yaupon, wild grape, American beautyberry, and smilax vine. Never cultivated but all of this state forest has had underbrush burned during winter of 1961-62.
Topography: Level to very gently sloping. Slope at pedon site is less than .05 percent; plane surface. Elevation is 173 feet above sea level. This is only 2 to 4 miles inland from contact of Citronelle and Lissie formation.
Drainage and permeability: Somewhat poorly drained. Slow runoff. Moderately slowly permeable.
Parent material: Somewhat stratified, acid, sandy clay loam and sandy loam, probably of Citronelle geologic group of Late Pliocene or Early Pleistocene geologic age. Some 3 or 4 miles inland from Lissie Plain, which is of Pleistocene geologic age.
Collected by: J. G. Cady, H. Oakes, G. S. McKee, W. R. McClintock, H. A. Moncrief, May 11, 1964.
Described by: G. S. McKee and H. Oakes.

A1 64239 0 to 4 inches. Grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) when moist; structureless but slightly cohesive; very friable when moist, nonsticky when wet; plentiful tree, shrub and grass roots; pH 6.5; clear irregular boundary.

A2 64240 4 to 10 inches. Light brownish gray (10YR 6/2) fine sandy loam, grayish brown (10YR 5/2) when moist, with many fine indistinct light gray and dark brown mottles; structureless; very friable, nonsticky; plentiful roots; many fine pores (vesicular); few wormcasts; contains occasional strongly cemented subrounded dark reddish brown iron concretions; pH 6.0; clear boundary.

B 64241 10 to 20 inches. Distinctly and finely mottled brownish yellow and gray heavy fine sandy loam; weak blocky structure; friable, slightly sticky, hard; plentiful roots; many fine continuous pores; occasional roundish strongly cemented, reddish iron concretions; few wormcasts; pH 5.0; gradual boundary.

Bx1 64242 20 to 32 inches. Distinctly and coarsely mottled light gray, brownish yellow and strong brown fine sandy loam; weak subangular blocky and blocky structure; slightly more clayey than horizon above; friable, sticky and slightly plastic; has occasional yellowish red medium-sized mottles comprising soil peds that have weakly cemented centers that can be crushed between the thumb and fingers; contains a few reddish and very dark brown iron concretions that are subrounded, slightly pitted and strongly cemented; common tree roots; pH 5.0; gradual boundary.

Bx2 64243 32 to 46 inches. Same colors, texture, and consistence as layer above, but yellowish red mottles comprise 2 to 3 percent of the area of the face of the pit in this horizon; occasional krotovina and small pockets of light gray fine sandy loam; occasional krotovina some 2 inches in diameter extends downward into the Bx5 horizon; weak blocky structure; contains few strongly cemented iron concretions as in layer above as well as red soil with weakly cemented centers that appears as mottles as in layer above; few tree roots; pH 5.0; gradual boundary.

Bx3 64244 46 to 56 inches. Same colors, but red mottles are coarse and in vertical "stacks;" fine sandy loam; in other parts of the 10-foot wide pit there are "nests" of reddish weakly cemented iron concretions that can be broken between thumb and fingers; weak blocky; friable, sticky and slightly plastic; common fine pores and few tree roots; pH 5.0; diffuse boundary.

Bx4 64245 56 to 69 inches. About same as horizon just above, but contains slightly more reddish coarse mottles; pH 5.0; diffuse boundary.

Bx5 64246 69 to 81 inches. Prominently and coarsely mottled light gray (10YR 7/2) when moist; brownish yellow (10YR 6/6) when moist, and reddish yellow (5YR 6/6) when moist; average texture of heavy fine sandy loam consisting of sandy clay loam in weak polygons up to 15 inches high and 6 inches in diameter extending up into the Bx4 horizon, with some bleached tongues of fine sandy loam surrounding the polygons and common pockets of fine sandy loam; the soil material comprising the coarse reddish yellow mottles has weakly cemented centers; occasional roundish very dark brown weakly cemented iron concretions up to about 1-cm diameter; occasional tree roots, mostly small; pH 5.0; diffuse boundary.

Bx6 64247 [illegible] to 95 inches plus. Similar to horizon above, but loamy texture and more cemented (still weakly cemented) probably by silica; contains less reddish mottles, being only occasional; some of the fine sandy pockets are "packed" and have considerable silt-size particles; occasional tree roots; pH 5.0.

Sand mineralogy (Method 7B1). Examination of coarse silt and very fine sand fractions indicates less than 1 percent weatherable minerals. Fractions are principally quartz with accessory zircon, tourmaline, and iron oxides. Family mineralogy is siliceous.

Remarks: At 20 to 22 inches there is a horizon of B and A12 that was not recognized at the time of sampling; comment of January 9, 1968. Colors are for dry soil unless otherwise indicated. Associated soils are Segno fine sandy loam in slightly higher areas (1 to about 5 feet), and Sorter silt loam in slightly lower areas. Depth to permanent water table is about 10 feet. Seasonal water table during the cool, moist season of about 3 months is near the soil surface. Determinations made at the site indicate that the forest site index for loblolly pine is 82 feet for trees at age 50 years.

Textures above agree with laboratory data. Field textures where different are given below:

B - light sandy clay loam or heavy fine sandy loam
Bx1 - sandy clay loam
Bx2 - sandy clay loam
Bx3 - light sandy clay loam
Bx4 - light sandy clay loam
Bx6 - heavy fine sandy loam

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Glossaquic Fragiudalf; fine-loamy, siliceous, thermic

SOIL Splendora fine sandy loam ___ SOIL Nos. S64TX-170-2 LOCATION Montgomery County, Texas

SOIL SURVEY LABORATORY Beltsville, Maryland ___ LAB. Nos. 64248-64255

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

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)	3B2 Cm	Coarse fragments 3B1: 2A2 > 2 (<76) Pct.	2 – 19 Pct. of < 76mm	19 – 76 Pct. of < 76mm
		Pct. of < 2 mm															
0-6	A1	63.4	31.3	5.3	0.1	1.7	8.3	32.5	20.8	19.0	12.3	58.9	42.6		tr	tr	-
6-15	A2	61.6	31.8	6.6	0.1	1.4	7.4	31.7	21.0	18.6	13.2	58.6	40.6	0.99	2	2	-
15-28	B	51.7	30.0	18.3	0.3	1.4	6.6	26.3	17.1	17.0	13.0	49.4	34.6	0.99	1	1	-
28-43	Bx1	49.6	28.0	22.4	0.5	1.2	6.1	24.3	17.5	15.8	12.2	47.6	32.1	0.96	6	6	-
43-56	Bx2	49.4	28.7	21.9	0.3	1.4	5.9	24.5	17.3	16.3	12.4	48.0	32.1	0.93	11	11	-
56-70	Bx3	50.7	27.9	21.4	0.4	1.6	6.7	25.0	17.0	16.1	11.8	47.7	33.7	0.94	9	9	-
70-81	Bx4	53.5	23.2	23.3	0.2	1.5	7.3	26.9	17.6	8.7	14.5	41.8	35.9	0.98	3	3	-
81-98+	Bx5	51.8	21.4	26.8	0.1	1.7	7.3	26.7	16.0	17.9	3.5	49.2	35.8	0.99	2	2	-

Depth (in.)	6A1a Organic carbon	6B2a Nitrogen	C/N		Carbonate as $CaCO_3$	6C2a Ext. iron as Fe	Bulk density: 4A1f ⅓ bar	Bulk density: 4A1h Oven dry	4D1 COLE	Water content: Pct.	Water content: 4B1c ⅓ bar	Water content: 4B2 15 bar		4C1 WRD	pH: 8C1c (1:1) 1NKCl	pH: 8C1a (1:1) H_2O
	Pct.	Pct.			Pct.	Pct.	g/cc	g/cc			Pct.	Pct.		in/in		
0-6	0.78	0.042	18			0.2									4.2	4.6
6-15	0.19					0.2		1.69	1.69	-		8.2	2.4	0.10	4.1	5.1
15-28	0.12					0.4		1.78	1.82	0.008		11.9	6.5	0.09	3.7	4.9
28-43	0.10					0.8		1.75	1.79	0.007		12.9	8.1	0.08	3.7	4.9
43-56	0.13					0.7		1.71	1.77	0.010		12.8	7.7	0.08	3.7	5.0
56-70	0.07					1.4		1.86	1.90	0.008		10.2	7.4	0.05	3.7	4.8
70-81	0.09					1.5		1.78	1.87	0.016		13.7	8.2	0.10	3.6	4.8
81-98+	0.08					2.1		1.76	1.87	0.020		15.6	9.5	0.11	4.0	4.8

Depth (in.)	Extractable bases 5B1a: 6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	6N2a Ext. acidity	CEC: 5A3a Sum cations	CEC	6G1d Ext. Al		Ratios to clay 8D1: CEC Sum	Ext. iron	15-bar water	8D3 Ca/Mg		Base saturation: 5C3 Sum cations Pct.	5C1 NH_4OAc Pct.
	meq/100 g																
0-6	1.8	0.7	tr	tr	2.5	3.5	6.0		0.2		1.13	0.04				42	
6-15	1.3	0.5	tr	tr	1.8	1.5	3.3		0.3		0.50	0.03	0.36			55	
15-28	2.6	1.0	0.1	tr	3.7	2.6	6.3		0.5		0.34	0.02	0.36	2.6		59	
28-43	2.2	1.6	0.1	tr	3.9	3.0	6.9		0.6		0.31	0.04	0.36	1.4		57	
43-56	2.2	1.8	0.2	0.1	4.3	2.8	7.1		0.6		0.32	0.03	0.35	1.2		60	
56-70	1.7	1.8	0.2	0.1	3.8	2.7	6.5		0.7		0.30	0.06	0.34	0.9		58	
70-81	1.7	2.1	0.4	0.1	4.3	2.9	7.2		0.5		0.31	0.06	0.35	0.8		60	
81-98+	2.0	2.4	0.7	0.1	5.2	2.4	7.6		0.3		0.28	0.08	0.35	0.8		68	

Depth (in.)	Clay Fraction Analysis 7A1b-d: Mt.	Mt.-Chl. Int. a/ (7A2 X-ray)	Vm.	Mi.	Int.	Qtz.	Kl. DTA (% 7A3)	Gibbsite	
0-6	-	x					23		
6-15	-	xx					24		
15-28									
28-43	-	xxx					36		
43-56									
56-70									
70-81	-	x					36		
81-98+									

Mt. = Montmorillonite, Chl. = chlorite, Vm. = Vermiculite, mi = mica, Int. = interstratified layer, Qtz. = quartz, Kl. = Kaolinite

Relative amounts: blank = not determined, dash = not detected, tr. = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant.

a. Montmorillonite-chlorite intergrade mineral.

Soil classification: Glossaquic Fragiudalf; fine-loamy, siliceous, thermic.
Soil: Splendora fine sandy loam.
Soil Nos.: S64TX-170-2; 64248-64255.
Location: Montgomery County, Texas. About 6 miles south-southwest of Conroe, Texas; about 75 feet east of the north-south entrance road on the west side of W. Goodrich Jones State Forest, and 0.4 mile south of intersection of the entrance road and FM Road 1488, which is 2.55 miles west of intersection of FM 1488 and Interstate Highway 45, which is 6.1 miles south of intersection of Interstate 45 and Texas Highway 105 at Conroe, Texas. NC part of photo AWU-5W-127.
Vegetation and use: Mixed stand of loblolly pine and desirable hardwoods, such as white oak, red oak, water oak, willow oak, and sweetgum. Understory of blackgum, post oak, holly, yaupon, wild grape, American beautyberry, and smilax vine. Never cultivated but has had underbrush burned during winter of 1961-62.
Topography: Very gently sloping, slope of about 1 percent, plane surface. Distance to intermittent drain is several hundred feet. Elevation is about 186 feet above sea level.
Drainage and permeability: Somewhat poorly drained. Slow runoff. Moderately slowly permeable.
Parent material: Somewhat stratified, acid, sandy clay loam and sandy loam, probably of Citronelle geologic group of Late Pliocene or Early Pleistocene geologic age. Some 4 miles inland from the Lissie Plain, which is of Pleistocene geologic age.
Collected by: J. G. Cady, H. Oakes, G. S. McKee, W. R. McClintock, H. A. Moncrief, May 12, 1964.
Described by: G. S. McKee and H. Oakes.

A1 64248 0 to 6 inches. Grayish brown (10YR 5/2) fine sandy loam, dark grayish brown (10YR 4/2) when moist; structureless; very friable, nonsticky, soft; contains plentiful tree, shrub and grass roots; contains occasional wormcasts; pH 6.5; clear irregular boundary.

A2 64249 6 to 15 inches. Light gray (10YR 7/2) fine sandy loam, light brownish gray (10YR 6/2) when moist with a few medium and fine faint yellowish brown and brown mottles; structureless, but contains few fine wormcasts and common number of fine pores; has occasional strongly cemented iron concretions up to about 5 mm in diameter; contains plentiful tree and grass roots; pH 5.7; clear irregular (2-inch) boundary.

B 64250 15 to 28 inches. Distinctly and coarsely mottled light gray (10YR 7/2) brownish yellow (10YR 6/6) loam with occasional fine strong brown mottles; weak blocky structure; friable, slightly sticky, hard; contains plentiful tree and shrub roots; contains common number of fine pores; contains occasional strongly cemented brownish iron concretions up to about 0.5-cm diameter; pH 5.5; gradual boundary.

Bx1 64251 28 to 43 inches. Distinctly and coarsely mottled light gray and brownish yellow sandy clay loam or loam that is slightly more clayey than layer just above, but contains occasional thin small lenses or pockets of fine sandy loam; weak blocky structure; friable, slightly sticky, hard; has occasional strong brown medium-sized mottles that surround or are associated with fine incipient or weakly cemented iron concretions; also contains occasional strongly cemented roundish fine iron concretions up to about 0.5 cm diameter; contains few tree roots; pH 5.5; diffuse boundary.

Bx2 64252 43 to 56 inches. Same two dominant colors as in layer above, but has about 2 percent of prominent coarse red and yellowish red mottles that are slightly hard when dry; loam with small fine sandy loam pockets and occasional lenses or small pockets of loamy fine sand; weak blocky structure; firm, sticky, very hard; contains few tree roots; the red soil comprising the mottles has semihard iron concretions in the center; in addition, contains occasional strongly cemented iron concretions that are brownish on outsides; pH 5.0; diffuse boundary.

Bx3 64253 56 to 70 inches. Coarsely and prominently mottled light gray, red and brownish yellow sandy clay loam with small pockets of fine sandy loam and occasional very small lenses of loamy fine sand; has tubular large gray tongues, some 6 to 18 inches long and 1 to 3 inches in diameter and some seem to surround apparent polygons that are harder than the gray material; roots are more concentrated in the gray tongues and moisture moves more readily through the gray tongues; pH 5.0; diffuse boundary.

Bx4 64254 70 to 81 inches. Coarsely mottled light gray, red, and brownish yellow sandy clay loam with some pinkish mottles; slightly cemented, but more so in the material comprising red coarse mottles; has occasional small roundish clay lenses in root channels and some darkened organic stains on outsides of the coarse peds and has occasional patchy clay films; pH 5.0; has occasional tree roots mostly in the gray tongues; diffuse boundary.

Bx5 64255 81 to 98 inches plus. About same as layer above, but apparently more cemented; pH 5.0; has occasional tree roots.

Remarks: At 26 to 28 inches there is a horizon of B and A12 that was not recognized at the time of sampling; comment of January 9, 1968. Colors are for dry soil unless otherwise indicated. Associated soils are Segno fine sandy loam, which mostly occupies slightly higher gentle side slopes, and one area of Conroe gravelly loamy fine sand which occupies a low ridgetop position a few feet higher than the Splendora and Segno. Depth to permanent water table is about 10 feet. Seasonal water table during the cool, moist season of about 3 months is near the soil surface. Determinations made at the site indicate that the forest site index for loblolly pine is 82 feet for trees at age 50 years.

Textures above agree with laboratory data. Field textures where different are given below:

B - light sandy clay loam
Bx2 - sandy clay loam

SOIL CLASSIFICATION Aquic Glossudalf; fine-silty over clayey, thermic

SOIL Series not designated — LOCATION Jefferson County, Texas

SOIL NOS. S59TX-123-4 — LAB. NOS. 11612-11619

SOIL SURVEY LABORATORY Lincoln, Nebraska — DATE March 1961

GENERAL METHODS 1A, 1B1a, 2A1, 2B

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	TEXTURAL CLASS
0-3½	A1	<0.1	0.2a	0.3b	6.2	25.1	63.1	5.1	68.9	24.5	-	sil
3½-7	A2	<0.1	0.1a	0.2b	5.4	23.7	64.4	6.2	65.6	27.1	-	sil
7-16	A&B	0.1	0.1a	0.2b	5.5	19.6	63.2	11.3	59.6	27.9	-	sil
16-21	B&A	<0.1	<0.1	0.1b	4.1	15.4	58.9	21.5	47.0	30.8	-	sil
21-32	B23t	<0.1	<0.1	0.1b	2.5	9.4	40.2	47.8	31.2	20.5	-	sic
32-43	B3	<0.1	<0.1	0.1b	3.3	11.0	41.3	44.3	34.8	20.3	-	sic
43-55	B3	<0.1	<0.1	0.2b	3.5c	12.8	48.3	35.2	39.3	24.8	-	sicl
15-17		<0.1	0.1a	0.2b	5.7	20.4	66.9	6.7	61.2	31.0	-	sil

DEPTH INCHES	HORIZON	8C1a pH 1:1	ORGANIC MATTER 6G2a Ext. Aluminum me/100g	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	Free Iron Fe_2O_3% 6C1a	$CaCO_3$ equivalent %	MOISTURE TENSIONS 4B2 15 Bar %
0-3½	A1	5.5	<1	1.75	0.072	24	0.3		3.6
3½-7	A2	5.3	1	0.51	0.022	23	0.5		2.6
7-16	A&B	5.0	3	0.17	0.016	11	0.6		4.4
16-21	B&A	5.1	6	0.13	0.014	9	1.9		8.2
21-32	B23t	5.0	16	0.20	0.027	7	2.2		18.8
32-43	B3	5.0	15	0.15			1.6		17.9
43-55	B3	5.1	9	0.12			2.1		14.6
15-17		5.3	1	0.05			0.6		1.9

DEPTH INCHES	HORIZON	5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 6N2b Ca	6G2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K (milliequivalents per 100g. soil)	BASE SAT. % NH_4OAc EXCH. 5C1	Base Sat. % on Sum Cations 5C3	Sum Ext. Bases 5B1a	Sum Ext. Cations 5A3a	8D3 Ca/Mg	8D1 CEC 1/ per 100 g. clay
0-3½	A1	6.7	2.2	0.6	6.2	0.1	0.1	45	33	3.0	9.2		131
3½-7	A2	3.6	1.2	0.3	4.0	0.1	<0.1	44	28	1.6	5.6		58
7-16	A&B	5.0	0.8	0.8	5.0	0.1	<0.1	34	25	1.7	6.7		44
16-21	B&A	8.8	0.6	0.7	9.5	0.1	0.1	17	14	1.5	11.0		41
21-32	B23t	22.6	2.0	2.5	24.8	0.6	0.2	23	18	5.3	30.1	0.8	47
32-43	B3	22.0	3.0	2.6	21.8	1.0	0.2	31	24	6.8	28.6	1.2	50
43-55	B3	17.6	3.5	2.4	15.0	1.2	0.2	41	33	7.3	22.3	1.4	50
15-17		2.0	0.1	0.3	2.6	0.1	<0.1	25	16	0.5	3.1		30

a. Many (Fe-Mn?) concr.
b. Common (Fe-Mn?) concr.
c. Few (Fe-Mn?) concr.

1/ Calculated value. $\frac{\text{CEC by } NH_4OAc}{\% \text{ clay}} \times 100$

Soil classification: Aquic Glossudalf; fine-silty over clayey, thermic.
Soil: Series not designated.
Soil Nos.: S59TX-123-4; 11612-11619.
Location: Jefferson County, Texas. North from County Courthouse at Beaumont on Pearl Street to Highway 90, thence west 2.7 miles on Highway 90 to U.S. Highways 96 and 287, thence northwest 5.8 miles on U.S. Highways 96 and 287 to intersection with Texas Highway 105, thence northwest 6.4 miles on Texas Highway 105 to intersection with Sweetgum Road, thence north 1.1 miles on Sweetgum Road, thence west 0.2 mile on River Oaks Boulevard, thence south on Woods Road 0.2 mile, east of road 30 feet in River Oak Estates subdivision.
Setting: The soil where sampled has a slightly concave slope of approximately 0.5 percent and a second growth cover of longleaf and loblolly pine, blackjack and red oak, some blackgum and sweetgum and a ground cover of carpet, pinehill bluestem, muhly and other woods grasses. Moisture content at time of sampling was at field capacity or greater.
Collected by: L. L. Gordon, J. R. Coover, R. B. Grossman, and G. J. Post, August 1959.
Described by: L. L. Gordon and R. B. Grossman.

A1 11612 0 to 3-1/2 inches. Dark gray (10YR 4.5/1) silt loam; weak granular; very friable; many fine fibrous roots and few fine woody roots; few wormcasts; clear irregular boundary.

A2 11613 3-1/2 to 7 inches. Pale brown (10YR 6/3) silt loam with common faint medium yellowish brown (10YR 5/8) mottles and about 30 percent of dark gray (10YR 4/1) mottles and streaks due to worm activity and filling of root channels; massive; firm to friable; few fine and medium pores; fine fibrous roots are common; clear boundary.

A&B 11614 7 to 16 inches. Yellowish brown (10YR 5/4) silt loam or loam containing many distinct medium light brownish gray (10YR 6/2) and yellowish brown (10YR 5/8) mottles; some of root channels are coated reddish brown; massive to weak subangular blocky; firm; slightly sticky and plastic; few to common very fine pores; few fine roots; clear to abrupt wavy boundary.

B&A 11615 16 to 21 inches. Mottled red (4.5YR 4/6) with about 40 percent of light brownish gray (10YR 6/2) along voids and surface of peds as well as part of the matrix and some brownish yellow silt loam containing considerable silt; compound weak to moderate fine and medium subangular and angular blocky; slightly sticky and plastic; pockets of a massive, brittle, vesicular layer of about the same color as the B1 horizon and 0 to 2 inches thick occur discontinuously in the lows of the wavy boundary between the A&B and B&A horizons; where pedon as a whole was sampled, this layer was very thin, the upper part of the B&A being only slightly vesicular porous; a separate sample of this vesicular layer was taken where it was thicker in the microlows of the wavy boundary and this vesicular horizon is described in detail at the end of the pedon description; few fine roots; few fine pores and occasional medium-sized pore; clear slightly wavy boundary.

B23t 11616 21 to 32 inches. Mottled red (2.5YR 4/6) and gray (7.5YR 6/1) silty clay mottled about 50-50 red and gray, and mottles are distinct and fine and medium in size; mostly fine and medium blocky with some subrounded peds; sticky and plastic; few fine pores; few fine fibrous and wood roots; gradual boundary.

B3 11617 32 to 43 inches and 11618 43 to 55 inches. Light gray (10YR 7/1) silty clay in upper part and silty clay loam in lower part with many medium and coarse mottles of red (10R 4/6) (about 30 percent) and about 10 percent of faint medium mottles of brownish yellow and about 10 percent prominent medium dark red mottles, some of which occur as streaks or bands; sticky but stiff dense clay; very firm; few very fine pores; very few fine roots; this horizon was sampled in two increments.

11619 15 to 17 inches. The brittle, vesicular porous discontinuous layer occurs in the lows of the wavy boundary between the B1 and B21t horizons. The horizon varies in thickness from 0 inch in the microhighs to 2 inches in the microlows. Very pale brown (10YR 7/3), very fine sandy loam, high in silt content; many faint medium mottles of light yellowish brown and few to common distinct fine and medium mottles of yellowish red and red; apparently massive.

Remarks: No pH readings were taken of this pedon due to very inclement weather conditions. The color designations herein refer to moist soil. This pedon was sampled as Acadia and the site was mapped Acadia in the Soil Survey for Jefferson County, Texas, issued February 1965. The Acadia series is in the fine, montmorillonitic, thermic family of Aeric Ochraqualfs.

Textures above agree with laboratory data. Field textures where different are given below:

A1 - very fine sandy loam
A2 - very fine sandy loam
A&B - heavy very fine sandy loam
B&A - clay loam
B23t - clay
B3 - clay

SOIL CLASSIFICATION Haplic Glossudalf; fine, mixed, thermic

SOIL Series not designated | LOCATION Jefferson County, Texas

SOIL NOS. S59TX-123-3 | LAB. NOS. 11605-11611

SOIL SURVEY LABORATORY Lincoln, Nebraska | DATE March 1961

GENERAL METHODS 1A, 1B1a, 2A1, 2B

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	TEXTURAL CLASS
0-2½	A1	0.6a	0.9a	1.6b	11.9	25.5	56.6	2.9	75.5	13.1	-	sil
2½-7	A2	0.6a	1.2a	1.6b	10.4	25.9	55.6	4.7	74.0	13.1	-	sil
7-13	B&A	0.5a	0.8a	1.2b	8.0	20.8	55.5	13.2	63.7	17.0	-	sil
13-18	B21t	0.1a	0.3a	0.6b	4.0	13.1	47.9	34.0	43.7	19.5	-	sicl
18-31	B22t	<0.1	0.1a	0.3b	2.2	9.0	38.8	49.6	32.2	16.8	-	c
31-44	B23t	<0.1	<0.1	0.2	2.1	9.1	45.3	43.3	35.6	20.0	-	sic
44-62	B23t	<0.1	<0.1	0.2	1.8	9.0	46.3	42.7	35.8	20.5	-	sic

8C1a pH 1:1	6C1a Free Iron Fe_2O_3 %	6G2a ORGANIC MATTER Ext. Aluminum me/100g	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	BULK DENSITY 4A1a Field State g/cc	4A1c 30-cm. g/cc	4A1h Oven Dry g/cc	MOISTURE TENSIONS 4B4 Field State %	4B3 30-cm %	4B1b 1/3 bar pieces %	4B2 15 Bar %
5.5	0.9	<1	1.14	0.059	19							2.6
5.4	0.9	<1	0.25	0.017	15	1.62	1.60	1.62	13.7	18.1	12.2c	1.6
5.1	1.0	3	0.24	0.020	12	1.66	1.65	1.69	14.5	18.1	15.1c	5.7
5.1	1.2	9	0.26	0.029	9	1.59	1.58	1.66	18.8	22.1	22.2	14.2
5.1	2.2	15	0.18	0.024		1.51	1.47	1.83	24.6	27.7	27.8	19.5
5.1	1.5	10	0.10									18.1
5.2	1.2	6	0.12			1.58		1.97	23.4	22.1		17.6

5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	5B1a 6Q2a K	BASE SAT. % NH_4OAc EXCH. 5C1	Base Sat. % on Sum Cations 5C3	Sum Ext. Bases 5B1a	Sum Ext. Cations 5A3a	8D3 Ca/Mg		8D1 1/ CEC per 100 g. clay
← milliequivalents per 100g. soil →												
4.1	1.4	0.4	4.5	0.1	0.1	49	31	2.0	6.5			141
2.4	0.9	0.2	2.6	<0.1	<0.1	46	30	1.1	3.7			51
6.2	0.8	0.4	6.4	0.1	0.1	22	18	1.4	7.8			47
14.8	1.7	1.6	15.5	0.4	0.2	26	20	3.9	19.4	1.1		44
23.1	3.7	2.5	22.1	1.1	0.3	33	26	7.6	29.7	1.5		46
22.6	6.9	3.2	16.2	1.7	0.4	54	43	12.2	28.4	2.2		52
24.9	11.3	4.1	10.5	2.3	0.4	73	63	18.1	28.6	2.8		53

a. Many (Fe-Mn?) concr.
b. Common (Fe-Mn?) concr.
c. 1/10-bar moisture.

1/ Calculated value. $\frac{\text{CEC by } NH_4OAc}{\% \text{ clay}} \times 100$

Soil classification: Haplic Glossudalf; fine, mixed, thermic.
Soil: Series not designated.
Soil Nos.: S59TX-123-3; 11605-11611.
Location: 0.8 mile north on Main Street from Jefferson County Courthouse at Beaumont, to Calder Avenue, then west 1.7 miles to 11th Street, then north 7.25 miles to Voth Cutoff, then 0.25 mile north on Broussard Road to Hillcrest Street, then north on Hillcrest 50 yards, then north of road 70 feet into pine timber. Jefferson County, Texas.
Slope: 0 to 1 percent.
Setting: The sample was taken in a cutover area of longleaf and loblolly pine with a thick ground cover of pinehill bluestem and wax myrtle and an occasional young pine. The area has a nearly level macrorelief but is dotted with an occasional sandy mound some 18 inches high and 20 to 30 feet in diameter. The soil was at or near field capacity when sampled.
Collected by: L. L. Gordon, J. R. Coover, R. B. Grossman, and G. J. Post, August 1959.
Described by: L. L. Gordon and R. B. Grossman.

A1 11605 0 to 2-1/2 inches. Dark gray (10YR 4/1.5) silt loam containing considerable organic matter; weak granular; very friable; common to many fine fibrous roots; few wormcasts; pH 5.5; clear boundary.

A2 11606 2-1/2 to 7 inches. Pale brown (10YR 6/3) silt loam containing few faint medium mottles of yellowish brown; massive; friable; common fine pores; few to common fine fibrous roots; few fine dark semihard concretions, apparently ferromanganese; pH 5.0; clear wavy boundary.

B&A 11607 7 to 13 inches. Light yellowish brown (10YR 6/4) silt loam or loam with common faint medium brownish yellow (10YR 6/6) mottles and occasional faint fine brownish yellow mottle; massive but porous; friable; few to common fine fibrous roots; pH 4.5; there is a clear wavy lower boundary; thickness of A1, A2, plus B1 horizons varies from 11 to 14 inches in the pit.

B21t 11608 13 to 18 inches. Yellowish brown (10YR 5/6) silty clay loam with many (about 40 percent) medium distinct red (2.5YR 4/8) mottles; weak to moderate fine to medium compound blocky and subangular blocky; firm moist; common fine and a few medium pores; pH 4.5; clear wavy boundary. This horizon ranges in thickness from 5 inches down to 1 inch.

B22t 11609 18 to 31 inches. Mottled brownish yellow (10YR 6/6), pale brown (10YR 6/3) and red (10R 4/6) clay; mottles are medium in size; weak to moderate fine angular blocky; firm moist; sticky and plastic but stiff; very few fine and very fine pores; few fine fibrous roots; pH 4.5; gradual boundary.

B23t 11610 31 to 44 inches and 11611 44 to 62 inches. Light gray (10YR 7/2) silty clay with common to many prominent medium red and few to common faint fine brownish yellow mottles and common prominent dark red streaks and coatings along the voids; sticky and plastic but stiff; very few very fine roots and pores; pH 4.5; gradual boundary. This horizon was sampled in two increments, 31 to 44 inches and 44 to 62 inches.

Remarks: The color designations herein refer to moist soil.

This pedon was sampled as Acadia and appears as Acadia in the Soil Survey for Jefferson County, Texas, issued February 1965. A description of the same site is published on page 56; the data are on pages 64 to 66. The Acadia series is in the fine, montmorillonitic, thermic family of Aeric Ochraqualfs.

Micromorphology (Method 4E1): Thin sections from the B21t (11608), B22t (11609), and lower part of the B23t (11610) were examined. Segregation of hydrous iron is strong. The B21t horizon has markedly less fine clay than the B22t. Probably the amounts of fine clay differ more than the total clay between the B21t and B22t. In the B22t, moderately oriented silicate clay occurs uniformly throughout as infillings of the interstices formed by the silt and sand (skeletal interstices), with little preferred orientation in subsurface positions (near macro voids). Orientation across several interstices is weak. Clay films are absent. Examination of structural surfaces in bulk density clods with the stereoscopic microscope corroborates the absence of clay films.

Textures above agree with laboratory data. Field textures where different are given below:

A1 - very fine sandy loam
A2 - very fine sandy loam
B&A - heavy very fine sandy loam
B21t - heavy clay loam
B22t - clay

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Vertic Hapludalf; fine, montmorillonitic, thermic

SOIL Series not designated SOIL Nos. S64TX-170-9 LOCATION Montgomery County, Texas

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 64310-64318

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

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)	Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3B2 Cm	Coarse fragments 3B1: 2A2 ≥ 2 (<76) Pct.	2 – 19 Pct. of < 76mm	19 – 76 Pct. of < 76mm
		Pct. of < 2 mm															
0-4	A1	81.7	13.5	4.8	tr	0.5	3.0	39.4	38.8	6.7	6.8	76.6	42.9	1.00	tr	tr	-
4-11	A2	86.0	10.2	3.8	0.1	0.9	4.7	48.6	31.7	5.5	4.7	73.4	54.3	1.00	tr	tr	-
11-17	B21t	35.6	5.9	58.5	tr	0.4	1.9	21.3	12.0	2.3	3.6	30.5	23.6	1.00	tr	tr	-
17-26	B22t	33.6	5.6	60.8	tr	0.3	1.6	19.8	11.9	2.2	3.4	29.6	21.7	1.00	-	-	-
26-38	B31t	49.0	5.6	45.4	tr	0.2	1.2	38.0	9.6	2.3	3.3	36.3	39.4	1.00	-	-	-
38-48	B32t	53.2	5.6	41.2	tr	0.1	3.2	43.2	6.7	1.6	4.0	32.4	46.5	1.00	-	-	-
48-65	IIC1	69.4	3.8	26.8	-	0.1	7.9	56.8	4.6	1.2	2.6	30.0	64.8	1.00	tr	tr	-
65-84	IIC2	73.7	3.4	22.9	-	tr	1.5	64.9	7.3	1.1	2.3	47.7	66.4	1.00	tr	tr	-
84-100+	IIC3	76.5	4.1	19.4	-	0.1	1.5	68.5	6.4	1.2	2.9	44.7	70.1	1.00	tr	tr	-

Depth (in.)	6A1a Organic carbon Pct.	6B2a Nitrogen Pct.	C/N	Carbonate as $CaCO_3$ Pct.	6C2a Ext. iron as Fe Pct.	Bulk density: 4A1f ⅓ bar g/cc	4A1h Oven dry g/cc	4B1 COLE	Water content: Pct.	4B1c ⅓ bar Pct.	4B2 15 bar Pct.	4C1 WRD in/in	pH: 8C1c (1:1) 1N KCl	8C1a (1:1) H_2O
0-4	1.22	0.055	22		0.2								4.0	4.3
4-11	0.13				0.2	1.52	1.50	0.003		4.6	1.6	0.04	4.3	5.2
11-17	0.36	0.053	7		1.5	1.29	1.74	0.105		34.2	22.8	0.15	3.3	4.4
17-26	0.31				1.6	1.35	1.79	0.097		31.7	23.2	0.11	3.3	4.3
26-38	0.16				1.1	1.44	1.78	0.073		25.8	17.0	0.13	3.4	4.3
38-48	0.13				0.8	1.53	1.81	0.057		23.7	15.1	0.13	3.2	4.3
48-65	0.04				0.4	1.68	1.77	0.018		15.0	10.1	0.08	3.3	4.2
65-84	0.04				0.3	1.63	1.73	0.019		16.5	9.3	0.12	3.3	4.2
84-100+	0.04				0.1	1.52	1.59	0.016		15.1	8.0	0.11	3.3	4.2

Depth (in.)	Extractable bases 5B1a: 6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	6H2a Ext. acidity	CEC: 5A3a Sum cations	6G1d Ext. Al	Ratios to clay: CEC Sum	Ext. iron	8D1 15-bar water	8D3 Ca/Mg	Base saturation: 5C3 Sum cations Pct.	5C1 NH_4OAc Pct.
	meq/100 g													
0-4	3.0	1.1	tr	0.2	4.3	4.6	8.9	0.4	1.85	0.04		2.7	48	
4-11	1.1	0.5	tr	tr	1.6	0.9	2.5	0.1	0.66	0.05	0.42		64	
11-17	7.9	7.9	0.2	0.7	16.7	13.6	30.3	6.8	0.52	0.02	0.39	1.0	55	
17-26	6.8	7.7	0.3	0.7	15.5	16.0	31.5	9.2	0.52	0.03	0.38	0.9	49	
26-38	4.3	5.6	0.3	0.5	10.7	14.0	24.7	8.9	0.54	0.02	0.37	0.8	43	
38-48	4.5	6.6	0.4	0.5	12.0	14.2	26.2	10.5	0.64	0.02	0.37	0.7	46	
48-65	3.1	4.5	0.4	0.3	8.3	9.4	17.7	7.4	0.66	0.01	0.38	0.7	47	
65-84	3.3	4.0	0.6	0.3	8.2	7.6	15.8	5.0	0.69	0.01	0.41	0.8	52	
84-100+	3.4	2.4	0.7	0.2	6.7	6.1	12.8	4.3	0.66	0.01	0.41	1.4	52	

Depth (in.)	Clay Fraction Analysis 7A1b-d: Mt.	Chl.	Vm.	Mi.	Int.	Qtz.	Kl. DTA	Gibbsite
	7A2 X-ray						% 7A3	
0-4	xxx						16	
4-11								
11-17								
17-26	xxx						25	
26-38								
38-48								
48-65	xxxx						28	
65-84								
84-100+								

Mt. = Montmorillonite, Chl. = chlorite, Vm. = Vermiculite, mi = mica, int. = interstratified layer, Qtz. = quartz, Kl. = Kaolinite

Relative amounts: blank = not determined, dash = not detected, tr. = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant.

Soil classification: Vertic Hapludalf; fine, montmorillonitic, thermic.
Soil: Series not designated.
Soil Nos.: S64TX-170-9; 64310-64318.
Location: Montgomery County, Texas. 16.0 miles northwest of Conroe, Texas; 40 feet east of FM Road 149 and 6.7 miles north of the intersection of FM 149 and Texas Highway 105 at Montgomery, Texas, which is 15.7 miles west-northwest of the intersection of Texas Highway 105 and U.S. Highway 75 at Conroe, Texas; north part of photo AWU-11W-18.
Vegetation and use: Mixed loblolly and shortleaf pine, and deciduous trees including red oak, sweetgum, white oak and blackgum. Understory of sweetgum, haw, yaupon, hackberry, American beauty berry, flame sumac, wild grape, Virginia creeper, hickory, and winged elm. Some aniolagrass and Panicum sp. Never cultivated.
Topography: Undulating slopes; slope of 3-1/2 percent to the east at pedon site, upper one-third of slope; site is about 1,000 feet from natural intermittent drain; approximately 35 feet higher than natural drain; plane surface. Elevation is about 310 feet above mean sea level.
Drainage and permeability: Somewhat poorly drained. Medium runoff. Very slowly permeable.
Parent material: Acid clays and sandy clays of the geological Fleming Group (Legarto and Oakville, undifferentiated) of Miocene or Pliocene geologic age. These are considered to be continental deposits. The substratum underneath the solum is believed to be less clayey than that from which the soil developed.
Collected by: J. G. Cady, H. Oakes, G. S. McKee, W. R. McClintock, H. A. Moncrief, May 12, 1964.
Described by: G. S. McKee and H. Oakes.

A1 64310 0 to 4 inches. Grayish brown (10YR 5/2) loamy fine sand, dark grayish brown (10YR 4/2) when moist; about the upper inch is darker but apparently caused by fire; structureless; very friable, nonsticky, loose when dry; contains plentiful tree, grass, and shrub roots; pH 5.5; clear boundary.

A2 64311 4 to 11 inches. Very pale brown (10YR 7/3) loamy fine sand, pale brown (10YR 6/3) when moist; structureless; very friable, nonsticky, loose when dry; contains plentiful roots; pH 5.5; clear boundary.

B21t 64312 11 to 17 inches. Prominently mottled red (2.5YR 4/8), light gray (2.5Y 7/2) and brownish yellow (10YR 6/6) clay; moderate medium and fine blocky; very firm, very sticky and plastic, very hard; roots are mainly between peds but some penetrate peds; outsides of peds are shiny and the gloss appears to be a result of pressure rather than clay films; pH 5.0; gradual boundary.

B22t 64313 17 to 26 inches. Prominently and coarsely mottled light gray, red, and some brownish yellow clay (same colors as in layer above); mottles are coarser than those in layer above; moderate medium blocky; very firm, very sticky and plastic; structure not quite as pronounced as in B21t; outsides of peds have shiny pressure faces; common number of tree roots of coarse to fine sizes; this layer has more gray and less red mottles than the B21t; pH 5.0; gradual boundary.

B31t 64314 26 to 38 inches. Light gray (10YR 7/1) sandy clay, gray (10YR 6/1) when moist, with many prominent red mottles and occasional fine brownish yellow mottles; moderate coarse and medium blocky structure; outsides of peds have shiny pressure faces; very firm, very sticky and plastic, very hard; fine tree roots penetrate the peds; pH 5.0; abrupt boundary.

B32t 64315 38 to 48 inches. Same colors as layer above; sandy clay; moderate coarse and medium blocky structure; peds have shiny surfaces, and some clay films; very firm; sticky and plastic; roots penetrate peds; pH 5.0; abrupt boundary.

IIC1 64316 48 to 65 inches. Prominently and coarsely mottled light gray (10YR 7/1) and red (2.5YR 5/8) weakly stratified sandy clay loam, and light sandy clay lenses in the gray portion, and the red part of the soil is heavy fine sandy loam; thin bedded 1/2 to 2 inches, but the red mottles extend across some of the thin beds; has occasional yellowish mottles; tree roots penetrate the mass; weak blocky in upper part, with occasional pressure faces; firm; sticky, and plastic in the gray part and nonplastic in the fine sandy loam part; pH 5.0; diffuse boundary.

IIC2 64317 65 to 84 inches. Similar to above layers in colors, but more coarsely mottled and texture becomes less clayey with depth, probably averaging light sandy clay loam; pH 4.5.

IIC3 64318 84 to 100 inches plus. Prominently and very coarsely mottled light gray (10YR 7/1) and red (2.5YR 5/8) weakly bedded fine sandy loam and loamy fine sand with a few lenses of sandy clay loam (probably averages fine sandy loam); organic stains in crevices and tree roots extend to full depth of the pit; pH 4.5.

Remarks: Colors are for dry soil unless otherwise indicated. The principal adjoining soils are ridgetop of Blanton fine sand and areas of Wicksburg loamy fine sands. Occasional small areas of Garner clay and Houston Black clays also occur as outcrops in the general large area of these soils. It is probable that the clay soils are developed in the Legarto clay geologic formation, described in University of Texas Bulletin No. 3232, Geology of Texas, as being of clayey, calcareous materials, as opposed to the Oakville sands, which lie stratigraphically below the Legarto clay. The two formations are undifferentiated in eastern Texas and comprise most of the Fleming Group. These soils probably developed in the more acid, less clayey Oakville sand. Depth to permanent water table is about 30 to 40 feet. Determinations at the site indicate that the forest site index for loblolly pine is 87 feet for trees of age 50 years. Textures above agree with laboratory data. Field textures where different are given below:

A1 - light fine sandy loam
A2 - light fine sandy loam
B31t - clay

U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Vertic Hapludalf; very fine, montmorillonitic, thermic

SOIL Series not designated SOIL Nos. S64TX-170-10 LOCATION Montgomery County, Texas

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 64319-64327

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

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: Int. III (0.05–0.02)	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3B2 Cm	Coarse fragments 3B1: 2A2 ≥ 2 (<76) Pct.	2 – 19 Pct. of < 76mm	19 – 76 Pct. of < 76mm
		Pct. of < 2 mm															
0-5	A1	81.1	14.7	4.2	0.2	0.8	7.2	49.9	23.0	7.7	7.0	63.1	58.1		tr	tr	-
5-10	A2	80.5	14.8	4.7	0.4	0.8	7.2	48.8	23.3	7.8	7.0	63.5	57.2		tr	tr	-
10-19	B21t	24.2	5.7	70.1	-	0.2	2.3	15.3	6.4	2.2	3.5	18.6	17.8	1.00	-	-	-
19-31	B22t	36.0	5.9	58.1	tr	0.3	2.3	22.9	10.5	2.6	3.3	30.1	25.5	1.00	tr	tr	-
31-41	B31t	48.3	5.5	46.2	-	0.2	2.0	32.8	13.3	1.8	3.7	40.7	35.0	1.00	-	-	-
41-53	B32t	52.6	5.7	41.7	-	0.2	2.5	37.1	12.8	2.1	3.6	40.5	39.8	1.00	-	-	-
53-68	IIC1	63.9	5.4	30.7	tr	0.5	9.4	43.8	10.2	2.1	3.3	34.0	53.7	1.00	tr	tr	-
68-86	IIC2	69.5	4.5	26.0	tr	1.1	14.3	45.4	8.7	1.6	2.9	34.5	60.8	1.00	tr	tr	-
86-122	IIC3	74.7	2.9	22.4	tr	1.2	21.1	45.4	7.0	1.0	1.9	27.9	67.7	1.00	tr	tr	-

Depth (in.)	6A1a Organic carbon Pct.	6B2a Nitrogen Pct	C/N		Carbonate as $CaCO_3$ Pct	6C2a Ext. iron as Fe Pct.	Bulk density: 4A1f ⅓ bar g/cc	Bulk density: 4A1h Oven dry g/cc	4D1 COLE	Water content: 4B1c ⅓ bar Pct.	Water content: 4B2 15 bar Pct.		4C1 WRD in/in		pH: 8C1c (1:1) 1N KCl	pH: 8C1a (1:1) H_2O
0-5	0.80	0.036	22			0.2									4.0	4.2
5-10	0.17					0.2									4.2	4.8
10-19	0.53	0.076	7			1.5	1.21	1.83	0.148	40.1	28.2		0.14		3.3	4.2
19-31	0.32					1.1	1.36	1.86	0.109	31.7	22.3		0.13		3.2	4.4
31-41	0.15					0.7	1.55	1.89	0.067	23.9	17.1		0.10		3.1	4.8
41-53	0.12					0.6	1.57	1.82	0.051	22.1	16.2		0.09		3.2	4.6
53-68	0.10					0.4	1.67	1.91	0.046	20.2	12.6		0.13		3.2	4.8
68-86	0.04					0.2	1.59	1.87	0.055	22.5	11.5		0.17		2.9	4.3
86-122	0.04					0.1	1.62	1.76	0.028	16.5	10.1		0.10		3.0	4.3

Depth (in.)	Extractable bases 5B1a: 6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	6H2a Ext. acidity	CEC: 5A3a Sum cations	6G1d Ext. Al	Ratios to clay 8D1: CEC Sum	Ratios to clay 8D1: Ext. iron	Ratios to clay 8D1: 15-bar water	8D3 Ca/Mg	Base saturation: 5C3 Sum cations Pct.	5C1 NH_4OAc Pct.
	meq/100 g													
0-5	1.6	0.5	0.1	0.1	2.3	3.4	5.7	0.6	1.36	0.05			40	
5-10	1.1	0.4	tr	tr	1.5	1.3	2.8	0.3	0.60	0.04			54	
10-19	7.4	7.5	0.6	0.8	16.3	26.5	42.8	17.1	0.61	0.02	0.40	1.0	38	
19-31	5.9	6.6	0.8	0.6	13.9	18.6	32.5	11.7	0.56	0.02	0.38	0.9	43	
31-41	5.2	5.8	1.1	0.5	12.6	12.0	24.6	7.6	0.53	0.02	0.37	0.9	51	
41-53	5.1	5.6	1.1	0.4	12.2	10.2	24.4	6.1	0.58	0.01	0.39	0.9	50	
53-68	4.4	4.6	1.3	0.3	10.6	6.2	16.8	3.3	0.55	0.01	0.41	1.0	63	
68-86	4.4	3.5	1.6	0.3	9.8	4.5	14.3	2.1	0.55	0.01	0.44	1.2	69	
86-122	4.4	4.4	2.1	0.2	11.1	3.4	14.5	1.1	0.65	-	0.45	1.0	77	

Depth (in.)	Clay Fraction Analysis 7A1b-d: Mt.	Chl.	Vm.	Mi.	Int.	Qtz.	Kl. DTA %	Gibbsite	
	7A2 X-ray						7A3		
0-5	xxx						22		
5-10									
10-19									
19-31	xxxx						30		
31-41									
41-53									
53-68	xxxx						26		
68-86									
86-122									

Mt. = Montmorillonite, Chl. = chlorite, Vm. = Vermiculite, mi = mica, Int. = interstratified layer, Qtz. = quartz, Kl. = Kaolinite

Relative amounts: blank = not determined, dash = not detected, tr. = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant.

Soil classification: Vertic Hapludalf; very fine, montmorillonitic, thermic.
Soil: Series not designated.
Soil Nos.: S64TX-170-10; 64319-64327.
Location: Montgomery County, Texas. About 17 miles northwest of Conroe, Texas. 100 feet east of FM Road 149 and 7.55 miles north of the intersection of FM Road 149 and Texas Highway 105 at Montgomery, Texas, which is 15.7 miles west-northwest of the intersection of Texas Highway 75 at Conroe, Texas; south part of photo AWU-11W-16.
Vegetation and use: Mixed loblolly and shortleaf pine, and deciduous trees including red oak, sweetgum, white oak, and blackgum. Understory of sweetgum, haw, yaupon, hackberry, American beauty berry, flame sumac, wild grape, Virginia creeper, hickory, and winged elm. Some uniolagrass and Panicum sp. Never cultivated, but has been "control burned" in 1961-62.
Topography: Undulating slopes; slope of about 3 percent; plane surface; about middle one-half of slope of about 800 feet toward natural intermittent drain. Elevation about 300 feet.
Drainage and permeability: Somewhat poorly drained. Medium runoff. Very slowly permeable.
Parent material: Acid clays and sandy clays of the Fleming geologic group (Legarto and Oakville, undifferentiated) of Miocene or possibly Pliocene geologic age. These are considered to be continental deposits, and it is believed that these soils developed in the Oakville sand formation. The sandier substratum beneath the solum probably is less clayey than that from which the soil developed.
Collected by: J. G. Cady, H. Oakes, G. S. McKee, W. R. McClintock, H. A. Moncrief, May 13, 1964.
Described by: G. S. McKee and H. Oakes.

A1 64319 0 to 5 inches. Grayish brown (10YR 5/2) loamy fine sand, dark grayish brown (10YR 4/2) when moist; about the upper inch is nearly 1 chip darker, due to burning of the understory about 1961; structureless; very friable; nonsticky, loose; plentiful tree, shrub, and grass roots; pH 5.0; clear boundary.

A2 64320 5 to 10 inches. Very pale brown (10YR 6.5/3) loamy fine sand, brown (10YR 5/3) when moist; structureless; very friable, nonsticky, loose; plentiful tree and shrub roots; contains occasional wormholes and worm casts; pH 5.5; abrupt wavy boundary over crests of the subsoil waves; the crests of the A2 and B21t contact are about 5 inches higher than the contact in the troughs. There is a sandy clay loam B1 horizon about 1-inch thick in the troughs and it is absent over the crests.

B21t 64321 10 to 19 inches. Prominently mottled yellowish red, red, light brownish gray (when moist) clay with a few fine brownish yellow mottles; weak coarse irregular blocky breaking to moderate fine irregular blocky; very firm; very sticky and plastic; contains an occasional very dark brown weakly cemented or incipient iron or ferromanganese concretion about 2-mm diameter; fine ped faces have shiny surfaces; contains plentiful tree and shrub roots; pH 5.0; gradual boundary.

B22t 64322 19 to 31 inches. Light gray (10YR 7/2) clay, light brownish gray (10YR 6/2) moist, with many prominent medium mottles of red and few distinct fine brownish yellow mottles; weak coarse blocky structure breaking to moderate medium blocky, slightly less strong than in layer above; ped faces have shiny surfaces more noticeable in the gray matrix, and appear to be clay films; contains plentiful roots; contains very few fine pores; pH 5.0; gradual boundary.

B31t 64323 31 to 41 inches. Same colors as layer just above; sandy clay; has medium and coarse red mottles of (2.5YR 4/6) and more of the distinct fine brownish yellow mottles; fine nearly clear quartz sand grains can be seen with the naked eye; structure similar to above, but the fine structure is weaker, but still considered to be moderate medium blocky; fewer of the shiny surfaces; very firm, very sticky and plastic, very or extremely hard; contains a few tree roots that seem to penetrate the coarser peds but are mostly between the finer peds; pH 5.5; diffuse boundary.

B32t 64324 41 to 53 inches. Same base color, sandy clay with many coarse prominent red mottles and few faint reddish yellow and yellow mottles; this layer is more clayey in the upper part of the layer and very gradually becomes more of a sandy clay in the lower about one-half of the layer; coarse blocky structure; very firm, sticky and plastic but not as sticky as layer above; contains few tree roots and organic stains between the coarse blocks along tree root channels; pH 5.0.

IIC1 64325 53 to 68 inches. Coarsely splotched or mottled light gray and shades of red and yellow sandy clay loam; weakly bedded with horizontal layers about one-half to three inches thick; dark tree roots are concentrated between the large cleavage planes in both vertical and the horizontal ones; pH 5.0; very firm, sticky, extremely hard when dry; diffuse boundary.

IIC2 64326 68 to 86 inches. White (10YR 8/2) light sandy clay loam with common number of coarse splotches or mottles of light red; slightly cemented or compacted; structureless, and seemingly weakly bedded; has occasional tree roots as in layer above, with dark organic stains along root channels; has occasional white concentrations of SiO_2? of about silt size; from speck size up to 1/2-inch diameter, the specks seem to be more concentrated between cleavage planes but the larger concentrations are imbedded in the soil matrix; pH 5.0; diffuse boundary.

IIC3 64327 86 to 122 inches plus. Same as layer above, but may be slightly more compacted, and vertical cleavage planes make the structure almost coarse prismatic; has fine tree roots, following crevices along cleavage planes; pH 5.0.

Remarks: Colors are for dry soil unless otherwise indicated. The principal adjoining soils are ridge tops of Blanton fine sand and areas of Wicksburg loamy fine sands. Occasional small areas of Garner clay and Ferris clay also occur as outcrops in the general large area of these soils. It is probable that the clay soils are developed in the Legarto clay geologic formation, described in University of Texas Bulletin No. 3232, Geology of Texas, as being of clayey, calcareous materials, as opposed to the Oakville sands, which lie stratigraphically below the Legarto clay. The two formations are undifferentiated in eastern Texas and comprise most of the Fleming Group. These soils probably developed in the more acid, less clayey Oakville sand. Depth to permanent water table is about 30 to 40 feet. Determinations at the site indicate that the forest site index for loblolly pine is 87 feet for trees of age 50 years. Textures above agree with laboratory data. Field textures where different are given below:

A1 - light fine sandy loam
A2 - light fine sandy loam

SOIL CLASSIFICATION- TYPIC PALEUDALF
FINE-LOAMY, SILICEOUS, THERMIC
SERIES - - - - - - - ATTOYAC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S57TX-174-90 COUNTY - - - NACOGDOCHES

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K493-498

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (SAND)								PARTICLE SIZE ANALYSIS (A)					ETHYLENE GLYCOL RETAINED			BULK DEN
		SAND 2-.05	SILT .05-.002	CLAY LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	LT 2 MM	LT .002 MM	LT .0002 MM	4A3A
IN		(PCT LT 2MM)								(PCT LT.002)					(- - MG/G - - -)			G/CC
000-8	AP	60.0	37.7	2.3	1.5	1.9	5.1	39.7	11.4				37	63				
008-14	B21T	42.2	41.1	16.7	0.7	0.9	1.5	18.7	10.4				28	72				
014-29	B22T	33.4	32.6	34.0	0.9	1.0	1.5	22.1	7.9				46	54				
029-44	B22T	41.1	28.9	30.0	2.9	1.7	2.7	26.4	7.4				34	66				
044-53	B23T	50.2	25.9	23.9	10.5	5.0	3.8	25.8	5.2				40	60				
053-72	B24T	42.4	28.6	29.0	3.8	2.8	2.6	26.3	7.0				42	58				

DEPTH	ORGANIC MATTER 6A1A ORGN	6B1A NITG	C/N	IRON 6C3 EXT. FE	RHOS 6S1A TOTL	EXTRACTABLE BASES 5B1A- CA	MG	NA	K	SUM EXTB	CAT EXC CAP 5A2A) LT 2	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO CA 8D3	CARB EQ 6E1E	PH 8C1A 1/1 H20	8C1C 1/2 KCL	8C1E 1/2 CACL
	CARB														TO MG	PCT			
IN	PCT	PCT		PCT	PCT	(- - - - - - - - MEQ / 100G - - - - - - - - -)								PCT					
000-8	0.46			0.3		1.6	0.2	TR	0.3	2.1	3.9	26A	55A	52	8.0		5.8		
008-14	0.35			1.1		3.6	1.0	TR	0.5	5.1	9.1	36A	50A	56	3.6		5.9		
014-29	0.35			2.0		5.3	1.6	TR	1.3	7.2	14.2	38A	48A	58	3.3		6.1		
029-44	0.17			2.4		3.6	1.4	TR	1.3	6.3	13.8	37A	48A	46	2.6		5.9		
044-53	0.23			3.3		2.8	1.6	TR	0.8	5.2	13.2	38A	51A	40	1.8		5.0		
053-72	0.17			4.5		2.6	2.4	TR	0.5	5.5	14.5	44A	56A	38	1.1		4.7		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S57TX-174-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-8	QZ1	QZ1 FD3		KK1 QZ2 MI2 VR3 FD3	KH1 MI3
8-14	QZ1	QZ1 FD3 MI3		KK1 MI2 QZ2 VR3 FD3	KH1 MI3
14-29	QZ1	QZ1 MI3 FD3 KK3		KK1 MI2 QZ2	KH1 MI3
29-44	QZ1	QZ1 MI3 FD3 KK3		KK1 MI2 QZ2	KH1 MI3
44-53	QZ1	QZ1 MI3 KK3		KK1 MI2 QZ2	KH1 MI3
53-72	QZ1	QZ1 MI2 KK3		KK1 MI2 QZ2	KH1 MI2 MT3

RELATIVE ABUNDANCE, 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, VR=VERMICULITE, KH=TABULAR HALLOYSITE.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Typic Paleudalf; fine-loamy, siliceous, thermic.
Soil: Attoyac.
Soil Nos.: 857TX-174-90; K493-498.
Location: Nacogdoches County, Texas. East 0.6 mile from intersection of Highway 7 and Farm Road 1274 in Martinsville on Highway 7, south of highway in cultivated field. Cover: Cultivated to oats.
Topography: Gently sloping ridgetop with a convex slope of 2-1/2 to 3 percent.
Sampled by: L. L. Gordon, June 1957.
Described by: L. L. Gordon.

Ap K493 0 to 8 inches. Brown (7.5YR 5/4; 4/4 moist) fine sandy loam; weak granular to massive; friable, slightly hard dry; few fine pores and fine roots; few very fine ferruginous concretions; clear boundary.

B21t K494 8 to 14 inches. Red (2.5YR 4/6; 3/6 moist) loam becoming light sandy clay in lower portion; weak subangular blocky; friable, hard dry, slightly sticky and plastic wet; common fine and medium pores; few wormcasts and very fine ferruginous concretions.

B22t K495&K496 14 to 44 inches. Red (10R 4/6; 3/6 moist) clay loam; compound weak subangular blocky and angular blocky; few fine and medium pores; few very fine iron concretions becoming more common in lower part; gradual boundary.

B23t K497 44 to 53 inches. Red (2.5YR 5/6; 4/6 moist) sandy clay loam with common distinct medium reddish yellow mottles; weak subangular blocky; friable, hard dry; few fine pores; fine hard iron concretions common; few brownish yellow mottles and soft concretions containing greensand in lower part of horizon; gradual boundary.

B24t K498 53 to 72 inches plus. Mottled red (2.5YR 5/6; 4/6 moist) and brownish yellow (10YR 6/8; 5/8 moist) with some dark red medium mottles (2.5YR 3/6; 2/6, moist) clay loam; massive to weak platy; firm to friable moist, hard dry; small iron concretions 2-8 mm common in upper part to few in lower part; few small lenses of greensand.

Remarks: 1. Pedon was sampled as Magnolia series. The soil is outside the range of the Magnolia series in having base saturation higher than 35 percent and is an Alfisol. In addition, it is of a fine-loamy textural family.

2. Textures above agree with laboratory data. Field textures where different are given below:

B21t - sandy clay loam
B22t - clay loam
B23t - clay
B24t - clay and sandy clay, the sandy clay being chiefly the brownish yellow portion.

SOIL CLASSIFICATION-TYPIC PALEUDALF
COARSE-LOAMY, SILICEOUS, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SERIES - - - - - - -WODEN

SOIL NO - - - - - - S54TX-34-90 COUNTY - - - CASS

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K214-219

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (- - - - - PCT LT 2MM - - - - -) SAND 2-.05	SILT .05-.002	CLAY LT .002	SAND VCOS 2-1	SAND CORS 1-.5	SAND MEDS .5-.25	SAND FNES .25-.10	SAND VFNS .10-.05	PARTICLE SIZE ANALYSIS (PCT LT 2MM) SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	ETHYLENE GLYCOL RETAINED 2 MM	ETHYLENE GLYCOL RETAINED .002 MM	GLYCOL (B) LT .0002 MM	BULK DEN 4A3A G/CC
000-5	A1	79.0	19.0	2.0									60	40	1.3			
005-10	A2	71.8	24.8	3.4														
010-13	B1	66.3	27.1	6.6														
013-33	B21T	56.5	25.5	18.0									29	71	14.6		126	
033-56	B22T	66.1	18.2	15.7														
056-84	B23T	72.1	16.0	11.9									34	66	8.1		98	

DEPTH IN	ORGANIC MATTER 6A1A ORGN PCT	6B1A NITG PCT	C/N CARB	IRON 6C3 EXT FE PCT	PHOS 6S1A TOTL PCT	EXTRACTABLE BASES 5B1A CA 6N2B	MG 6Q2D	NA 6P1A	K 6Q2A	SUM EXTB MEQ/100G	CAT EXC CAP 5A2A LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO CA TO MG 8D3	CA CARB EQ PCT 6E1E	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
000-5	0.23					0.4	0.1	0.1	0.1	0.7	1.5	27A		47	4.0		5.6		
005-10	0.17					0.4	0.1	0.1	0.1	0.7	1.6			44	4.0		5.3		
010-13	0.17					0.9	0.3	0.1	0.2	1.5	3.1			48	3.0		5.3		
013-33	0.17					3.6	1.0	0.1	0.3	4.8	8.5	43A		56	3.6		5.3		
033-56	0.12					2.2	1.0	0.1	0.3	3.6	8.5			42	2.2		5.0		
056-84	0.06					1.1	0.7	0.1	0.2	2.1	4.6	33A		46	1.6		4.9		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S54TX-34-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-5	QZ1	QZ1 FD3		CL2 KK2 QZ2 MI3	KK2 VC2
5-10	QZ1	QZ1 FD3	VC2 KK2 QZ3 MI3		
10-13	QZ1	QZ1 FD3	VC2 KK2 MI2 QZ3		
13-33	QZ1	QZ1 FD3		KK2 CL2 VC2 MI2 QZ2	KK2 VC2
33-56	QZ1	QZ1 FD3	VC2 KK2 MI2 QZ3		
56-84	QZ1	QZ1		KK2 CL2 VC2 MI2 QZ2	KK1 VC2

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, QZ=QUARTZ, VR=VERMICULITE, CL=CHLORITE, VC=CHLORITE-VERMICULITE OR VERMICULITE-CHLORITE INTERSTRATIFIED.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Typic Paleudalf; coarse-loamy, siliceous, thermic.
Soil: Woden loamy fine sand.
Soil Nos.: S54TX-34-90; K214-219.
Location: Cass County, Texas. 2.2 miles northeast of Atlanta, along Farm Road 251, 200 feet north of the road. Cover: Pine with some grass.
Topography: Convex surface with gradient of 2-1/2 percent.
Sampled by: I. C. Mowery, March 1954.
Described by: I. C. Mowery.

A1 K214 0 to 5 inches. Very pale brown (10YR 7/3; 5/3 when moist) loamy fine sand; structureless; very friable, loose;grass and tree roots moderately numerous; gradual smooth boundary.

A2 K215 5 to 10 inches. Very pale brown (10YR 8/3; 5.5/3 when moist) fine sandy loam; structureless; very friable, loose; grass and tree roots moderately numerous; clear smooth boundary.

B1 K216 10 to 13 inches. Strong brown (7.5YR 5/6; 4/6 when moist) fine sandy loam mottled with pale brown (10YR 6/3; 5/3, when moist); weak fine subangular blocky structure; crumbly and friable, hard; tree and grass roots less abundant; gradual smooth boundary.

B21t K217 13 to 33 inches. Yellowish red (6YR 5/8; 4/8 when moist) fine sandy loam; weak medium blocky; friable, hard, slightly sticky; porous; tree roots few; gradual smooth boundary.

B22t K218 33 to 56 inches. Reddish yellow (7.5YR 6/8; 5/8 when moist) fine sandy loam; weak medium subangular blocky structure; friable, hard; gradual smooth boundary.

B23t K219 56 to 84 inches plus. Mottled reddish yellow (5YR 6/6) and (7.5YR 6/6) very pale brown (10YR 7/3) and light gray (10YR 7/2) fine sandy loam. The gray seems to be heavier and stickier. The mottles merge or blend into one another. Weak coarse subangular blocky; friable, hard; uncoated sand grains of very pale brown (10YR 7/3).

Remarks: 1. Pedon was sampled as Ruston series. The soil is outside the range of the Ruston series in being coarse-loamy and in having base saturation of more than 35 percent at 1.25 meters below the top of the Argillic horizon.

2. Textures above agree with laboratory data. Field textures where different are given below:

A2 - loamy fine sand
B21t - sandy clay loam
B22t - heavy fine sandy loam

SOIL CLASSIFICATION-TYPIC PALEUDALF
COARSE-LOAMY, SILICEOUS, THERMIC
SERIES - - - - - - -WOODEN

TEXAS AGRICULTURAL
EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S54TX-34-91 COUNTY - - - CASS

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K220-225

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (PCT LT 2MM) SAND 2-.05	SILT .05-.002	CLAY LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	PARTICLE SIZE (A) SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	(ETHYLENE GLYCOL) RETAINED (B) LT 2 MM	LT .002 MM	LT .0002 MM	BULK DEN 4A3A G/CC
000-6	AP	72.9	24.6	2.5									60	40	1.9		111	
006-11	A2	66.9	28.9	4.2														
011-23	B1T	59.2	30.9	9.9														
023-41	B21T	58.4	28.8	12.8									30	70	10.2		132	
041-63	B22T	66.6	25.7	7.7														
063-90	B23T	74.3	9.0	16.7									46	54	7.0		102	

DEPTH IN	ORGANIC MATTER 6A1A ORGN PCT	6B1A NITG PCT	C/N	IRON 6C3 EXT FE PCT	PHOS 6S1A TOTL PCT	EXTRACTABLE BASES 5B1A (MEQ / 100G) CA	MG	NA	K	SUM EXTB	CAT EXC CAP 5A2A) 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO CA TO MG	CA CARB EQ 6E1E PCT	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
000-6	0.46					0.8	0.2	0.1	0.2	1.3	2.4	36A		54	4.0		5.7		
006-11	0.23					0.6	0.2	0.1	0.2	1.1	2.2			50	3.0		5.4		
011-23	0.12					1.2	0.3	0.1	0.2	1.8	3.9			46	4.0		5.2		
023-41	0.12					1.4	0.8	0.1	0.3	2.6	6.0	49A		43	1.8		4.8		
041-63	0.06					0.6	0.5	0.1	0.2	1.4	3.7			38	1.2		4.7		
063-90	0.12					0.3	1.2	0.1	0.3	1.9	5.2	32A		37	0.3		4.6		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S54TX-34-91

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-6	QZ1	QZ1 MI3 FD3		CL2 KK2 QZ2 MI2	KK2 VC2
6-11	QZ1	QZ1 FD3	VC2 KK2 QZ2 MI3		
11-23	QZ1	QZ1 FD3	VC2 KK2 MI3 QZ3		
23-41	QZ1	QZ1 MI3 FD3		KK2 CL2 MI2 VC2 QZ3	KK2 VR2
41-63	QZ1	QZ1 MI3 FD3	VC2 KK2 MI2 QZ3		
63-90	QZ1 FD3	QZ1 MI2 KK2 FD3		KK1 MI2 QZ2	KK1 VR2

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, QZ=QUARTZ, VR=VERMICULITE, CL=CHLORITE, VC=CHLORITE-VERMICULITE OR VERMICULITE-CHLORITE INTERSTRATIFIED.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Typic Paleudalf; coarse-loamy, siliceous, thermic.
Soil: Woden loamy fine sand.
Soil Nos.: S54TX-34-91; K220-225.
Location: Cass County, Texas. Four miles east-northeast of Linden, along private road to house, 650 feet south of intersection of private road and county road 200 yards east of T County Road to the north. Cover: Annual weeds and grasses.
Topography: Gently sloping upland with convex surface and gradient of 1-1/2 percent.
Sampled by: I. C. Mowery, March 1954.
Described by: I. C. Mowery.

Ap K220 0 to 6 inches. Pale brown (10YR 6/3; 5/3 when moist) loamy fine sand; structureless; very friable, soft; grass roots moderately abundant; clear smooth boundary.

A2 K221 6 to 11 inches. Very pale brown (10YR 7/3; 6/4 when moist) fine sandy loam; structureless; very friable, soft; porous; grass roots moderately abundant; clear smooth boundary.

B1t K222 11 to 23 inches. Reddish yellow (7.5YR 6/6; 5/6 when moist) fine sandy loam; with few fine very pale brown (10YR 7/3) mottles; weak fine subangular blocky structure; friable, slightly hard; roots few; wormcasts few; gradual smooth boundary.

B21t K223 23 to 41 inches. Reddish yellow (5YR 6/6; 5/6 when moist) fine sandy loam; weak medium subangular blocky structure; very crumbly and friable, slightly hard; grass roots few; gradual smooth boundary.

B22t K224 41 to 63 inches. Reddish yellow (7YR 6/6; 5/6 when moist) fine sandy loam; weak medium subangular blocky structure; friable, slightly hard; contains uncoated sand grains; gradual smooth boundary.

B23t K225 63 to 90 inches plus. Yellowish red (5YR 5/6; 6/6 when moist) fine sandy loam mottled with reddish yellow; light yellowish brown, and streaked with gray which is a sandy clay; weak coarse angular blocky structure; friable; uncoated sand grains.

Remarks: 1. Pedon was sampled as Ruston series. This soil is outside the range of the Ruston series in being coarse-loamy and in having base saturation of more than 35 percent at 1.25 meters below the top of the Argillic horizon.

2. Textures above agree with laboratory data. Field textures where different are given below:

Ap - fine sandy loam
B1t - heavy fine sandy loam
B21t - sandy clay loam
B23t - heavy fine sandy loam

SOIL CLASSIFICATION-TYPIC PALEUDALF
COARSE-LOAMY, SILICEOUS, THERMIC
SERIES - - - - - - -WODEN

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S54TX-37-92 COUNTY - - - CHEROKEE

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K233-240

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (- - - - - - PCT LT 2MM - - - - - -) SAND 2-.05	SILT .05-.002	CLAY LT .002	SAND VCOS 2-1	SAND CORS 1-.5	SAND MEDS .5-.25	SAND FNES .25-.10	SAND VFNS .10-.05	SILT 2-.05	CLAY .05-.002	CLAY LT .002	PARTICLE SIZE ANALYSIS (PCT LT.002) CRSE CLAY .002-.0002	FINE CLAY LT .0002	(A) ETHYLENE GLYCOL RETAINED (- - MG/G - - -) LT 2 MM	LT .002 MM	(B) GLYCOL LT .0002 MM	BULK DEN 4A3A G/CC
000-7	AP	72.6	23.2	4.2									52	48	2.9			
007-18	A2	68.3	25.0	6.7														
018-26	B1	66.8	23.9	9.3														
026-43	B21T	64.5	22.5	13.0									39	61	9.2		121	
043-66	B22T	70.1	16.7	13.2														
066-88	B23T	80.0	10.3	9.7														
088-104	B3	73.8	11.2	15.0														
104-121	C	68.9	16.3	14.8									28	72	9.7		113	

DEPTH IN	6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	6C3 EXT FE PCT	6S1A TOTL PCT	(- -EXTRACTABLE BASES 5B1A- -) 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO CA 8D3 TO MG	CARB 6E1E PCT	(- - - PH - - -) 8C1A 1/1 H20	8C1C 1/2 KCL	8C1E 1/2 CACL
						(- - - - - - - - MEQ / 100G - - - - - - - -)													
000-7	0.29					0.9	0.1	0.1	0.3	1.4	3.0	22A		47	9.0		5.9		
007-18	0.12					1.2	0.2	0.1	0.3	1.8	3.3			55	6.0		6.0		
018-26	0.12					1.6	0.4	0.1	0.3	2.4	3.7			65	4.0		5.9		
026-43	0.06					2.0	0.9	0.1	0.3	3.3	5.4	41A		61	2.2		5.5		
043-66	0.06					2.1	0.8	0.1	0.3	3.3	6.5			51	2.6		5.6		
066-88	0.06					1.5	0.6	0.1	0.2	2.4	5.0			48	2.5		6.0		
088-104	0.12					2.1	1.3	0.1	0.3	3.8	6.7			57	1.6		5.5		
104-121	0.06					1.8	1.0	0.1	0.2	3.1	5.2	32A		60	1.8		5.2		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S54TX-37-92

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-7	QZ1	QZ1 FD3		KK2 MI2 QZ2 VM3	VR2 KK2
7-18	QZ1	QZ1 FD3	KK2 MI2 VR2 QZ2		
18-26	QZ1	QZ1 FD3 MI3	KK2 MI2 VR2 QZ3		
26-43	QZ1	QZ1 MI3 FD3		KK2 MI2 QZ2 VR2	VR2 KK2
43-66	QZ1	QZ1 MI3	MI2 KK2 QZ3		
66-88	QZ1 FD3	QZ1 MI3 KK3 FD3	KK2 MI2 QZ3		
88-104	QZ1	QZ1 FD3 MI3 KK3	KK2 MI2		
104-121	QZ1	QZ1 MI3 KK3 FD3		KK1 MI2 QZ2 VR2	KK1 VR2

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, QZ=QUARTZ, VR=VERMICULITE, VH=VERMICULITE-ILLITE OR ILLITE-VERMICULITE INTERSTRATIFIED.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Typic Paleudalf; coarse-loamy, siliceous, thermic.
Soil: Woden fine sandy loam.
Soil Nos.: S54TX-37-92; K233-240.
Location: Cherokee County, Texas. Four miles north of Jacksonville and 1/4 mile west of Enterprise school. Cover: Abandoned field now being grazed.
Topography: Convex surface with gradient of 1-1/2 percent.
Sampled by: I. C. Mowery, May 1954.
Described by: I. C. Mowery

Ap K233 0 to 7 inches. Light brown (7.5YR 6/4; 4/4 when moist) fine sandy loam; structureless; very friable, loose, occasional small ferruginous concretions and small fragments of laterite; clear smooth boundary.

A2 K234 7 to 18 inches. Light reddish brown (5YR 6/5; 4/5 when moist) fine sandy loam; structureless; friable, slightly hard; few small ferruginous concretions; gradual smooth boundary.

B1 K235 18 to 26 inches. Reddish yellow (5YR 6/6; 4/6 when moist) fine sandy loam; weak subangular blocky structure; friable, slightly hard; fine pores; permeable; few small ferruginous concretions; gradual smooth boundary.

B21t K236 26 to 43 inches. Yellowish red (5YR 5/8; 4/8 when moist) fine sandy loam; weak medium subangular blocky structure; friable, hard, permeable; few ferruginous pebbles; diffuse smooth boundary.

B22t K237 43 to 66 inches. Yellowish red (5YR 5/8; 4/8 when moist) fine sandy loam; weak medium subangular blocky structure; friable; hard; permeable; few ferruginous pebbles; gradual smooth boundary.

B23t K238 66 to 88 inches. Strong brown (7.5YR 5/8; 4/8 when moist) loamy fine sand; mottled with reddish yellow (7.5YR 6/8; 5/8 when moist), and has a few small very pale brown spots with uncoated sand grains; weak medium subangular blocky structure; friable, slightly hard; ferruginous pebbles slightly more numerous; gradual smooth boundary.

B3 K239 88 to 104 inches. Strong brown (7.5YR 5/8; 4/8 when moist) fine sandy loam mottled with yellowish red (5YR 5/8; 4/8 when moist); weak coarse angular blocky; friable, slightly hard; ferruginous pebbles slightly more numerous; gradual smooth boundary.

C K240 104 to 121 inches. Mottled brownish yellow (10YR 6/6; 5/6 when moist) and strong brown (7.5YR 5/8; 4/8 when moist) fine sandy loam weakly stratified with sandy clay loam.

Remarks: 1. Pedon was sampled as Ruston series. This soil is outside the range of the Ruston series in being coarse-loamy and in having base saturation of more than 35 percent at 1.25 meters below the top of the Argillic horizon.

2. Textures above agree with laboratory data. Field textures where different are given below:

Ap - loamy fine sand
B21t - sandy clay loam
B22t - sandy clay loam
B23t - fine sandy loam

SOIL CLASSIFICATION-TYPIC PALEUDALF
COARSE-LOAMY, SILICEOUS, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION

SERIES - - - - - - -WODEN

COLLEGE STATION, TEXAS

SOIL NO - - - - - - S54TX-37-93 COUNTY - - - CHEROKEE

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K241-248

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1									PARTICLE SIZE ANALYSIS (A)			ETHYLENE GLYCOL RETAINED (B)		BULK DEN
					(SAND)											
		SAND	SILT	CLAY	VCOS	CORS	MEDS	FNES	VFNS	SAND	SILT	CLAY	CRSE CLAY	FINE CLAY	LT	LT	4A3A
		2-.05	.05-.002	LT .002	2-1	1-.5	.5-.25	.25-.10	.10-.05	2-.05	.05-.002	LT .002	.002-.0002	LT .0002	2 MM	.002 MM	.0002 MM	
IN		(PCT LT 2MM											(PCT LT.002)		(MG/G)			G/CC
000-5	AP	68.9	27.7	3.4									59	41	1.8		104	
005-10	A2	63.3	31.6	5.1														
010-14	B1	58.9	34.0	7.1														
014-37	B21T	53.5	28.4	18.1									34	66	12.5		120	
037-61	B22T	53.8	24.3	21.9														
061-74	B23T	55.1	25.6	19.3														
074-100	B24T	56.4	25.6	18.0														
100-120	B25	59.5	25.9	14.6									33	67	10.0		111	

DEPTH	ORGANIC MATTER 1		IRON	PHOS	EXTRACTABLE BASES 5B1A					CAT EXC CAP 5A2A1			BASE SAT	RATIO CA	CA CARB	PH		
	6A1A ORGN CARB	6B1A NITG	C/N	6C3 EXT FE	6S1A TOTL	6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	LT 2 MM	LT .002 MM	LT .0002 MM	8D3 SC2	8D3 CA TO	EQ 6E1E	8C1A 1/1 H20	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	(MEQ / 100G)								PCT	MG	PCT			
000-5	0.52					1.2	0.3	0.1	0.3	1.9	2.7	30A		70	4.0		6.3		
005-10	0.23					1.0	0.2	0.1	0.2	1.5	2.4			63	5.0		6.2		
010-14	0.17					1.0	0.3	0.1	0.2	1.6	2.7			59	3.3		5.9		
014-37	0.12					2.9	1.1	0.1	0.3	4.4	7.3	34A		60	2.6		5.6		
037-61	0.06					2.1	1.2	0.2	0.2	3.7	8.5			44	1.8		4.9		
061-74	0.06					1.7	1.0	0.2	0.3	3.2	7.4			43	1.7		4.9		
074-100	0.12					1.6	1.4	0.2	0.2	3.4	6.3			54	1.1		4.9		
100-120	0.06					1.1	1.3	0.1	0.2	2.7	5.4	30A		50	0.8		4.9		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S54TX-37-93

DEPTH	SAND	SILT	CLAY	COARSE CLAY	FINE CLAY
INCHES	2 - 0.05MM	0.05 - 0.002MM	LESS THAN 0.002MM	0.002 - 0.0002MM	LT 0.0002MM
0-5	QZ1 FD3	QZ1 FD3	MI2 KK2 QZ2	MI2 KK2 QZ2	KK2 VR2
5-10	QZ1	QZ1 FD3	MI2 KK2 QZ3		
10-14	QZ1	QZ1 FD3	MI2 KK2 QZ3		
14-37	QZ1	QZ1 FD3		MI2 KK2 QZ2	KK2 VR2
37-61	QZ1	QZ1 FD3 MI3	MI2 KK2 QZ3		
61-74	QZ1	QZ1 MI3 FD3	MI2 KK2 QZ3		
74-100	QZ1	QZ1 MI3 KK3 FD3	KK2 MI2 QZ3		
100-120	QZ1	QZ1 MI3 FD3		MI2 KK2 QZ2	KK2 VR2

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT. 2 = 10 - 40 PCT. 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, QZ=QUARTZ, VR=VERMICULITE.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Typic Paleudalf; coarse-loamy, siliceous, thermic.
Soil: Woden fine sandy loam.
Soil Nos.: S54TX-37-93; K241-248.
Location: Cherokee County, Texas; 9.2 miles north of Jacksonville and 1.4 miles northwest of Mixon.
Cover: Abandoned field in weeds and grasses.
Topography: Surface gradient of 2 percent.
Sampled by I. C. Mowery, May 1954.
Described by: I. C. Mowery.

Ap K241 0 to 5 inches. Very pale brown (10YR 7/4; 5/4 when moist) fine sandy loam; structureless; very friable, soft; clear smooth bounday.

A2 K242 5 to 10 inches. Very pale brown (10YR 7/3; 5/3 when moist) fine sandy loam; structureless; friable, soft; porous; gradual smooth boundary.

B1 K243 10 to 14 inches. Mottled reddish yellow (5YR 6/8; 5/8 when moist) and very pale brown (10YR 7/3; 5/3 when moist) heavy fine sandy loam; weak fine subangular blocky structure; friable, slightly hard; gradual smooth boundary.

B21t K244 14 to 37 inches. Yellowish red (5YR 5/8; 4/8 when moist) fine sandy loam; weak medium subangular blocky structure; friable, and crumbly, slightly sticky, hard; permeable; pore spaces noticeable; diffuse smooth boundary.

B22t K245 37 to 61 inches. Yellowish red (5YR 5/7; 4/7 when moist) sandy clay loam; weak medium subangular blocky structure; friable, hard, slightly sticky; gradual smooth boundary.

B23t K246 61 to 74 inches. Mottled yellowish red (7.5YR 5/8; 4/8 when moist) and brownish yellow (10YR 6/6; 5/6 when moist) fine sandy loam; weak medium angular blocky; friable, slightly hard; porous; gradual smooth boundary.

B24t K247 74 to 100 inches. Mottled reddish yellow (5YR 6/8; 5/8 when moist) and brownish yellow (10YR 6/6; 5/6 when moist), fine sandy loam; weak coarse angular blocky structure; friable, slightly hard; few fine pores; gradual smooth boundary.

B25 K248 100 to 120 inches plus. Brownish yellow (10YR 6/6; 5/6 when moist) fine sandy loam mottled with white (10YR 8/2; 7/2 when moist) and reddish yellow (7.5YR 6/6; 5/6 when moist); massive; friable, slightly hard.

Remarks: 1. Pedon was sampled as Ruston series. This soil is outside the range of the Ruston series in being coarse-loamy and in having base saturation of more than 35 percent at 1.25 meters below the top of the argillic horizon.

2. Textures above agree with laboratory data. Field textures where different are given below:

B21t - sandy clay loam
B23t - light sandy clay loam
B24t - heavy fine sandy loam
B25 - heavy fine sandy loam

SOIL CLASSIFICATION-AQUIC PALEUDALF
FINE-LOAMY, SILICEOUS, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SERIES - - - - - - -KATY

SOIL NO - - - - - - S55TX-79-93 COUNTY - - - FORT BEND

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K305-311

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1								PARTICLE SIZE ANALYSIS (B)				ETHYLENE GLYCOL RETAINED			BULK DEN
		(- - - - - - SAND - - - - - -)															
		SAND	SILT	CLAY	VCOS	CORS	MEDS	FNES	VFNS	SAND	SILT	CLAY	CRSE CLAY	FINE CLAY	LT	LT	LT	
		2-	.05-	LT	2-	1-	.5-	.25-	.10-	2-	.05-	LT	.002-	LT	2	.002	.0002	
		.05	.002	.002	1	.5	.25	.10	.05	.05	.002	.002	.0002	.0002	MM	MM	MM	
IN		(- - - - - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - - - - -)								(PCT LT.002)				(- - MG/G - - -)			G/CC
000-12	A1	54.5	39.1	6.4			1.9A	30.7	21.9				53	47				
012-25	A2	53.8	37.7	8.5			1.6A	29.8	22.4				45	55				
025-28	B21T	39.0	24.7	36.4			1.1A	19.8	18.1				17	83				
028-46	B22T	47.0	29.0	24.0			1.3A	23.7	22.0				23	77				
046-64	B23T	38.7	27.3	34.1			0.9A	19.3	18.5				15	85				
064-84	B24T	41.6	26.3	32.2			0.8A	20.5	20.3				17	83				
084-110	B25T	38.7	29.0	32.4			0.7A	16.9	21.1				18	82				

DEPTH	ORGANIC MATTER			IRON	PHOS	(- -EXTRACTABLE BASES 5B1A- -)					CAT EXC CAP			BASE	RATIO	CA	PH		
	6A1A	6B1A	C/N	6C3	6S1A	6N2E	6O2D	6P1A	6Q2A		LT	LT	LT	SAT	8D3	CARB	8C1A	8C1C	8C1E
	ORGN	NITG		EXT	TOTL	CA	MG	NA	K	SUM	2	.002	.0002	5C2	CA	EQ	1/1	1/2	1/2
	CARB			FE						EXTB	MM	MM	MM		TO	6E1E	H20	KCL	CACL
IN	PCT	PCT		PCT	PCT	(- - - - - - - - MEQ / 100G - - - - - - - -)								PCT	MG	PCT			
000-12	0.64					1.1	0.5	0.2	TR	1.8	3.6	31B	69B	51	2.2		5.1		
012-25	0.29					0.9	0.4	0.2	TR	1.5	3.5	42B	63B	44	2.3		5.0		
025-28	0.46					5.8	4.5	1.8	0.2	12.3	16.7	61B	57B	74	1.3		5.8		
028-46	0.52					2.9	2.1	0.7	0.1	5.8	10.1	55B	60B	57	1.4		5.1		
046-64	0.23					6.6	4.7	2.8	0.2	14.3	17.5	58B	60B	83	1.4		6.9		
064-84	0.12					5.3	4.2	2.7	0.1	12.3	15.9	55B	57B	77	1.3		7.4		
084-110	0.12					6.5	4.9	3.3	0.2	14.9	16.9	63B	59B	88	1.3		7.5		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S55TX-79-93

DEPTH	SAND	SILT	CLAY	COARSE CLAY	FINE CLAY
INCHES	2 - 0.05MM	0.05 - 0.002MM	LESS THAN 0.002MM	0.002 - 0.0002MM	LT 0.0002MM
0-12	QZ1	QZ1		QZ1 KK3	KH1 AS3
12-25	QZ1	QZ1		QZ1 KK3 MI3	KH1 AS3
25-28	QZ1	QZ1		QZ1 KK2 MI3	KH1 AS3
28-46	QZ1	QZ1		QZ1 KK2 MI3	KH1 AS3
46-64	QZ1	QZ1		QZ1 KK2	KH1 AS3
64-84	QZ1	QZ1 FD3		QZ1 KK2	KH1 AS3
84-110+	QZ1	QZ1 FD3		QZ1 KK2	KH1 AS3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, QZ=QUARTZ, H=TABULAR HALLOYSITE, AS=AMORPHOUS MATERIAL WHICH GIVES A 10.6A PEAK WITH K SATURATION.

(A) THE VERY COARSE, COARSE, AND MEDIUM SAND FRACTIONS HAVE BEEN COMBINED.
(B) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Aquic Paleudalf; fine-loamy, siliceous, thermic.
Soil: Katy fine sandy loam.
Soil Nos.: S55TX-79-93; K305-311.
Location: Fort Bend County, Texas. Nine and a half miles north of Rosenberg; 3.3 miles east of Fulshear; 100 yards northeast of railroad crossing at Flewellen siding. Cover: Brown-seeded paspalum, little bluestem, and panicum.
Topography: Nearly level upland with numerous small depressions.
Sampled by: I. C. Mowery, May 1955.
Described by: I. C. Mowery.

A1 K305 0 to 12 inches. Light brownish gray (10YR 6/2; 5/2 when moist) fine sandy loam with a few fine dark brown spots; structureless;porous; very friable when moist, soft when dry; pH 5.5; grass roots abundant; gradual smooth boundary.

A2 K306 12 to 25 inches. Very pale brown (10YR 7/3; 6/3 when moist) fine sandy loam with a few fine brownish yellow spots; structureless; porous; very friable when moist; soft when dry; pH 5.5; grass roots less numerous; gradual wavy boundary (2-1/2 inch transition).

B21t K307 25 to 28 inches. Transition.

B22t K308 28 to 46 inches. Mottled light gray (10YR 7/2; 6/2 when moist), light brownish gray (10YR 6/2; 5/2 when moist), yellowish brown (10YR 5/6; 4/6 when moist) and red (2.5YR 4/8; same moist) loam; moderate medium blocky in upper part and weak medium blocky in lower part; very firm when moist, sticky and plastic when wet, very hard when dry; grass roots are moderate in number and are more numerous in cleavages; sand grains are noticeable; pH 6.3; diffuse wavy boundary.

B23t K309 46 to 64 inches. Color same as horizon above, but clay loam texture and with more red mottling; weak medium blocky; consistence same as horizon above; pH 7.5; very few roots; gradual wavy boundary.

B24t K310 64 to 84 inches. Mottled very pale brown (10YR 7/3; 6/3 when moist), brownish yellow (10YR 6/6; 5/6 when moist), gray (10YR 6/1; 5/1 when moist) and red (2.5YR 5/8; 4/8 when moist) clay loam; weak coarse blocky; very firm, very sticky; pH 7.7; continues through next layer.

B25t K311 84 to 110 inches plus. Same as above.

Remarks: 1. Soil has appreciable tabular Halloysite in the clay fraction.

2. Textures above agree with laboratory data. Field textures where different are given below:

B22t - clay
B24t - sandy clay
B25t - sandy clay

SOIL CLASSIFICATION-GROSSARENIC PALEUDALF
LOAMY, SILICEOUS, THERMIC

SERIES - - - - - - -KENNEY

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S54TX-37-90 COUNTY - - - CHEROKEE

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K226-232

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (SAND)									PARTICLE SIZE ANALYSIS			(A) (ETHYLENE GLYCOL) RETAINED			BULK DEN
		SAND 2- .05 MM	SILT .05- .002 MM	CLAY LT .002 MM	VCOS 2- 1 MM	CORS 1- .5 MM	MEDS .5- .25 MM	FNES .25- .10 MM	VFNS .10- .05 MM	SAND 2- .05 MM	SILT .05- .002 MM	CLAY LT .002 MM	CRSE CLAY .002- .0002 MM	FINE CLAY LT .0002 MM	LT 2 MM	.002 MM	LT .0002 MM	4A3A
IN		(- - - - - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - - - - -)											(PCT LT.002)		(- - MG/G - - -)			G/CC
000-14	AP	86.7	11.3	2.0									65	35	1.4		125	
014-31	A21	85.7	11.8	2.5														
031-48	A22	86.7	11.6	1.7														
048-66	A23	88.2	10.9	0.9									78	22				
066-88	B21T												35	65	0.8			
088-112	B22T	71.4	14.6	14.0											11.5		116	
112-128	C	68.8	12.5	18.7														

DEPTH	ORGANIC MATTER 6A1A ORGN	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	EXTRACTABLE BASES 5B1A CA	MG	NA	K	SUM	CAT EXC CAP 5A2A1 LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO CA MG	CA CARB EQ 6E1E TO	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	(- - - - - - - - - - MEQ / 100G - - - - - - - - - -)								PCT		PCT			
000-14	0.23					0.8	0.2	TR	0.2	1.2	2.1	25A		57	4.0		5.9		
014-31	0.06					0.7	0.2	TR	0.2	1.1	1.6			69	3.5		6.2		
031-48	0.06					0.5	0.1	0.1	0.1	0.8	1.1			73	5.0		6.3		
048-66	0.06					0.4	TR	TR	0.2	0.6	0.9			67			6.6		
066-88	0.06					3.8	0.1	0.1	0.3	4.3	8.4	17A		51	38.0		5.7		
088-112	0.06					2.6	0.6	0.1	0.3	3.6	5.5	43A		65	4.3		5.7		
112-128	0.06					2.8	1.0	0.1	0.3	4.2	7.1			59	2.8		5.3		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A1) S54TX-37-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-14	QZ1 FD3	QZ1 FD3		KK2 VC2 QZ2 MI2	VC1 KK2
14-31	QZ1	QZ1 FD3 MI3	KK2 MI2 QZ2 VC2		
31-48	QZ1 FD3	QZ1 FD3	KK2 MI2 QZ2		
48-66	QZ1	QZ1 FD3 MI3		KK2 QZ2 MI2 VC2	VC1 KK1
66-88	QZ1	QZ1 MI3 FD3 KK3		KK1 MI2 QZ2 VC2	VR1 KK1
88-112	QZ1	QZ1 FD3 MI3 KK3	KK2 MI2 QZ2		
112-128	QZ1	QZ1 FD3 MI3 KK3	KK2 MI2 QZ2		

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, QZ=QUARTZ, VR=VERMICULITE, VC=CHLORITE-VERMICULITE OR VERMICULITE-CHLORITE INTERSTRATIFIED.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Grossarenic Paleudalf; loamy, siliceous, thermic.
Soil: Kenney fine sand.
Soil Nos.: S54TX-37-90; K226-232.
Location: Cherokee County, Texas. Seven miles northwest of Jacksonville and 1.2 miles southeast of Reese, 0.3 mile southeast of road corner (west and north). Cover: Abandoned field, formerly cultivated.
Topography: Convex surface with gradient of 1-1/2 percent.
Sampled by: I. C. Mowery, May 1954.
Described by: I. C. Mowery.

Ap K226 0 to 14 inches. Pale brown (10YR 6/3; 4/3 when moist) fine sand; single grain; very friable, loose; abrupt smooth boundary.

A21 K227 14 to 31 inches. Very pale brown (10YR 7/3; 5/3 when moist) loamy fine sand; single grain; very friable, loose; continuous through next horizon.

A22 K228 31 to 48 inches. Very pale brown (10YR 7/3; 5/3 when moist) fine sand; single grain; very friable, loose; continuous through next horizon.

A23 K229 48 to 66 inches. Very pale brown (10YR 7/3; 5/3 when moist) fine sand; single grain; very friable, loose; clear smooth boundary.

B21t K230 66 to 88 inches. Mottled yellowish red (5YR 4/6; 3/6 when moist) and reddish yellow (5YR 6/6; 5/6 when moist) fine sandy loam with a few light brown spots; weak coarse angular blocky structure; friable, hard, porous; gradual smooth boundary.

B22t K231 88 to 112 inches. Mottled reddish yellow (5YR 6/6; 5/6 when moist) and strong brown (7.5YR 5/6; 4/6 when moist) fine sandy loam; weak coarse angular blocky structure; friable, slightly hard, porous; gradual smooth boundary.

C K232 112 to 128 inches. Yellowish red (5YR 5/6; 4/6 when moist) heavy fine sandy loam mottled with very pale brown (10YR 7/3; 6/3 when moist).

Remarks: 1. Pedon sampled as Lakeland loamy fine sand. The soil is outside the range of the Lakeland series in having an argillic horizon within 80 inches of the surface and having a base saturation of more than 35 percent in the upper 20 inches of the argillic horizon.

2. Textures above agree with laboratory data. Field textures where different are given below:

Ap - loamy fine sand
A22 - loamy fine sand
A23 - loamy fine sand
B21t - sandy clay loam
B22t - heavy fine sandy loam

SOIL CLASSIFICATION-GROSSARENIC PALEUDALF
LOAMY, SILICEOUS, THERMIC
SERIES - - - - - - -KENNEY

TEXAS AGRICULTURAL
EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S54TX-37-91 COUNTY - - - CHEROKEE

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K249-254

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (SAND) SAND								PARTICLE SIZE ANALYSIS (A)				(ETHYLENE GLYCOL) RETAINED (B)		BULK DEN
		2-.05	.05-.002	CLAY LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	LT 2 MM	LT .002 MM	LT .0002 MM	4A3A
IN		PCT LT 2MM								PCT LT.002)					MG/G			G/CC
000-8	AP	86.6	11.7	1.7									64	36	1.1			
008-25	A21	80.8	16.6	2.6														
025-42	A22	81.0	15.9	3.1														
042-48	B21T	75.6	15.0	9.4									54	46	5.0		135	
048-68	B22T	69.0	11.9	19.0														
068-96	B23T	60.9	9.2	29.9									30	70	18.4		98	

DEPTH	ORGANIC MATTER 6A1A ORGN CARB	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	EXTRACTABLE BASES 5B1A CA	MG	NA	K	SUM EXTR	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO CA 8D3 CARB TO	CA CARB EQ 6E1E	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	MEQ / 100G								PCT	MG	PCT			
000-8	0.12					0.7	0.1	0.1	0.1	1.0	1.5			67	7.0		6.1		
008-25	0.06					0.6	0.1	TR	0.1	0.8	1.2			67	6.0		6.3		
025-42	0.06					0.6	0.1	TR	0.1	0.8	1.3			62	6.0		6.5		
042-48	0.06					2.0	0.2	0.1	0.2	2.5	3.9	35A		64	10.0		6.2		
048-68	0.06					1.5	1.5	0.1	0.3	3.4	8.2			41	1.0		6.2		
068-96	0.06					1.6	1.6	0.1	0.2	3.5	12.3	40A		28	1.0		5.2		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S54TX-37-91

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-8	QZ1	QZ1 FD3		CL2 KK2 QZ2 FD3	KK2 VC2
8-25	QZ1	QZ1 FD3	VC2 KK2 QZ2 MI2		
25-42	QZ1	QZ1 FD3 MI3	KK2 VC2 QZ2 MI2		
42-48	QZ1	QZ1 FD3		VC2 KK2 QZ2	KK2 VC2
48-68	QZ1	QZ1	KK2 VC2 MI2 QZ3		
68-96	QZ1	QZ1		KK1 VC2 MI2 QZ3	KK1 VR2

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, QZ=QUARTZ, VR=VERMICULITE, CL=CHLORITE, VC=CHLORITE -VERMICULITE OR VERMICULITE-CHLORITE INTERSTRATIFIED.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Grossarenic Paleudalf; loamy, siliceous, thermic.
Soil: Kenney loamy fine sand.
Soil Nos.: S54TX-37-91; K249-254.
Location: Cherokee County, Texas. Two miles north of Jacksonville on the tomato disease laboratory, in northwest corner of pine tree plantation. Cover: Pine trees (plantation)
Topography: Erosional upland; weakly convex surface with gradient of less than 1 percent.
Sampled by: I. C. Mowery, May 1954.
Described by: I. C. Mowery.

Ap K249 0 to 8 inches. Light gray (10YR 7/2; 5/2 when moist) loamy fine sand or fine sand; single grain; very friable, loose; numerous tree roots; clear smooth boundary.

A21 K250 8 to 25 inches. Very pale brown (10YR 7/3; 5/3 when moist) loamy fine sand; single grain; very friable, loose; continues through next horizon.

A22 K251 25 to 42 inches. Very pale brown (10YR 7/3; 5/3 when moist) loamy fine sand; single grain; very friable, loose; gradual smooth boundary.

B21t K252 42 to 48 inches. Mottled very pale brown (10YR 7/3; 5/3 when moist), brownish yellow (10YR 6/6; 5/6 when moist), and strong brown (7.5YR 5/6; 4/6 when moist) fine sandy loam; weak coarse angular blocky; friable, slightly hard, porous; gradual smooth boundary.

B22t K253 48 to 68 inches. Yellow (10YR 7/8; 6/8 when moist) sandy loam, mottled with red (2.5YR 4/6; 3/6 when moist) weak coarse angular blocky; friable, hard; gradual smooth boundary.

B23t K254 68 to 96 inches plus. Mottled red (2.5YR 4/6; 3/6 when moist) and yellow (10YR 7/8; 6/8 when moist) sandy clay loam weakly stratified with light gray (10YR 7/2; 6/2 when moist) clay; weak coarse angular blocky; friable.

Remarks: 1. Pedon was sampled as Lakeland loamy fine sand. The soil is outside the range of the Lakeland series in having an argillic horizon within 80 inches of the surface. This soil has base saturation of about 50 percent in the 48 to 68 inch horizon and about 30 percent in the 68 to 96 inch horizon by the NaOAc method. Therefore it is reasonable that the base saturation is 35 percent or higher at 72 inch depth.

2. Textures above agree with laboratory data. Field textures where different are given below:

Ap - loamy fine sand
B22t - sandy clay loam

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Plinthic Paleudalf; fine-loamy, siliceous, thermic

SOIL *Segno loamy fine sand* SOIL Nos. S64TX-170-3 LOCATION *Montgomery County, Texas*

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 64256-64265

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (In.)	Horizon	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)	3B2 Cm	Coarse fragments 3B1: 2A2 ≥ 2 (<76) Pct.	2 – 19 Pct. of < 76mm	19 – 76 Pct. of < 76mm
		Pct. of < 2 mm															
0-6	A1	76.7	20.2	3.1	tr	2.0	9.2	41.1	24.4	15.3	4.9	63.3	52.3		-	-	-
6-16	A2	75.8	19.9	4.3	0.2	2.0	8.6	41.0	24.0	15.0	4.9	62.6	51.8	1.00	tr	tr	-
16-21	B21t	58.1	17.9	24.0	0.4	1.4	6.6	32.4	17.3	12.5	5.4	47.6	40.8	1.00	tr	tr	-
21-31	B22t	51.4	19.2	29.4	0.3	1.4	5.5	27.2	17.0	12.3	6.9	44.9	34.4	0.97	4	4	-
31-42	B23t	50.2	22.6	27.2	1.1	1.4	5.1	24.6	18.0	14.4	8.2	47.7	32.2	0.96	6	6	-
42-49	B24t	48.8	24.9	26.3	0.8	1.1	4.8	23.8	18.3	16.1	8.8	49.0	30.5	0.92	12	12	-
49-57	B25t	50.6	24.0	25.4	0.9	1.2	4.9	24.6	19.0	14.8	9.2	48.9	31.6	0.93	10	10	-
57-71	B26t	53.9	21.8	24.3	1.0	1.4	5.7	26.9	18.9	13.3	8.5	48.9	35.0	0.97	4	4	-
71-81	B27t	53.1	18.8	28.1	1.6	2.5	6.2	26.0	16.8	11.4	7.4	43.5	36.3	0.89	16	16	-
81-93+	B28t	51.0	16.3	32.7	1.5	2.7	6.4	25.3	15.1	9.9	6.4	39.9	35.9	0.94	9	9	-

Depth (In.)	6A1a Organic carbon Pct.	6B2a Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct.	6C2a Ext. iron as Fe Pct.	Bulk density: 4A1f ⅓ bar g/cc	4A1h Oven dry g/cc	4D1 COLE	Water content: Pct	4B1c ⅓ bar Pct.	4B2 15 bar Pct.	4C1 WRD in/in		pH: 8C1c (1:1) 1N KCl	8C1a (1:1) H_2O
0-6	1.83	0.071	26			0.1									3.7	4.2
6-16	0.15					0.2	1.67	1.65	0.04		4.5	1.7	0.04		4.2	5.2
16-21	0.25					1.1	1.71	1.77	0.013		13.6	8.8	0.08		4.2	5.2
21-31	0.17					1.5	1.71	1.77	0.011		14.6	10.5	0.07		3.9	5.0
31-42	0.11					1.8	1.72	1.73	0.003		14.4	10.0	0.07		3.9	5.2
42-49	0.07					2.0	1.77	1.81	0.007		14.0	9.6	0.07		3.7	4.8
49-57	0.06					1.9	1.79	1.85	0.010		13.4	9.3	0.09		3.6	4.8
57-71	0.04					1.7	1.80	1.86	0.011		13.3	8.8	0.08		3.6	4.6
71-81	0.06					3.0	1.75	1.82	0.010		16.7	10.7	0.09		3.7	4.7
81-93+	0.04					3.5	1.72	1.79	0.011		17.9	12.0	0.09		3.6	4.6

Depth (In.)	Extractable bases 5B1a: 6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	6H2a Ext. acidity	CEC: 5A3a Sum cations		6G1d Ext. Al		Ratios to clay 8D1: CEC Sum	Ext. iron	15-bar water	8D3 Ca/Mg		Base saturation: 5C3 Sum cations Pct.	5C1 NH_4OAc Pct.
	meq/100 g																
0-6	1.9	0.4	tr	tr	2.3	6.6	8.9		0.9		2.87	0.03				26	
6-16	0.7	0.2	tr	tr	0.9	1.2	2.1		0.3		0.49	0.05	0.40			43	
16-21	2.3	1.7	0.1	tr	4.1	3.7	7.8		0.7		0.33	0.05	0.37	1.4		53	
21-31	2.1	2.2	0.1	0.1	4.5	4.1	8.7		0.7		0.30	0.05	0.36	1.0		53	
31-42	1.4	2.0	0.2	0.1	3.7	4.0	7.6		0.6		0.28	0.07	0.37	0.7		47	
42-49	0.9	2.0	0.1	0.1	3.1	3.9	7.0		1.1		0.27	0.08	0.36			46	
49-57	0.7	2.0	0.2	0.1	3.0	3.8	6.8		1.2		0.27	0.07	0.37			44	
57-71	0.7	2.0	0.1	0.1	2.9	3.2	6.1		1.0		0.25	0.07	0.36			48	
71-81	0.8	2.4	0.2	0.1	3.5	3.6	7.1		1.0		0.25	0.11	0.38			49	
81-93+	1.1	2.8	tr	tr	3.9	3.8	7.7		1.0		0.24	0.11	0.37	0.4		51	

Depth (In.)	Clay Fraction Analysis 7A1b-d: Mt.	Chl.	Vm.	Mi.	Mt.-Chl. Int. a/	Qtz.	KI. DTA %	Gibbsite
	7A2 X-ray						7A3	
0-6	-		xx	-	x	xx	32	
6-16	-		-	-	xxx	xx	33	
16-21	-		-	-	xxx	tr	33	
21-31	-		-	-	xxx	tr	38	
31-42	-		-	tr	xxxx	xx	43	
42-49	-		-	tr	xxx	x	42	
49-57	-		-	tr	xx	tr	42	
57-71	-		-	tr	xx	tr	40	
71-81	-		-	tr	xx	tr	43	
81-93+	-		-	tr	xx	tr	44	

Mt. = Montmorillonite, Chl. = chlorite, Vm. = Vermiculite, mi = mica, Int = Interstratified layer, Qtz. = quartz, Kl. = Kaolinite

Relative amounts: blank = not determined, dash = not detected, tr. = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant.

a. Montmorillonite-chlorite intergrade mineral.

Soil classification: Plinthic Paleudalf; fine-loamy, siliceous, thermic.
Soil: Segno loamy fine sand.
Soil Nos.: S64TX-170-3; 64256-64265.
Location: Montgomery County, Texas. About 7-1/2 miles south-southwest of Conroe, Texas; 50 feet north and 900 feet east of intersection of the southmost compartment road and the north-south entrance road on west side of W. Goodrich Jones State Forest, which intersection is 1.65 miles south of FM Road 1488; the entrance road is 2.55 miles west of intersection of FM Road 1488 and Interstate Highway 45, which is 6.1 miles south of intersection of Interstate Highway 45 and Texas Highway 105 at Conroe, Texas; SC part of photo AWU-5W-127.
Vegetation and use: About 70 percent shortleaf and 30 percent loblolly pine. Area was prescription-burned in 1961-1962 winter season (all underbrush was burned). Understory is sweetgum and red oak sprouts, dominantly--some Spanish mulberry and French mulberry.
Topography: Very gently undulating; pedon is a low ridgetop position, slightly convex surface; slope of about 1-1/2 percent, 450-foot distance to nearly level area of Caddo fine sandy loam. Elevation at pedon site is about 188 feet.
Drainage and permeability: Moderately well drained. Slow runoff. Moderately slowly permeable.
Parent material: Sandy clay loam continental sediments probably of the Citronelle geologic group of Late Pliocene or Early Pleistocene geologic age.
Collected by: J. G. Cady, H. Oakes, G. S. McKee, W. R. McClintock, H. A. Moncrief, May 11, 1964.
Described by: G. S. McKee and H. Oakes.

A1 64256 0 to 6 inches. Grayish brown (10YR 5/2) loamy fine sand, very dark grayish brown (10YR 3/2) when moist; structureless but slightly cohesive and contains a few wormcasts; very friable, nonsticky, soft; plentiful tree, shrub and grass roots; pH 5.5; clear irregular lower boundary.

A2 64257 6 to 16 inches. Very pale brown (10YR 7/4) loamy fine sand, light yellowish brown (10YR 6/4) when moist; structureless but contains many fine continuous pores and a few wormcasts and filled wormholes (with darker brown) up to 1 cm diameter; very friable; nonsticky; plentiful tree, shrub and grass roots; pH 5.7; clear slightly irregular lower boundary.

B21t 64258 16 to 21 inches. Brownish yellow (10YR 6/6) light sandy clay loam, yellowish brown (10YR 5/6) when moist; crushed soil is about one-half chip higher value than outsides of peds; weak fine blocky and subangular blocky; friable, slightly sticky, hard; contains plentiful roots and many continuous fine pores; few wormcasts and a few wormholes; contains occasional strongly cemented subangular iron concretions around which are distinct yellowish red (when moist) medium-sized mottles; pH 5.8; gradual lower boundary.

B22t 64259 21 to 31 inches. Brownish yellow (10YR 6/6) sandy clay loam, yellowish brown (10YR 5/6) when moist, with common distinct yellowish red and red medium mottles, some of which surround weakly cemented or incipient reddish iron concretions; also contains occasional strongly cemented brownish iron concretions up to about 1 cm diameter; weak medium blocky and subangular blocky, and has few patchy clay films; friable, sticky, hard; contains few fine pores and occasional wormcasts; diffuse boundary.

B23t 64260 31 to 42 inches. Same colors and texture as layer just above, but the red mottles are medium-sized and coarse; the red mottles comprise about 10 percent of the mass; weak medium blocky and subangular structure with a few patchy clay films; contains a few tree roots; pH 5.7; diffuse boundary.

B24t 64261 42 to 49 inches. Same colors and texture as above, but contains more of the coarse red mottles than of medium, and contains occasional light gray mottles; the red mottles are slightly harder than in two layers just above; weak medium and coarse blocky and contains a few patchy clay films; pH 5.7; diffuse lower boundary.

B25t 64262 49 to 57 inches. Similar in texture and colors to layer above, except contains about 5 percent of light gray mottles that are longer vertically than horizontally; the soil is softer in the vertical gray soil than in the reddish and brownish yellow material; the red mottles have interiors that are incipient weakly cemented dark brown iron concretions; brittle; contains occasional tree roots; pH 5.5; diffuse boundary.

B26t 64263 57 to 71 inches. Prominently and coarsely mottled red, yellowish red, gray, and brownish yellow sandy clay loam; weak blocky structure, with occasional patchy clay films; weakly cemented and difficult to break between the fingers, the reddish material is the hardest of the soil, brittle; weakly cemented iron concretions about 3 to 5 mm diameter comprise the centers of the red mottles; contains occasional tree roots; pH 5.5; diffuse boundary.

B27t 64264 71 to 81 inches. Like layer just above, except contains more coarse light gray mottles perpendicular to the surface (longer vertically), and contains less yellowish mottles; the light gray soil material is softer than the red material, and apparently the moisture moves through the gray material; the red mottles are weakly cemented to the extent that they require extreme pressure between the fingers and thumb to be broken; the insides of some of the red mottles are strongly cemented and require a tool to be broken; contains occasional tree roots through the light gray part of the soil; it appears that moisture moves through the light gray soil material; pH 5.8; arbitrary boundary.

B28t 64265 81 to 93 inches. Same as layer above; this layer divided for sampling only.

Remarks: Augered to depth of 140 inches, and the soil material appeared to be less hardened below a depth of about 110 inches, and the weakly cemented red mottles become less in number. Geologic formation probably is of Citronelle Group--Upper Unnamed Sand (Pliocene Age), which at pedon site is estimated to be 20 to 40 feet higher in elevation than the Lissie Formation. The "Lissie Plain," approximately 3 miles to the south is an almost featureless plain, and contains more area of Caddo and Rains soils in Montgomery County, with fingers of treeless glades extending into the timbered area. Colors are for dry soil unless otherwise indicated. Adjoining soil in all directions is Splendora fine sandy loam, which lies 6 inches to 10 feet lower than the Segno fine sandy loam. Two small isolated spots of a poorly drained soil are mapped separately from the Splendora fine sandy loam as Waller series. Depth to permanent water table is over 10 feet, probably about 25 feet. Tree measurements at the site indicate that the forest site index (height of tree for age 50 years) is 91 feet for loblolly pine. In other similar soil areas the shortleaf site is 83 feet. The soil at the site supports a good stand of loblolly pine with some shortleaf pine and such desirable hardwoods as red oak, sweet gum, magnolia and black gum. Understory is yaupon, American elm, wax myrtle, and American beauty berry.

Textures above agree with laboratory data. Field textures where different are given below:
A1 - fine sandy loam A2 - fine sandy loam

SOIL CLASSIFICATION: Plinthic Paleudalf; fine-loamy, siliceous, thermic

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Segno fine sandy loam SOIL Nos. S64TX-170-4 LOCATION Montgomery County, Texas

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 64266-64274

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

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)		3B2 Cm	Coarse fragments 3B1: 2A2 ≥ 2 (<76) Pct.	2 – 19 Pct. of < 76mm	19 – 76 Pct. of < 76mm
		Pct. of < 2 mm																
0-6	A1	72.9	22.9	4.2	tr	2.6	11.2	38.0	21.1	14.4	8.5	56.9	51.8			tr	tr	-
6-12	A2	71.9	23.1	5.0	0.2	2.8	11.4	37.1	20.4	13.9	9.2	55.6	51.5			tr	tr	-
12-21	B21t	60.3	20.5	19.2	0.4	2.2	9.1	31.5	17.1	11.9	8.6	46.4	43.2		1.00	tr	tr	-
21-29	B22t	59.6	20.5	19.9	0.5	2.1	8.8	31.4	16.8	11.8	8.7	46.0	42.8		0.97	4	4	-
29-42	B23t	58.5	19.9	21.6	0.9	2.0	8.6	30.2	16.8	11.6	8.3	45.3	41.7		0.89	16	16	-
42-54	B24t	55.4	19.7	24.9	1.2	2.4	7.7	27.5	16.6	11.1	8.6	43.5	38.8		0.92	11	11	-
54-62	B25t	55.2	20.5	24.3	1.2	2.6	8.5	27.3	15.6	11.5	9.0	42.5	39.6		0.94	9	9	-
62-74	B26t	52.9	19.5	27.6	0.8	2.8	8.8	25.6	14.9	10.9	8.6	40.4	38.0		0.97	5	5	-
74-85+	B27t	48.5	18.2	33.3	0.6	2.8	8.9	22.8	13.4	7.9	10.3	33.8	35.1		0.98	3	3	-

Depth (in.)	6A1a Organic carbon Pct.	6B2a Nitrogen Pct.	C/N		Carbonate as $CaCO_3$ Pct.	6C2a Ext. iron as Fe Pct.	Bulk density 4A1f ⅓ bar g/cc	Bulk density 4A1h Oven dry g/cc	4D1 COLE	Water content 4B1c ⅓ bar Pct.	Water content 4B2 15 bar Pct.		4C1 WRD in/in		pH 8C1c (1:1) 1N KCl	pH 8C1a (1:1) H_2O
0-6	0.63	0.042	15			0.1									5.0	5.5
6-12	0.13					0.2									4.8	5.7
12-21	0.14					0.6	1.74	1.80	0.011		11.6	6.9		0.08	4.0	5.2
21-29	0.09					0.8	1.73	1.78	0.008		11.9	7.0		0.08	3.5	4.6
29-42	0.10					0.8	1.71	1.75	0.006		13.0	7.7		0.08	3.4	4.5
42-54	0.11					1.7	1.79	1.83	0.007		14.1	9.0		0.08	3.4	4.8
54-62	0.06					1.7	1.78	1.80	0.003		13.8	9.0		0.08	3.6	4.8
62-74	0.04					2.1	1.81	1.86	0.009		14.8	10.0		0.08	3.7	4.8
74-85+	0.04					2.5	1.80	1.86	0.011		15.2	11.9		0.06	3.7	4.7

Depth (in.)	Extractable bases 5B1a: 6N2d Ca meq/100 g	6O2b Mg meq/100 g	6P2a Na meq/100 g	6Q2a K meq/100 g	Sum meq/100 g	6H2a Ext. acidity meq/100 g	CEC 5A3a Sum cations meq/100 g	6G1d Ext. Al meq/100 g	Ratios to clay 8D1: CEC Sum	Ext. iron	15-bar water	8D3 Ca/Mg	Base saturation 5C3 Sum cations Pct.	5C1 NH_4OAc Pct.
0-6	2.9	0.7	0.2	0.1	3.9	1.5	5.4	0.1	1.28	0.02			72	
6-12	1.0	0.5	tr	tr	1.5	0.5	2.0	-	0.40	0.04			75	
12-21	2.4	1.8	tr	0.1	4.3	2.5	6.8	0.3	0.35	0.03	0.36	1.3	63	
21-29	1.6	1.5	tr	0.1	3.2	3.3	6.5	0.9	0.33	0.04	0.35	1.1	49	
29-42	1.1	1.7	0.1	0.1	3.0	3.9	6.9	1.2	0.32	0.04	0.36	0.6	43	
42-54	1.1	2.0	0.1	0.1	3.3	4.0	7.3	1.0	0.29	0.07	0.36	0.6	45	
54-62	1.1	2.1	0.1	0.1	3.4	3.3	6.7	0.8	0.28	0.07	0.37	0.5	51	
62-74	1.2	2.5	0.2	0.1	4.0	3.5	7.5	0.8	0.27	0.08	0.36	0.5	53	
74-85+	1.6	2.9	0.2	0.1	4.8	3.6	8.4	0.6	0.25	0.08	0.36	0.6	57	

Depth (in.)	Clay Fraction Analysis 7A1b-d: Mt. (7A2 X-ray)	Chl. (7A2 X-ray)	Vm. (7A2 X-ray)	Mi. (7A2 X-ray)	Mt.-Chl. Int. a/ (7A2 X-ray)	Qtz. (7A2 X-ray)	Kl. DTA % (7A3)	Gibbsite (7A3)
0-6				-	xx	xx	26	
6-12				-	xxx	x	26	
12-21								
21-29								
29-42				-	xx	tr	47	
42-54								
54-62								
62-74				tr	x	tr	47	
74-85+								

Mt. = Montmorillonite, Chl. = chlorite, Vm. = Vermiculite, mi = mica, Int. = interstratified layer, Qtz. = quartz, Kl. = Kaolinite

Relative amounts: blank = not determined, dash = not detected, tr. = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant.

a. Montmorillonite-chlorite intergrade mineral.

Soil classification: Plinthic Paleudalf; fine-loamy, siliceous, thermic.
Soil: Segno fine sandy loam.
Soil Nos.: S64TX-170-4; 64266-64274.
Location: Montgomery County, Texas. About 7 miles south-southwest of Conroe, Texas; 50 feet south and 0.3 mile east of intersection of third east-west compartment road (counted from the north) and the north-south entrance road on west side of W. Goodrich Jones State Forest, which intersection is 0.65 mile south of FM Road 1488; the entrance road is 2.55 miles west of the intersection of FM Road 1488 and Interstate Highway 45, which intersection is 6.1 miles south of intersection of Interstate Highway 45 and Texas Highway 105 at Conroe, Texas; NC part of photo AWU-5W-127.
Vegetation and use: Loblolly pine and shortleaf pine, mainly with a few desirable hardwoods and underbrush of yaupon, wax myrtle and American elm.
Topography: Very gently undulating; slope of about 1-1/2 percent at pedon site; plane surface; elevation is about 165 feet.
Drainage and permeability: Moderately well drained. Slow runoff. Moderately slowly permeable.
Parent material: Sandy clay loam sediments, probably of Citronelle geologic group; continental deposits of Late Pliocene or Early Pleistocene geologic age.
Collected by: J. G. Cady, H. Oakes, G. S. McKee, W. R. McClintock, H. A. Moncrief, May 12, 1964.
Described by: G. S. McKee and H. Oakes.

A1 64266 0 to 6 inches. Grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) when moist; structureless but slightly cohesive and contains few wormcasts; very friable, nonsticky, soft; contains plentiful tree, shrub and grass roots; pH 6.0; clear slightly irregular boundary.

A2 64267 6 to 12 inches. Very pale brown (10YR 7/3) fine sandy loam, pale brown (10YR 6/3) when moist; structureless; very friable, nonsticky, soft; contains occasional wormcasts; plentiful pine tree, shrub, and grass roots; contains common number of fine pores; pH 6.0; clear slightly irregular lower boundary.

B21t 64268 12 to 21 inches. Brownish yellow (10YR 6/6) fine sandy loam, yellowish brown (10YR 5/6) when moist, with occasional fine strong brown mottles; weak angular and subangular blocky structure; friable, slightly sticky, hard; has common number of fine pores and few wormcasts; contains common number of tree and shrub roots; contains occasional strongly-cemented brown iron concretions; pH 5.7; gradual lower boundary.

B22t 64269 21 to 29 inches. Brownish yellow (10YR 6/6) fine sandy loam, very slightly more clayey than layer just above, with common distinct fine and medium reddish yellow and a few faint pale brown mottles; weak subangular and angular blocky structure; friable, slightly sticky, hard; common tree roots; contains a few subrounded brownish hard iron concretions up to 1.5 cm in diameter, and some have dark centers while some have red centers; pH 5.5; common fine and medium pores; gradual boundary.

B23t 64270 29 to 42 inches. Same base color as layer above but sandy clay loam texture, has common number (2 percent) of red and yellowish red medium-sized mottles and an occasional gray mottle below 32 inches; weak angular and subangular blocky structure; few patchy clay films; friable, hard; contains a few more of the iron concretions than in layer above; some of the red mottles have slightly hardened or incipient iron concretions in their centers; few tree roots and common number of fine pores throughout the mass; pH 5.0; amount of red mottles and sizes and number of concretions increase with depth; diffuse boundary.

B24t 64271 42 to 54 inches. Distinctly mottled brownish yellow, red, and pale brown sandy clay loam with occasional prominent medium-sized light gray mottles; contains few tree roots and few fine pores; weak subangular and angular blocky structure; friable, sticky, very hard; contains more iron concretions, and mottles are coarser than in layer above; pH 5.2; diffuse boundary.

B25t 64272 54 to 62 inches. Similar to layer above, but contains about 10 to 15 percent of prominent light gray mottles and the reddish mottles are slightly hard and have the iron concretions in their centers; in addition, contains a few subrounded hard iron concretions, contains occasional tree roots; weak blocky structure and some ped faces are shiny and have patchy clay films; pH 5.5; diffuse boundary.

B26t 64273 62 to 74 inches. Distinctly and coarsely mottled light gray, red and strong brown sandy clay loam; structureless but contains occasional patchy clay films and few pores mostly in the gray; weakly cemented; pH 5.5; few tree roots mostly in the gray mottled soil material; diffuse boundary.

B27t 64274 74 to 85 inches plus. Similar to above, but slightly more cemented; has occasional pinkish mottles; pH 5.5; water seems to move better through the gray soil material than through the red material.

Sand mineralogy (Method 7B1). Examination of coarse silt and very fine sand fractions indicates less than 1 percent weatherable minerals. Fractions are principally quartz with accessory zircon, tourmaline, and iron oxides. Family mineralogy is siliceous.

Remarks: Colors are for dry soil unless otherwise indicated. Adjoining soil to the north and west is Splendora fine sandy loam, which lies some 6 inches to 6 feet lower. This area is sideslope position whereas S64Tex-170-3 is from ridgetop position. This soil pedon is slightly less well drained than the one taken from the ridgetop. To the northeast is an adjoining area of Sorter silt loam, which is in the lowest position. To the south is an adjoining area, a low ridgetop some 5 to 10 feet higher of *Conroe gravelly loamy fine sand. Depth to permanent water table is over 10 feet, probably about 20 feet. Geologic formation probably is of Citronelle group, Upper Unnamed Sand, of Late Pliocene or Early Pleistocene geologic age, which at pedon site is estimated to be some 15 to 30 feet higher in elevation than the Lissie formation. The "Lissie Plain," approximately 4 miles to the south, is a featureless plain, and contains more area of Splendora and Sorter soils in Montgomery County, Texas.

Textures above agree with laboratory data. Field textures where different are given below:

B21t - light sandy clay loam
B22t - sandy clay loam

SOIL CLASSIFICATION- RHODIC PALEUDALF
FINE, KAOLINITIC, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SERIES - - - - - - -SERIES NOT DESIGNATED

SOIL NO - - - - - - S57TX-174-91 COUNTY - - - NACOGDOCHES

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K499-504

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (- - - - - SAND - - - - -)									PARTICLE SIZE ANALYSIS (A)				(ETHYLENE GLYCOL)		BULK
		SAND 2-.05 MM	SILT .05-.002 MM	CLAY LT .002 MM	VCOS 2-1 MM	CORS 1-.5 MM	MEDS .5-.25 MM	FNES .25-.10 MM	VFNS .10-.05 MM	SAND 2-.05 MM	SILT .05-.002 MM	CLAY LT .002 MM	CRSE CLAY .002-.0002 MM	FINE CLAY LT .0002 MM	RETAINED 2 MM	LT .002 MM	( ) LT .0002 MM	DEN 4A3A
IN		(- - - - - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - - - - -)											(PCT LT.002)		(- - MG/G - - -)			G/CC
000-7	AP	52.8	37.8	9.4	9.5	7.7	2.9	17.8	15.3				33	67				
007-29	B21T	28.8	28.0	43.2	11.6	3.1	0.7	6.6	7.0				33	67				
029-51	B22T	27.9	29.2	42.9	9.5	2.7	0.7	7.4	7.7				59	41				
051-72	B23T	27.4	30.4	42.2	8.8	3.3	0.9	7.6	6.0				48	52				
072-92	B23T	24.4	40.6	35.0	6.5	2.8	0.8	8.0	6.5				55	45				
092-104	C	31.6	39.0	29.4	10.2	3.3	0.9	8.7	7.6				53	47				

DEPTH	ORGANIC MATTER 6A1A ORGN CARB	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	(- -EXTRACTABLE BASES 6B1A- -) 6N2E CA	6Q2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 8A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO CA 8D3	CA CARB EQ 6E1E	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	(- - - - - - - - - MEQ / 100G - - - - - - - - -)								PCT		PCT			
000-7	0.52			1.9		1.0	0.2	TR	0.4	1.6	4.4	38A	52A	38	5.0		6.0		
007-29	0.35			4.4		4.5	1.5	TR	0.2	6.2	13.8	33A	44A	45	3.0		5.4		
029-51	0.23			5.0		3.2	1.5	TR	0.3	5.0	13.4	32A	37A	38	2.1		5.1		
051-72	0.23			5.8		2.9	1.9	TR	0.2	5.0	12.3	30A	39A	41	1.5		5.3		
072-92	0.17			5.9		1.6	1.9	TR	0.2	3.7	10.7	28A	36A	35	0.8		5.2		
092-104	0.12			4.7		0.9	1.9	TR	0.3	3.1	10.0	29A	39A	31	0.5		5.0		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S57TX-174-91

DEPTH	SAND	SILT	CLAY	COARSE CLAY	FINE CLAY
INCHES	2 - 0.05MM	0.05 - 0.002MM	LESS THAN 0.002MM	0.002 - 0.0002MM	LT 0.0002MM
0-7	QZ1	QZ1		KK1 QZ2 MI2	KH1 MI3
7-29	QZ1	QZ1 MI3 KK3		KK1 QZ2 MI2	KH1 MI3
29-51	QZ1	QZ1 MI3 KK3		KK1 QZ2 MI2	KH1 MI3
51-72	QZ1	QZ1 MI3 KK3		KK1 QZ2 MI2	KH1 MI3
72-92	QZ1	QZ1 MI3 KK3		KK1 MI2 QZ2	KH1 MI3
92-104	QZ1	QZ1 MI3 KK3		KK1 MI2 QZ2	KH1 MI3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. MI=MICA OR ILLITE, KK=KAOLINITE, QZ=QUARTZ, KH=TABULAR HALLOYSITE.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Rhodic Paleudalf; fine, kaolinitic, thermic.
Soil: Series not designated.
Soil Nos.: S57TX-174-91; K499-504.
Location: Nacogdoches County, Texas; 4.45 miles north from intersection of Highway 21 and Farm Road 225 at Douglass on Farm Road 225; thence west 0.6 mile on county road, south of road 200 yards down fence line, east of fence about 30 feet. Cover: Annual weeds and grasses and some sericea lespedeza.
Topography: Gently sloping with a gradient of about 2 percent.
Sampled by: L. L. Gordon, June 1957.
Described by: L. L. Gordon.

Ap K499 0 to 7 inches. Red (2.5YR 5/6; 3.5/6 moist) fine sandy loam; weak granular in upper portion to massive in lower or plow sole portion; very friable, slightly hard dry; few fine pores; few small hard ferruginous concretions 2-5 mm in diameter; gradual smooth boundary.

B21t K500; B22t K501; and
B23t K502, 7 to 72 inches. Red (10R 4/6; 3/6, moist) clay; moderate to strong fine subangular blocky; friable moist, hard dry, sticky and plastic; fine pores common; few large pores and wormcasts; common fine hard dark ferruginous concretions 2-6 mm in diameter; clayskins almost continuous; few soft brownish yellow semihard concretions 3-15 mm in diameter which cause brownish yellow streaks in the soil mass when crushed with spade or auger; some of these contain greensand; gradual smooth boundary.

B23t K503 72 to 92 inches. Red (10R 4/7; 3/7, moist) clay loam; otherwise same as horizon above except moderate fine subangular blocky; and fine and medium distinct reddish yellow mottles are common; also contains few soft ferromanganese concretions in addition to iron concretions as in above horizon; gradual smooth boundary.

C K504 92 to 104 inches. Mottled red (2.5YR 4/6; 3/6, moist), reddish yellow (7.5YR 6/8; 5/8, moist) and brownish yellow (10YR 6/8; 5/8, moist) clay loam; apparently massive; friable, hard dry, sticky and plastic wet; fine hard iron concretions common; few soft fine ferromanganese concretions; few lenses or pockets of greensand.

Remarks: 1. Sampled as Nacogdoches series. Soil is outside the range of the Nacogdoches series in that the base saturation is 35 percent at 72 inches.

2. Note (for publication): The clay fraction has appreciable tabular halloysite.

3. Six samples run in laboratory. The described 7-72 horizon was broken into 3 samples.

4. Textures above agree with laboratory data. Field textures where different are given below:

B22t - clay
C - clay

SOIL CLASSIFICATION-UDIC HAPLUSTALF

SERIES - - - - - - -GRANDFIELD FINE-LOAMY, MIXED, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S57TX-12-90 COUNTY - - - BAYLOR

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K598-605

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (SAND) SAND								PARTICLE SIZE ANALYSIS SAND			CRSE CLAY	FINE CLAY	(A) (ETHYLENE GLYCOL) RETAINED		(B)	BULK DEN
		SAND 2-.05	SILT .05-.002	CLAY LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	SAND 2-.05	SILT .05-.002	CLAY LT .002	.002-.0002	LT .0002	2 MM LT	.002 MM LT	.0002 MM LT	4A3A
IN		(PCT LT 2MM)											(PCT LT.002)		(MG/G)			G/CC
000-5	AP	70.8	21.1	8.1	0.3	10.3	10.6	29.8	19.8				41	59		136		
005-14	A1	66.2	22.4	11.4	0.2	8.5	9.2	28.6	19.7				35	65		152		
014-18	B1T	56.6	25.0	18.4	0.1	5.1	5.7	23.8	21.9				30	70		162		
018-32	B21T	39.9	30.7	29.4	0.3	2.9	4.8	12.4	19.5				40	60		167		
032-52	B22T	40.5	38.1	21.4	0.3	2.3	1.9	10.0	26.0				34	66		146		
052-76	B23T	50.8	30.3	18.9	0.2	3.4	2.7	1.1	43.4				30	70		171		
076-105	CCA	29.6	51.4	19.0	0.4	2.5	1.9	8.1	16.7				50	50		160		
105-113	C	39.6	49.9	10.5	0.2	2.9	5.7	11.5	19.3				33	67		178		

DEPTH	ORGANIC MATTER 6A1A ORGN CARB	6B1A NITG	C/N	6C3 EXT FE	6S1A TOTL	IRON PHOS 6N2E CA	EXTRACTABLE BASES 6Q2D MG	6P1A NA	6Q2A K	SUM EXTB	5B1A- CAT EXC 2 MM LT	CAP .002 MM LT	5A2A) .0002 MM LT	BASE SAT 5C2	RATIO CA TO MG	CA EQ 6E1E	(- PH -) 8C1A 1/1 H20	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	(MEQ / 100G)								PCT	MG	PCT			
000-5	0.35						1.4	0.4	0.4		5.3	59A	73A			0.3	7.8		
005-14	0.52						1.5	0.6	0.6		8.5	63A	78A			0.5	7.7		
014-18	0.64					7.6	2.4	0.9	0.7	11.6	11.2	66A		100	3.2		7.3		
018-32	0.58					11.5	3.9	0.9	0.7	17.0	17.1	66A	77A	99	2.9		7.0		
032-52	0.23					9.7	3.5	0.2	0.5	13.9	12.9	62A	80A	100	2.8		7.2		
052-76	0.12						3.7	0.1	0.4		12.3	73A				1.0	7.5		
076-105	0.12						4.5	0.2	0.4		10.6	66A	85A			17.4	8.2		
105-113	0.12						6.2	0.3	0.5		13.4	76A	90A			5.4	8.3		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S57TX-12-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-5	QZ1 FD3	QZ1 FD3 MI3		MI1 KK2 QZ2 VR3 CL3	MV1 MI1 KK3
5-14	QZ1 FD3	QZ1 FD2 MI3		MI1 KK2 QZ2 VR3	MV1 MI1 KK3
14-18	QZ1 FD3	QZ1 FD2 MI3		MI2 KK2 QZ2 VR3 CL3	MV1 MI1 KK3
18-32	QZ1 FD3	QZ1 FD2 MI3		MI2 KK2 QZ2 VR3 CL3	MV1 MI1 KK3
32-52	QZ1 FD3	QZ1 FD2 MI3		MI2 KK2 QZ2 CL2	MV1 MI1 KK3
52-76	QZ1 FD3	QZ1 FD2 MI3		MI2 KK2 QZ2 CL2	MT1 MI1 KK3
76-105	QZ1 FD3	QZ1 FD2 MI2 KK3		MI2 KK2 QZ2 CL2	MT1 MI1 KK3
105-113	QZ1 FD3	QZ1 FD2 MI2 KK3		MI2 KK2 QZ2 CL2	MT1 MI1 KK3

RELATIVE ABUNDANCE, 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, VR=VERMICULITE, CL=CHLORITE, MV=DIFFUSE, HYDRATED, EXPANSIBLE AND MICACEOUS (13-18A).

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Udic Haplustalf; fine-loamy, mixed, thermic.
Soil: Grandfield fine sandy loam.
Soil Nos.: S57TX-12-90; K598-605.
Location: Baylor County, Texas. From intersection of U.S. 82 and 277 in Seymour, go west along U.S. 82, then north 2.3 miles on Farm Road 1789. Sample site is in a field about 20 steps west of Farm Road 1789 and 40 feet north of the private road going west to a farm residence. Cover: Cultivated field.
Topography: Nearly level.
Sampled by: I. C. Mowery, August 1957.
Described by: I. C. Mowery.

Ap K598 0 to 5 inches. Brown (7.5YR 5/4; 4/4, moist) fine sandy loam; very weak fine granular; very friable, soft, nonsticky; noncalcareous; abrupt smooth boundary.

A1 K599 5 to 14 inches. Reddish brown (5YR 5/4; 4/4, moist) fine sandy loam; weak fine subangular blocky; friable, hard, nonsticky; numerous pores; noncalcareous; clear smooth boundary.

B1t K600 14 to 18 inches. Reddish brown (5YR 4/4; 3/4, moist) heavy fine sandy loam; weak medium subangular blocky; friable, hard, slightly sticky; very crumbly; noncalcareous; many pores; few roots, gradual smooth boundary.

B21t K601 18 to 32 inches. Red (2.5YR 4/6; 3/6 moist) clay loam; weak prismatic and weak coarse subangular blocky; very hard, sticky; noncalcareous; many fine pores; few roots; diffuse smooth boundary.

B22t K602 32 to 52 inches. Red (2.5YR 4.5/6; 3.5/6, moist) loam; massive; friable, very hard, slightly sticky; noncalcareous; occasional splotches or stains of ferromanganese; continues--

B23t K603 52 to 76 inches. Same as above; gradual wavy boundary.

Cca K604 76 to 105 inches. Yellowish red (4YR 5/6; 4/6, moist) silt loam; massive; moderately friable, hard, slightly sticky; strongly calcareous; few large soft lumps and hard concretions of $CaCO_3$ occupying about 10 percent of the mass; gradual wavy boundary.

C K605 105 to 113 inches. Yellowish red (4YR 5/6; 4/6, moist) loam; soil mass weakly calcareous, but contains occasional soft lumps of $CaCO_3$; massive.

Remarks: 1. Sampled as Miles series. This soil is outside the range of the Miles series in having a decrease of more than 20 percent of the maximum of the agrillic horizon within 1.5 m of the surface. The location appears to be on Brazos River Terrace.

2. Textures above agree with laboratory data. Field textures where different are given below:

Ap - light fine sandy loam
B1t - heavy sandy loam
B22t - sandy clay loam
B23t - sandy clay loam
Cca - heavy sandy clay loam
C - heavy sandy clay loam

SOIL CLASSIFICATION- UDIC HAPLUSTALF
FINE-LOAMY, MIXED, THERMIC

SERIES - - - - - - -SERIES NOT DESIGNATED

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S61TX-72-90 COUNTY - - - ERATH

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K1145-1151

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (PCT LT 2MM) SAND 2-.05	SAND .05-.002	CLAY LT .002	SAND .VCOS 2-1	SAND .CORS 1-.5	SAND .MEDS .5-.25	SAND .FNES .25-.10	SAND .VFNS .10-.05	PARTICLE SIZE ANALYSIS (A) SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002 (PCT LT.002)	FINE CLAY LT .0002 (PCT LT.002)	ETHYLENE GLYCOL RETAINED LT 2 MM	LT .002 MM	LT .0002 MM	BULK DEN 4A3A G/CC
000-4	AP	79.4	17.0	3.6	0.1	0.4	0.4	49.0	30.0				47	53				
004-10	A2	82.0	15.0	3.0	0.1	0.3	0.4	51.8	29.3				48	52				
010-14	B21T	69.5	15.8	14.7	0.0	0.3	0.4	43.5	25.3				51	49				
014-26	B21T	53.1	17.9	29.0	0.0	0.2	0.3	30.8	21.8				27	73				
026-49	B22T	52.5	25.0	22.5	0.0	0.2	0.2	27.9	24.1				29	71				
049-55	B3	47.7	39.8	12.5	0.0	0.3	0.2	22.5	24.7				29	71				
055-73	C	49.3	42.9	7.8	0.0	0.3	0.2	17.1	31.8				35	65				

DEPTH IN	ORGANIC MATTER 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON 6C3 EXT FE PCT	PHOS 6S1A TOTL PCT	EXTRACTABLE BASES 5B1A (MEQ/100G) 6N2E CA	6Q2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO CA 8D3 CA/MG	CA CARB EQ 6E1E PCT	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
000-4	0.70					4.1	0.3	0.1	0.3	4.8	4.4	62A	82A	109	13.7		7.5		
004-10	0.30					2.2	0.3	0.1	0.3	2.9	2.8	57A	82A	104	7.3		7.4		
010-14	.60					6.2	1.2	0.1	0.4	7.9	9.2	62A	78A	86	5.2		6.9		
014-26	0.60					10.2	2.3	0.2	0.5	13.2	17.7	67A	83A	75	4.4		6.1		
026-49	0.30					8.3	2.2	0.2	0.4	11.1	14.1	66A	83A	79	3.8		6.8		
049-55	0.20					5.5	1.7	0.2	0.3	7.7	8.7	72A	85A	89	3.2		6.6		
055-73	0.10					3.7	1.1	0.2	0.2	5.2	5.7	67A	87A	91	3.4		6.9		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S61TX-72-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-4	QZ1 FD3	QZ1 FD3		MI1 KK2 QZ3	MV1 MI3 KK3
4-10	QZ1 FD3	QZ1 FD3		MI1 KK2 QZ3	MV1 MI3 KK3
10-14	QZ1 FD3	QZ1 MI3 FD3		MI1 KK2 QZ3	MV1 MI3 KK3
14-26	QZ1 FD3	QZ1 MI3 KK3 FD3		MI1 KK2 MV3 QZ3	MV1 MI3 KK3
26-49	QZ1 FD3	QZ1 KK3 MI3 FD3		MI2 KK2 MV3 QZ3	MV1 MI3 KK3
49-55	QZ1	QZ1 KK3 FD3		KK1 MI2 MV3 QZ3	MV1 MI3 KK3
55-73	QZ1 FD3	QZ1 KK2 FD3		KK1 MI2 MV2 QZ3	MV1 MI3 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, QZ=QUARTZ, MV=DIFFUSE, HYDRATED, EXPANSIBLE AND MICACEOUS (13-18A).

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Udic Haplustalf; fine-loamy, mixed, thermic.
Soil: Series not designated.
Soil Nos.: S61TX-72-90; K1145-1151.
Location: Erath County, Texas. About 0.5 mile north of Bunyan, along Farm Road 219; turn west off Farm Road 219 onto county road, follow county road 0.9 mile, sample on east side of road approximately 30 feet north of fence line. Cover: Abandoned field supporting little bluestem, greenbriar, oak sprouts, annual weeds and grasses.
Parent material: Sandy formations of Lower Cretaceous Age.
Topography: Weakly convex surface which faces east and has a gradient of 4 percent.
Sampled by: J. R. Thomas, June 5, 1961.
Described by: J. R. Thomas.

Ap K1145 0 to 4 inches. Brown (10YR 5/2) loamy fine sand; dark brown (10YR 4/3) when moist; structureless; very friable; about neutral; abrupt smooth boundary.

A2 K1146 4 to 10 inches. Very pale brown (10YR 6/3) loamy fine sand; brown (10YR 5/3) when moist; structureless; very friable; about neutral; gradual smooth boundary.

B21t K1147 and K1148 10 to 26 inches. Yellowish red (5YR 4/6) sandy clay loam; slightly darker (5YR 3/6) when moist; weak to moderate medium subangular blocky structure; few patchy clay films; common fine pores; friable, slightly plastic; slightly acid; gradual smooth boundary.

B22t K1149 26 to 49 inches. Yellowish red (5YR 4/6) sandy clay loam; weak blocky structure; apparent clay films lining root channels and on some ped surfaces; friable, slightly plastic; slightly acid; few spots of yellowish brown in lower part; gradual smooth boundary.

B3 K1150 49 to 55 inches. Reddish yellow (5Y 6/6) loam with few fragments of soft partly weathered yellowish and white sandstone; structureless; about neutral. Diffuse boundary.

C K1151 55 to 73 inches. Thin-bedded reddish yellow, white and yellowish brown weakly cemented sandstone with lenses and thin strata of reddish yellow loam; about neutral reaction.

Remarks: 1. Padon was sampled as Stephenville series. The soil differs from the Stephenville in having a solum more than 40 inches thick over the weak sandstone (packsand) and in having base saturation higher than 75 percent in the argillic horizon. It differs from the Weatherford series in the last respect. The 10-26 inch horizon was subdivided for laboratory.

2. Textures above agree with laboratory data. Field textures where different are given below:

Ap - light fine sandy loam
A2 - light fine sandy loam
B22t - light sandy clay loam
B3 - light sandy clay loam
C - fine sandy loam and gray sandy clay

SOIL CLASSIFICATION: Udic Haplustalf; fine, mixed, thermic

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Lindy loam SOIL Nos. S63TX-49-1 LOCATION Cooke County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 18217-18223 March 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (In.)	Horizon	Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05) D	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 Noncarbonate <0.002	Coarse fragments 2A2: 3B1 19-2 Wt. Pct.	3B2 19-2 Vol. of <19mm
		Pct. of < 2 mm														
0-4	Ap	41.2	38.2	20.6	3.9	3.5	6.4	10.6	16.8	29.9	8.3	51.8	24.4	21	6	4
4-9	A1	35.8	38.3	25.9	3.4	3.2	5.1	8.7	15.4	28.0	10.3	47.6	20.4	26	7	4
9-20	B21t	30.6	38.2	31.2	2.7	2.4	4.3	7.6	13.6	26.8	11.4	44.1	17.0	31	7	4
20-30	B22t	18.0	22.8	59.2	4.2	1.8	2.2	3.8	6.0	13.8	9.0	21.7	12.0	59	21	12
30-40	IIB23	25.0	42.4	32.6	7.2	5.0	3.4	5.4	4.0	10.2	32.2	16.8	21.0	33	60	
40-52	IIIC1	17.7	62.1	20.2	3.7	3.0	1.9	4.0	5.1	11.0	51.1	18.3	12.6	10	25	
52-65	IIIC2	23.6	56.7	19.7	3.4	4.4	2.5	5.8	7.5	11.6	45.1	22.5	16.1	12	16	12
20-30	a	16.2	23.9	59.9	2.6	1.4	2.2	4.0	6.0	13.7	10.2	21.7	10.2			
52-65	a	1.3	29.2	69.5	tr	0.1	0.2	0.4	0.6	4.7	24.5	5.5	0.7			

Depth (In.)	6A1a Organic carbon c	6B1a Nitrogen	C/N	Carbonate as $CaCO_3$: 6E1b <2mm	3A1a <0.002 mm.	6C2a Ext. Iron as Fe	Bulk density: 4A1a Field-State	4A1d 1/3-Bar d	4A1d 1/3-Bar	4A1b Air-Dry	4D1 COLE	Water Content: 4B4 Field-State	4B1c 1/3-Bar	4B2 15-Bar	4C1 1/3-to 15-Bar	pH 8C1a 1:1
	Pct.	Pct.		Pct.	Pct.	Pct.	g/cc	g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.	
0-4	1.09	0.091	12			3.1	1.67	1.53	1.59	1.69	0.019	7.4	17.8	8.1	0.15	6.5
4-9	0.94	0.089	11			3.8	1.58	1.46	1.52	1.65	0.027	14.0	18.6	10.3	0.12	5.9
9-20	0.78	0.070	11			4.0	1.54	1.42	1.48	1.62	0.031	15.8	20.5	12.0	0.12	5.9
20-30	1.01	0.085	12			6.2	1.38	1.19	1.35	1.54	0.039	25.6	29.0	21.8	0.09	6.2
30-40	0.61			49	tr	2.5								14.1		7.8
40-52	0.12			77	10	0.8								7.7		8.0
52-65	0.07			75	8	0.7	2.00	1.69	1.92	2.00	0.012	8.1	12.1	7.9	0.07	8.2

Depth (In.)	Extractable bases: 6N2a Ca	6O2a Mg	6P2a Na	5B1a 6Q2a K	Sum	6H1a Ext. Acidity	Cat. Exch. Cap.: 5A3a Sum Cations	5A1a NH_4OAc	Liquid Limit	Plasticity Index	Linear Shrinkage	6D3 Ca/Mg	Base saturation: 5C3 Sum Cations	5C1 NH_4OAc
	meq/100 g								Pct.	Pct.	Pct.		Pct.	Pct.
0-4	9.5	1.6	tr	0.4	11.5	5.5	17.0	12.9	29	12	6.4	5.9	68	89
4-9	10.6	1.8	0.1	0.3	12.8	6.5	19.3	14.4				5.9	66	89
9-20	13.2	1.7	0.1	0.4	15.4	7.6	23.0	17.3				7.8	67	89
20-30	28.8	2.1	0.1	0.7	31.7	10.3	42.0	33.2	59	28	17.5	14	75	95
30-40	21.9e	0.4f	0.1	0.5	22.9			22.0						
40-52	13.9e	0.6f	0.1	0.2	14.8			11.7						
52-65	11.3e	0.9f	tr	0.2	12.4			9.5						

Depth (In.)	Ratios to Clay 8D2: NH_4OAc CEC	Ext. Iron	15-Bar Water
0-4	0.63	0.15	0.39
4-9	0.56	0.15	0.40
9-20	0.55	0.13	0.38
20-30	0.56	0.10	0.37
30-40	0.67	0.08	0.43
40-52	1.17	0.08	0.77
52-65	0.79	0.06	0.66

a. Carbonate removed (Method 3A3) and iron removed (Method 6C2). Particle size distribution was determined on samples treated for carbonate removal and both carbonate and iron removal. The results were similar. Clay percentage x $(1-\frac{CaCO_3}{100})$ yields the measured noncarbonate clay on a carbonate-containing basis. The calculated value for 18223 is 17. This value is higher than the one reported under the column heading, "Noncarbonate clay (3A1a)" indicating cementation of clay by carbonate.

b. Fe-Mn nodules comprise 25 to 50 percent of the sand above 30 inches. Carbonate comprises more than 50 percent of the sand below 30 inches.

c. 10 kg/m^2 to 30 inches (Method 6A).

d. Calculated to include volume but not weight of 2-19 mm material (Method 3B2).

e. KCl-TEA extraction (Method 6N4b).

f. KCl-TEA extraction (Method 6O4b).

Soil classification: Udic Haplustalf; fine, mixed, thermic.
Soil: Lindy loam.
Soil Nos.: 863TX-49-1; 18217-18223.
Location: Cooke County, Texas. Five miles northwest of center of Gainesville, Texas; in pasture, 95 paces southwest of FM Road 1200 from a point that is 1.3 miles northwest from its intersection with FM Road 1201.
Vegetation and use: Old cropland, now low-grade pasture.
Topography: Undulating landscape having nearly level to gently sloping divides and side slopes of about 5 percent leading to narrow drainageways. Site is about 1.5 percent slope on divide.
Drainage and permeability: Well drained, runoff is slow to moderate. Permeability is slow.
Parent material: Of questionable origin. Pedon lies upon hard limestone, has loamy surface and clayey Bt, and is presumed to not be derived from limestone. May be from interbedded clayey shales or old alluvium of Pleistocene Epoch.
Sampled by and date: J. DeMent, W. R. Elder, R. B. Grossman, H. Oakes, M. Stout, and W. Walters, April 15, 1963.
Described by: Maurice Stout.

Ap 18217 0 to 4 inches. Dark brown (7.5YR 3/3) loam; darker brown (7.5YR 3/2) moist; weak to moderate granular structure; having many very fine wormcasts; very hard; friable; nonsticky; crushed and dry; the soil is dark brown (7.5YR 4/3); few coarse ironstone on and in horizon; few very fine subrounded glossy black ironstone, worn; few pellet concretions, about 2 mm in size, black inside, brown outside; pH 7.0; noncalcareous; abrupt lower boundary.

A1 18218 4 to 9 inches. Reddish brown (5YR 4/4) loam; dark reddish brown (5YR 3/4) moist; moderate very fine and fine subangular blocky structure; crushed reddish brown (5YR 4/4) dry; common fine subrounded gravels of quartz, ironstone, very hard; firm to friable; occasional coarse fragment of ironstone; pH 7.0; noncalcareous; clear slightly wavy lower boundary.

B21t 18219 9 to 20 inches. Reddish brown (5YR 4/4) clay loam; dark reddish brown (5YR 3.5/4) moist; moderate medium blocky structure with some fine angular blocky; crushed reddish brown (5YR 4/4) dry; increase in very fine granular pebbles - smooth, mostly subrounded; few medium to coarse ironstone fragments - angular; pH 6.8; noncalcareous; clear slightly wavy lower boundary.

B22t 18220 20 to 30 inches. Reddish brown (5YR 4/4) gravelly clay; dark reddish brown (5YR 3/4) moist; strong very fine angular blocky structure; each ped has continuous shiny surface, reddish brown (5YR 4/4) dry; about 10 percent fine pebbles (subrounded ironstone, quartz, hematite concretions and some coarser ironstone fragments); extremely hard; very firm; pH 6.8; noncalcareous; lower abrupt wavy boundary.

IIB23 18221 30 to 40 inches. Reddish brown (5YR 4/3) gravelly clay loam; dark reddish brown (5YR 3/3) moist; moderate to strong very fine angular structure; peds shiny; estimated 65 to 70 percent coarse fragments; angular and subrounded fragments of limestone, chalk, quartz, some stones smooth and calcium-free above and having precipitated pendents below; ironstone and fine pebbles; soil fines tongue in and through horizon; shiny surfaces on brown material and along cracks and cleavages; calcareous throughout; clear wavy lower boundary.

IIIC1 18222 40 to 52 inches. White, grayish, brownish, and yellowish silt loam bedded with limestone and marly clays; about 30 percent of surface covered with brown stains; some Fe-Mn coatings; some shiny faces on fines and coating the rock; calcareous; pH 8.3; gradual wavy to irregular boundary.

IIIC2 18223 52 to 65 inches. Much mottled marl and limestone; thin strata and nodular (grays, yellows, yellowish brown); marl gray, yellow and brown having hard strata of limestone; coatings of black Fe-Mn on fragments along partings; calcareous.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

IIB23 - gravelly clay
IIIC1 - silty clay

SOIL CLASSIFICATION-TYPIC PALEUSTALF
FINE, MIXED, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SERIES - - - - - - -WICHITA

SOIL NO - - - - - - S57TX-104-90 COUNTY - - - HASKELL

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K629-633

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (SAND) SAND 2- .05	SAND .05- .002	SILT .002- LT	CLAY LT	SAND VCOS 2- 1	SAND CORS 1- .5	SAND MEDS .5- .25	SAND FNES .25- .10	SAND VFNS .10- .05	PARTICLE SIZE ANALYSIS (SAND) SAND 2- .05	SILT .05- .002	CLAY LT .002	CRSE CLAY .002- .0002	FINE CLAY LT .002	ETHYLENE GLYCOL RETAINED (B) LT 2 MM	LT .002 MM	LT .0002 MM	BULK DEN 4A3A
IN		PCT LT 2MM												PCT LT.002		MG/G			G/CC
000-7	AP	19.7	51.0	29.3		0.4	0.9	1.0	6.2	11.2				30	70	30.3	170	255	
007-25	B21T	17.1	47.3	35.6		0.2	0.7	0.8	5.5	9.9				28	72	41.9	177	253	
025-40	B22TCA	18.3	47.1	34.6		2.0	1.6	1.1	5.4	8.4				29	71	41.9	172	270	
040-58	B23TCA	9.3	56.8	33.9		2.1	1.5	0.6	2.4	2.9				42	58	52.3	140	229	
058-74	B24TCA	5.4	63.4	31.2		0.1	0.1	0.1	2.4	3.0				51	49	59.4	135	221	

DEPTH	ORGANIC MATTER 6A1A ORGN CARB	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	EXCHANGEABLE BASES 5B1B 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO CA 8D3 TO	CARB EQ 6E1E	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	MEQ / 100G								PCT	MG	PCT			
000-7	0.99					4.5	0.3	1.0			20.4	69A	101A			2.5	7.8		
007-25	0.75					9.8	1.8	0.5			26.5	75A	107A			2.9	7.9		
025-40	0.29					13.0	4.9	0.5			22.9	73A	107A			8.8	8.3		
040-58	0.12					10.5	6.1	0.5			20.6	60A	91A			27.9	8.3		
058-74	0.06					13.2	8.3	0.8			29.4	59A	95A			13.2	8.2		

DEPTH	(SATURATED PASTE) 8E1 REST OHM-CM	PH 8C1B	NA 8A H2O PCT	NA 5D2 ESP PCT	NA 5E SAR	SALT 8D5 TOTL SOLU PPM	GYP 6F1A PCT	SATURATION EXTRACT 8A1A EC MMHOS/CM	6N1B CA	6O1B MG	6P1A NA	6Q1A K	6I1A CO3	6J1A HCO3	6K1B CL	6L1A SO4	6M1A NO3	ATTERBERG 4F1 LQID LMIT PCT	4F2 PLST INDX PCT
IN									MEQ / LITER										
000-7																			
007-25			49	5	5	400		1.20	2.7	1.9	8.0	TR	1.0	7.6	2.1	4.0			
025-40			53	16	13	1000		2.90	2.6	3.8	23.9	TR	0.7	3.2	8.8	13.6			
040-58			54	17	14	2400		4.90	10.9	13.6	49.9	TR	0.3	3.1	13.2	64.0			
058-74			57	19	17	2200		6.00	5.5	8.2	45.3	0.1	0.8	2.0	22.6	31.4			

MINERALOGY DATA + (METHODS 7A1A THROUGH 7A1D AND 7A2A) S57TX-104-90.

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-7	QZ1 FD3	QZ1 FD3 MI3 KK3 CL3		MI2 KK2 QZ2 CL2	MT1 MI3 KK3
7-25	QZ1 FD3	QZ1 FD3 MI3 KK3 CL3		MI2 KK2 CL2 QZ2	MT1 MI3 KK3
25-40	QZ1 FD3	QZ1 FD3 MI3 KK3 CL3		MI2 KK2 QZ2 CL2	MT1 MI3 KK3
40-58	QZ1 FD3	QZ1 MI2 FD3 KK3 CL3		MI2 KK2 CL2 QZ2	MT1 MI3 KK3
58-74		QZ1 MI2 FD3 KK3 CL3		MI2 CL2 KK2 QZ3	MT1 MI3 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 60 PCT. 2 = 10 - 40 PCT. 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, CL=CHLORITE.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Typic Paleustalf; fine, mixed, thermic.
Soil: Wichita silty clay loam.
Soil Nos.: S57TX-104-90; K629-633.
Location: Haskell County, Texas. From intersection of Texas Highway 24 and U.S. Highway in Haskell, go east on Texas Highway 24 for 5.2 miles. Sample site is on the south side of the highway, 30 feet from edge of highway.
Topography: Gently sloping field with a convex surface and a 1-1/2 percent slope.
Sampled by: I. C. Mowery, August 1957.
Described by: I. C. Mowery.

Ap K629 0 to 7 inches. Reddish brown (5YR 5/4; 4/4, moist) silty clay loam; weak fine granular and subangular blocky; moderately firm, hard, sticky; noncalcareous; few small gravel; abrupt smooth boundary.

B21t K630 7 to 25 inches. Reddish brown (4YR 4/4; 3/4, moist) silty clay loam; moderate medium blocky; very firm, extremely hard, very sticky; noncalcareous; few patchy clayskins; few small ferromanganese concretions; few fine pores; occasional small gravel; gradual smooth boundary.

B22tca K631 25 to 40 inches. Yellowish red (5YR 4/6; 3/6, moist) silty clay loam; consistence and structure same as above; strongly calcareous; contains many soft and hard $CaCO_3$ concretions that occupy about 3 percent of the mass; many fine ferromanganese concretions; few fine gravel; gradual wavy boundary.

B23tca K632 40 to 58 inches. Dark reddish brown (2.5YR 3/4; 4/4, moist) silty clay loam that readily breaks down to small irregular aggregates which are coated with ferromanganese; strongly calcareous; large soft lumps of $CaCO_3$ occupy about 10 percent of the mass; gradual wavy boundary.

B24tca K633 58 to 74 inches. Same as above except only occasional soft lumps of lime, and contains some shaly Permian Red Bed material.

Remarks: 1. Pedon was sampled as Tillman clay loam. The soil differs from the Tillman series in having chroma of 4 in the epipedon (Ochric epipedon).

2. Textures above agree with laboratory data. Field textures where different are given below:

Ap - clay loam
B21t - clay
B22tca - clay
B23tca - clay
B24tca - clay

SOIL CLASSIFICATION-TYPIC PALEUSTALF, FINE, MIXED, THERMIC

SERIES - - - - - - -WICHITA

TEXAS AGRICULTURAL EXPERIMENT STATION

COLLEGE STATION, TEXAS

SOIL NO - - - - - - S57TX-138-91 COUNTY - - - KNOX

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K591-597

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (PCT LT 2MM) SAND								PARTICLE SIZE ANALYSIS (A) (PCT LT.002) SAND			CRSE CLAY	FINE CLAY	(ETHYLENE GLYCOL) RETAINED (B) LT 2 MM	LT .002 MM	LT .0002 MM	BULK DEN 4A3A G/CC
		SAND 2-.05	SILT .05-.002	CLAY LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	SAND 2-.05	SILT .05-.002	CLAY LT .002	CLAY .002-.0002	CLAY LT .0002		MG/G		
000-3	AP	20.1	44.4	35.5	0.0	0.3	0.3	11.8	7.7				41	59	32.1	132	197	
003-6	A1	20.1	42.5	37.4	0.1	0.4	0.3	11.5	7.9				39	61	32.1	130	195	
006-23	B21T	17.6	36.8	45.6	0.0	0.3	0.3	10.3	6.9				35	65	41.9	145	209	
023-49	B22T	18.8	38.0	43.2	0.7	0.6	0.3	10.0	7.3				37	63	41.6	147	213	
049-70	B23TCA	13.7	34.0	52.3	0.1	0.3	0.2	7.3	5.8				38	62	46.2	140	196	
070-97	B24TCA	11.5	37.5	51.0	0.3	0.8	0.4	5.4	4.7				50	50	45.7	134	204	
097-116	CCA	7.0	45.9	47.2	1.7	1.5	0.3	2.0	1.5				73	27	40.0	79	142	

DEPTH IN	ORGANIC MATTER 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON 6C3 EXT FE PCT	PHOS 6S1A TOTL PCT	EXCHANGEABLE BASES 5B1B 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO CA TO MG	CA EQ 6E1E PCT	CARB 8C1A 1/1 H20	PH 8C1C 1/2 KCL	8C1E 1/2 CACL
						MEQ / 100G													
000-3	0.99					10.4	5.6	0.2	1.5	17.7	19.5	52A	75A	91	1.9		6.5		
003-6	0.99					10.0	5.8	0.2	1.4	17.4	19.5	52A	75A	89	1.7		6.5		
006-23	0.64						9.6	0.8	0.9		24.4	59A	83A			2.6	7.5		
023-49	0.29						11.1	2.0	0.8		23.0	61A	83A			3.5	7.8		
049-70	0.17						11.6	4.1	1.1		24.1	59A	78A			4.1	7.4		
070-97	0.17						10.5	4.1	1.1		23.5	55A	76A			10.1	7.5		
097-116	0.12						8.2	3.3	0.9		18.6	36A	61A			10.3	7.5		

DEPTH IN	SATURATED PASTE 8E1 REST OHM-CM	8C1B PH	8A H2O PCT	NA 5D2 ESP PCT	NA 5E SAR	SALT 8D5 TOTL SOLU PPM	GYP 6F1A PCT	SATURATION EXTRACT 8A1 8A1A EC NMHOS/CM	6N1B CA	6O1B MG	6P1A NA	6Q1A K	6I1A CO3	6J1A HCO3	6K1B CL	6L1A SO4	6M1A NO3	ATTERBERG 4F1 LQID LMIT PCT	4F2 PLST INDX
									MEQ / LITER										
000-3																			
003-A																			
006-23			49	3	2	180		0.50	1.7	1.4	2.5	TR	0.1	3.0	1.5	0.0			
023-49			54	6	4	1000		2.50	8.3	8.4	13.0	0.1	1.1	2.0	2.1	28.0			
049-70			59	7	7	4000		10.20	38.3	29.6	38.6	0.3	0.4	1.8	47.9	48.5			
070-97			56	7	7	4000		11.30	40.9	26.7	43.5	0.4	0.3	1.1	87.6	26.6			
097-116			43	9	7	2400		9.00	30.6	20.4	37.6	0.1	0.2	0.8	74.2	16.0			

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S57TX-138-91

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-3	QZ1 FD3	QZ1 MI2 FD3 KK3		MI2 KK2 QZ3 CL3	MV1 MI2 KK3
3-6	QZ1 FD3	QZ1 MI2 FD3 KK3		MI2 KK2 QZ3 CL3	MV1 MI2 KK3
6-23	QZ1 FD3	QZ1 FD3 MI3		MI2 KK2 QZ3 CL3	MT1 MI2 KK3
23-49	QZ1 FD3	QZ1 MI2 FD3 KK3		MI2 KK2 QZ3	MT1 MI2 KK3
49-70	QZ1 FD3	QZ1 MI2 FD3 KK3 CL3		MI2 KK2 QZ3 CL3	MT1 MI2 KK3 CL3
70-97	QZ1 FD3	QZ1 FD2 MI2 KK3 CL3		MI2 KK2 QZ3 CL3	MT1 MI2 KK3
97-116	QZ1 FD3	QZ1 MI2 KK3 CL3 FD3		MI2 KK3 QZ3 CL3	MI1 MV2 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, CL=CHLORITE, MV=DIFFUSE, HYDRATED, EXPANSIBLE AND MICACEOUS (13-18A).

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Typic Paleustalf; fine, mixed, thermic.
Soil: Wichita silty clay loam.
Soil Nos.: S57TX-138-91; K591-597.
Location: Knox County, Texas. From intersection of State Highway 283 and U.S. Highway 82 in Benjamin, go west along Highway 82, 2.1 miles; sample site is in edge of field 0.1 mile north of highway and 30 feet west of pasture fence. Cover: Cultivated field.
Topography: Surface gradient is about 3/4 percent.
Sampled by: I. C. Mowery, August 1957.
Described by: I. C. Mowery.

Ap K591 0 to 3 inches. Reddish brown (5YR 4/4; 3/4, moist) clay loam or silty clay loam; weak fine granular; moderately firm, very hard, sticky; noncalcareous; abrupt smooth boundary.

A1 K592 3 to 6 inches. Reddish brown (5YR 4/4; 3/4, moist) clay loam; weak medium and fine subangular blocky; firm, very hard, sticky; noncalcareous; few fine ferromanganese concretions; abrupt smooth boundary.

B21t K593 6 to 23 inches. Reddish brown (5YR 3.5/4, moist) clay; moderate medium blocky; very firm, extremely hard, very sticky; noncalcareous; few ferromanganese concretions; very few roots; gradual smooth boundary.

B22t K594 23 to 49 inches. Reddish brown (5YR 5/4; 4/4, moist) clay; consistence and structure same as B21t horizon; calcareous; contains a few weakly cemented $CaCO_3$ concretions and soft masses that occupy less than 1 percent of the mass; few ferromanganese concretions; gradual wavy boundary.

B23tca K595 49 to 70 inches. Reddish brown (2.5YR 4/4; 3/4, moist) clay; firm, very hard, slightly sticky; strongly calcareous and contains few to many soft lumps of $CaCO_3$ that occupy 2 to 3 percent of the mass; few ferromanganese concretions; aggregates, in spots, are coated with what appears to be ferromanganese; gradual wavy boundary.

B24tca K596 70 to 97 inches. Same as above but contains more, about 10 percent of the mass, in larger lumps of soft $CaCO_3$; gradual wavy boundary.

Cca K597 97 to 116 inches. Reddish brown (2.5YR 4/4; 3/4, moist) silty clay with lenses of greenish or bluish shale; soil mass is noncalcareous, but occasional soft lumps of $CaCO_3$ are present. This is Permian Red Beds.

Remarks: 1. Pedon was sampled as Tillman series. The soil differs from the Tillman series in having chromas of 4 in the epipedon (Ochric epipedon).

2. Textures above agree with laboratory data. Field textures where different are given below:

Ap - silty clay loam
A1 - heavy silty clay loam
B23tca - light silty clay
B24tca - light silty clay
Cca - shaley clay

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Aquic Arenic Paleustalf; loamy, siliceous, thermic

SOIL Nimrod fine sand SOIL Nos. S63TX-72-1 LOCATION Erath County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 18229-18239 March 1968
GENERAL METHODS: 1A, 1B1b, 2A1, 2B

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 2A2: 3B1 ≥ 2 (<19) Pct.	2 – 19 Pct. of < 76 mm	19 – 76 Pct. of < 76 mm
		Pct. of < 2 mm														
0-4	A11	88.1	10.1	1.8	0.2	1.6	15.9	60.1	10.3	7.7	2.4	43.5	77.8	tr		
4-17	A12-1	95.1	4.2	0.7	0.1	1.5	18.6	66.7	8.2	2.3	1.9	38.1	86.9	tr		
17-31	A12-2	93.3	5.8	0.9	0.3	1.3	15.9	66.2	9.6	3.5	2.3	42.7	83.7	tr		
31-32	IIB21t	69.0	12.0	19.0	0.4	1.2	11.3	48.3	7.8	4.6	7.4	33.9	61.2	tr		
32-39	IIB22t	62.0	7.7	30.3	0.1	1.0	10.9	43.3	6.7	3.8	3.9	30.2	55.3	tr		
39-51	IIB23t	67.8	9.9	22.3	0.1	0.8	10.0	47.5	9.4	5.5	4.4	37.1	58.4	tr		
51-63	IIB24t	68.8	12.2	19.0	0.1	0.9	10.1	47.3	10.4	6.5	5.7	39.9	58.4	tr		
63-72	IIB25t	66.9	12.8	20.3	0.6	1.3	9.9	44.9	10.2	6.3	6.5	38.1	56.7	tr		
72-86	IIB26t	50.8	10.8	38.4	1.9	1.5	7.0	31.5	9.8	5.3	5.5	32.2	41.0	3		
86-99	IIC1ca	52.1	18.9	29.0	2.6	3.9	9.8	26.4	9.4	8.5	10.4	31.1	42.7	9		
99-112	IIC2	68.6	16.8	14.6	0.4	1.2	8.5	44.2	14.3	11.0	5.8	49.6	54.3	tr		

Depth (In.)	6A1a Organic carbon b Pct.	6B1a Nitrogen Pct.	C/N	Carbonate as $CaCO_3$: 6E1b <2mm. Pct.	3A1a <0.002 mm. Pct.	6C2a Ext. Iron as Fe Pct.	Bulk density: 4A1a Field-State g/cc	4A1d 1/3-Bar g/cc	4A1b Air-Dry g/cc	4D1 COLE	Water content: 4B4 Field-State Pct.	4B1c 1/3-Bar Pct.	4B2 15-Bar Pct.	4C1 1/3-to 15-Bar in./in.	pH: 8C1b Sat. Paste	8C1a 1:1	8C1a 1:10
0-4	0.52	0.033	16			0.2	1.36c				2.6c		1.4			6.8	
4-17	0.07	0.009	8			0.2	1.45c				1.4c		0.8			6.0	
17-31	0.06	0.008	8			0.1	1.5 d						0.5			6.0	
31-32	0.28	0.020	14			0.5	1.5 d						5.2			6.8	
32-39	0.26	0.033	8			0.9	1.65	1.58	1.78	0.040	17.3	19.4	12.3	0.11		5.9	
39-51	0.11	0.012	9			0.5	1.80	1.72	1.83	0.020	12.6	17.0	9.2	0.13	4.9	4.6	
51-63	0.08	0.007	11			0.3	1.8 d						8.2			4.7	
63-72	0.05					0.4	1.93	1.86	1.96	0.017	11.3	13.1	8.4	0.09		5.0	
72-86	0.08					1.2							17.9		6.1	6.4	6.8
86-99	0.11			16	-	0.9	1.49	1.34	1.50	0.040	16.6	26.5	13.2	0.18	7.5	8.0	8.1
99-112	0.03			tr	-	0.2							6.3		7.6	8.0	8.0

Depth (In.)	Extractable bases: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	5B1a Sum	6H1a Ext. Acidity	Cat. Exch. Cap.: 5A3a Sum Cations	5A1a NH_4OAc	6G1b KCl-Ext. Al	Water extract from saturated paste: 6P1a Na	6Q1a K	8A1 Elec. Cond. mmhos/cm.	8E1 Resistivity g ohms-cm.	8D5 Total Sol. Salts In Soil ppm.
	meq/100 g									meq/liter				
0-4	2.4	0.3	-	0.1	2.8	0.5	3.3	2.6						
4-17	0.5	0.1	-	tr	0.6	0.5	1.1	0.7						
17-31	0.4	tr	-	tr	0.4	0.7	1.1	0.6						
31-32	5.0	1.0	-	0.2	6.2	1.9	8.1	5.8						
32-39	10.0	2.9	tr	0.6	13.5	4.8	18.3	14.5	tr					
39-51	7.4	2.1	tr	0.4	9.9	4.2	14.1	12.0	0.4			0.23	10,300	60
51-63	6.9	1.6	tr	0.4	8.9	4.2	13.1	10.8	0.6					
63-72	8.3	1.5	0.1	0.4	10.3	3.5	13.8	11.7	0.2					
72-86	19.7	3.2	0.2	0.8	23.9	3.4	27.3	23.4		0.5	tr	0.19		
86-99	17.6e	2.5f	0.1	0.6	20.8			18.1		0.6	0.1	0.32		
99-112	8.4e	1.3f	tr	0.3	10.0			9.6		0.4	0.1	0.28		

Depth (In.)	8A Water at Saturation Pct.	5D2 Exchangeable Na Pct.	5C1 Base Sat. NH_4OAc CEC Pct.	Gypsum Pct.	Ratios to Clay &D1: NH_4OAc CEC	Ext. Iron	15-Bar Water
0-4		<1	108				
4-17		<1	86				
17-31		<1	67				
31-32		<1	107		0.31	0.03	0.27
32-39		<1	93		0.48	0.03	0.40
39-51	40.0	<1	82		0.54	0.02	0.41
51-63		<1	82		0.57	0.02	0.43
63-72		<1	88		0.58	0.02	0.41
72-86	62.0	<1	102		0.61	0.03	0.47
86-99	47.8	<1			0.62	0.03	0.46
99-112	29.7	<1			0.66	0.01	0.43

a. The very coarse and coarse sands above 32 inches and between 63 and 99 inches contain a high proportion of Fe-Mn nodules. Carbonate comprises about 10 percent of the sand between 86 and 99 inches.
b. 3 kg/m^2 to 60 inches (Method 6A).
c. Core (Method 4A3a).
d. Estimated.
e. KCl-TEA extraction (Method 6N4b).
f. KCl-TEA extraction (Method 6O4b).
g. Resistivity measured at saturated paste is similar to that measured at moisture equivalent for medium- and fine-textured soils. For coarse-textured soils, resistivity generally decreases from moisture equivalent to saturated paste. Therefore, minimum values are reported.

	Horizon: All	IIB22t	IIB24t	IIB26t
Liquid Limit (Pct.)	21	33	28	47
Plasticity Index (Pct.)	3	19	14	32
Linear Shrinkage (Pct.)	0.4	8.3	5.7	15.1

Soil classification: Aquic Arenic Paleustalf; loamy, siliceous, thermic.
Soil: Nimrod fine sand.
Soil Nos.: S63TX-72-1, 18229-18239.
Location: Erath County, Texas; 18.2 miles west of Stephenville on FM Road 8; south 3.3 miles on county road; east of road 75 yards in field.
Vegetation and use: Oak, green briars (Smilex vines) and little bluestem.
Topography: Nearly level to gently undulating landscape having microrelief of low mounds and slightly depressed lows. Site about 1 percent, on both microknolls and low.
Drainage and permeability: Moderately well drained. Runoff is slow. Permeability is slow.
Parent material: Mixed; surface of transported sand; subsoil developing in sandy clay loams, sandy loams and sandy clays--presumed to be transported.
Sampled by and date: M. Stout, W. R. Elder, J. A. DeMent, and R. B. Grossman, April 16, 1963.
Described by: M. Stout and W. R. Elder.

A11 18229 0 to 4 inches. Light yellowish brown (10YR 6/4) fine sand; brown (10YR 5/3) when moist; structureless; single grained; loose when moist and dry; pH 7.0; abrupt irregular lower boundary.

A12-1 18230 4 to 17 inches. Light yellowish brown (10YR 6/4) fine sand; brown (10YR 5/3) moist; structureless; single grained; loose when moist and dry; 5 percent of brownish and blackish spots or mottles near old root channels; pH 5.8; arbitrary boundary for sampling purpose.

A12-2 18231 17 to 31 inches. Same as above, except abrupt lower boundary.

IIB21t 18232 31 to 32 inches. Very pale brown (10YR 7/4) fine sandy loam; light yellowish brown (10YR 6/4) moist; faintly mottled with strong brown and light gray; seemingly moderate coarse blocky having subangular stones or pebbles on upper boundary; pH 5.5; abrupt lower boundary.

IIB22t 18233 32 to 39 inches. Light gray (10YR 7/2) sandy clay loam; light brownish gray (10YR 6/2) moist; common medium fine mottles of yellowish red, very coarse strong prismatic structure; has films on some vertical sections; peds coated with very pale brown (10YR 7/4); extremely hard; very firm; pH 5.5; clear smooth boundary.

IIB23t 18234 39 to 51 inches. Prominently and coarsely mottled light gray (10YR 6/1) and red (2.5YR 4/6) sandy clay loam; strong coarse prismatic structure having apparent clay films of dull grayish brown along vertical faces; peds within are structureless massive; pH 5.5; very hard, firm; gradual smooth lower boundary.

IIB24t 18235 51 to 63 inches. Light gray (10YR 7/2) fine sandy loam; light brownish gray (10YR 6/2) moist; prominently and coarsely mottled with red and reddish yellow; strong coarse and very coarse prismatic structure having apparent clay films of grayish brown along vertical faces; peds within are structureless massive; pH 4.8; gradual smooth boundary.

IIB25t 18236 63 to 72 inches. Light gray (10YR 7/1) sandy clay loam; gray (10YR 6/1) moist with coarse, distinct brownish yellow mottles; strong coarse-very coarse prismatic structure; having apparent clay films of grayish brown; roots concentrated along vertical faces; few Fe-Mn concretions; peds within are structureless massive; pH 5.5; gradual lower boundary.

IIB26t 18237 72 to 86 inches. Light gray (10YR 7/1) sandy clay; gray (10YR 6/1) moist; with distinct medium to coarse strong brown mottles; weak coarse prismatic polished surfaces; common, about 3 percent Fe-Mn black concretions; common rounded quartz or other siliceous pebbles--fine; pH 6.5; gradual lower boundary.

IIC1ca 18238 86 to 99 inches. Much mottled gray (10YR 6/1) and brownish yellow (10YR 6/6) sandy clay loam containing estimated 35 percent soft and slightly hard $CaCO_3$ as nodules and masses; sandstone ghosts; hard crystalline limestone angular and subrounded fragments; Fe-Mn masses in interstices and fractures; seemingly massive in place with blocky structure in areas of clay concentration; siliceous, smooth shiny black and translucent ironstone in upper boundary; boundary clear with pocket of calcium extending into lower horizon about 1 inch.

IIC2 18239 99 to 112 inches. Light gray (10YR 7/1) fine sandy loam; gray (10YR 6/1) moist; mottles of brownish yellow; moderate blocky structure; very hard, very firm; calcareous and contains a few films and masses of $CaCO_3$; rests on underlying rock.

R 112 inches plus. Hard rock, unidentified.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

IIB21t - heavy sandy loam
IIB22t - heavy sandy clay loam
IIB24t - heavy sandy loam
IIB25t - light sandy clay loam
IIC2 - clay

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Aquic Arenic Paleustalf; loamy, siliceous, thermic

SOIL Nimrod fine sand SOIL Nos. S63TX-72-2 LOCATION Erath County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 18240-18248 March 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1: Total Sand (2–0.05) [a]	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: 3B1 > 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76 mm	
0-4	A11	90.1	8.4	1.5	-	0.3	3.3	65.0	21.5	5.0	3.4	71.5	68.6			tr		
4-15	A12-1	95.8	3.8	0.4	-	0.3	3.4	70.7	21.4	1.6	2.2	71.1	74.4			tr		
15-27	A12-2	95.4	4.1	0.5	tr	0.2	3.2	69.7	22.3	1.9	2.2	72.2	73.1			tr		
27-29	B21t	71.9	5.7	22.4	tr	0.3	2.7	52.0	16.9	2.3	3.4	55.5	55.0			tr		
29-40	B22t	63.9	5.8	30.3	tr	0.2	2.0	45.9	15.8	2.2	3.6	51.6	48.1			tr		
40-53	B23t	61.8	7.4	30.8	-	0.1	0.9	44.4	16.4	3.6	3.8	58.2	45.4			tr		
53-68	B24t	72.0	4.7	23.3	-	tr	0.7	62.9	8.4	3.0	1.7	62.6	63.6			tr		
68-80	IIC1	84.9	3.8	11.3	-	0.2	5.0	74.3	5.4	2.9	0.9	40.4	79.5			tr		
80-92	IIC2-1	87.3	3.2	9.5	-	0.9	15.1	64.6	6.7	2.0	1.2	29.6	80.6			tr		

Depth (in.)	6A1a Organic carbon [b]	6B1a Nitrogen	C/N		Carbonate as $CaCO_3$		Bulk density: 4A1a Field-State	4A1d 1/3-Bar	4A1b Air-Dry	4D1 COLE	Water content: 4B4 Field-State	4B1c 1/3-Bar	4B2 15-Bar	4C1 1/3-to 15-Bar		pH: 8C1b Sat. Paste	8C1a 1:1	8C1a 1:10
	Pct.	Pct.			Pct.		g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.				
0-4	0.68	0.049	14				1.42c				1.1		1.3			6.5	6.7	6.7
4-15	0.10	0.005	20				1.35c				0.4		0.3			6.2	6.4	6.0
15-27	0.07	0.005	14				1.45c				0.2		0.5			6.2	6.3	5.8
27-29	0.33	0.025	13				1.5 d						8.4			4.6	5.5	5.7
29-40	0.15	0.026	6				1.76	1.66	1.80	0.028	12.1	17.2	12.1	0.08		4.4	5.3	5.5
40-53	0.04	0.015	3				1.8 d						12.8			4.6	5.5	5.7
53-68	0.03	0.010	3				1.75	1.58	1.86	0.056	17.2	22.9	9.8	0.21		4.7	5.6	5.8
68-80	0.02												4.3			4.7	5.8	5.8
80-92	0.02												4.3			4.7	5.6	5.7

Depth (in.)	Extractable bases: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	5B1a Sum	6H1a Ext. Acidity	Cat. Exch. Cap.: 5A3a Sum Cations	5A1a NH_4OAc	6G1b KCl-Ext. Al	Water extract from saturated paste 8A1: 6P1a Na	6Q1a K	CO_3	HCO_3	Cl	SO_4	8A1a Electrical conductivity
	meq/100 g									meq/liter						mmho/cm
0-4	3.5	0.4	-	0.1	4.0	1.4	5.4	4.1	tr	0.1	0.2					0.19
4-15	0.4	0.1	-	tr	0.5	0.7	1.2	0.6	tr	0.1	0.1					0.12
15-27	0.3	0.1	-	tr	0.4	0.2	0.6	0.5	tr	0.1	0.1					0.10
27-29	4.4	2.6	tr	0.3	7.3	4.2	11.5	8.9	0.1	0.2	0.1					0.15
29-40	5.7	3.9	tr	0.5	10.1	6.4	16.5	13.1	0.6	0.1	0.1					0.10
40-53	7.4	4.8	tr	0.6	12.8	5.7	18.5	15.1	0.3	0.1	0.1					0.10
53-68	6.1	3.6	0.1	0.5	10.3	3.5	13.8	11.6	0.2	0.2	0.1					0.10
68-80	3.0	1.7	tr	0.3	5.0	1.9	6.9	6.0	0.1	0.2	0.1					0.11
80-92	2.5	1.5	tr	0.2	4.2	1.9	6.1	5.0	0.1	0.2	0.1					0.11

Depth (in.)	8A Water at Saturation	5D2 Exchangeable Na	5C1 Base Sat. NH_4OAc	Gypsum	Ratios to Clay 8D1: NH_4OAc CEC	Ext. Iron	15-Bar Water
	Pct	Pct.	CEC Pct.	Pct.			
0-4	29.0	<1	98				
4-15	27.0	<1	83				
15-27	26.6	<1	80				
27-29	31.4	<1	82		0.40		0.38
29-40	43.5	<1	77		0.43		0.40
40-53	46.3	<1	85		0.49		0.42
53-68	43.8	<1	89		0.50		0.42
68-80	28.2	<1	83		0.53		0.38
80-92	28.0	<1	84		0.53		0.45

a. Fe-Mn nodules comprise a major portion of the very coarse and coarse sand between 15 and 40 inches.
b. 3 kg/m^2 to 60 inches (Method 6A).
c. Core (Method 4A3a).
d. Estimated.

Soil classification: Aquic Arenic Paleustalf; loamy, siliceous, thermic.
Soil: Nimrod fine sand.
Soil Nos.: S63TX-72-2 ; 18240-18248 .
Location: Erath County, Texas. Six miles north of intersection of Highway 108 and FM Road 8; left (west) on Pidgeon Road (FM) 3.5 miles; left (south) on farm lane approximately 50 yards, thence left (east) in wooded tract, 75 yards.
Vegetation and use: Wooded area having oak, purple top, Scribner's panicum, little bluestem.
Topography: Nearly level to gently undulating landscape having undulating to moundy microrelief. Slope less than 1 percent at site.
Drainage and permeability: Moderately well drained. Runoff is slow. Permeability is slow.
Parent material: Mixed; surface of transported sand; subsoil developing in sandy clay loams, sandy loams, and sandy clays--presumed to also be transported.
Sampled by and date: M. Stout, W. R. Elder, J. A. DeMent, and R. B. Grossman, April 16, 1963.
Described by: M. Stout and W. R. Elder.

All 18240 0 to 4 inches. Light brownish gray (10YR 6.5/2) fine sand, grayish brown (10YR 4.5/2) moist; structureless, single grained; loose when dry, slightly friable to loose when moist; pH 8.0; thickness is variable; lower boundary abrupt and irregular.

A12-1 18241 4 to 15 inches. Very pale brown (10YR 7/3) fine sand, brown (10YR 5/3) moist; structureless, single grained; loose when moist and dry; 5 percent brownish and blackish spots near old root channels; pH 7.0; arbitrary boundary for sampling purposes.

A12-2 18242 15 to 27 inches. Very pale brown (10YR 7/3) fine sand; pale brown (10YR 6/3) moist; structureless-single grained; pH 6.8; discontinuous stone line of fine and medium gravel, ironstone fragments, quartz, limestone, and sandstone pebbles at lower boundary, which is abrupt and wavy to irregular with sand filling the voids in underlying horizon.

B21t 18243 27 to 29 inches. Mottled pale brown, yellowish brown, and reddish brown sandy clay loam forming rounded caps on columnar structure of underlying horizon; upper 1/16 inch to 1/4 inch surface light gray (10YR 7/1); breaks to moderate medium blocky structure; hard, slightly firm; pH 5.5; abrupt lower boundary.

B22t 18244 29 to 40 inches. Light gray (10YR 7/2) sandy clay loam; light brownish gray (10YR 6/2) moist; mottled with distinct fine olive brown and coarse strong brown in ped interiors; strong columnar structure breaking into coarse blocky structure or prisms and coated with gray (10YR 5/1) fine sand; apparent clay films on vertical peds; extremely hard; very firm; pH 5.5; lower boundary slightly wavy.

B23t 18245 40 to 53 inches. Light gray (10YR 7/2) sandy clay loam, light brownish gray (10YR 6/2) moist; distinctly mottled with coarse olive brown and red; strong coarse columnar structure breaking into coarse prisms or blocks; apparent clay films and sandy coating, on vertical faces or gray (10YR 5/1); extremely hard; very firm; few ferruginous sandstone fragments and Fe-Mn concretions; pH 5.5; gradual slightly wavy boundary.

B24t 18246 53 to 68 inches. Light gray (10YR 7/2) sandy clay loam; light brownish gray (10YR 6/2) moist; fewer coarse red and yellowish mottles than in layer above; strong coarse to very coarse columnar structure with few horizontal planes; ped interiors massive; vertical ped surfaces coated with gray and sandy surfaces; extremely hard; very firm; ferruginous sandstone fragments and Fe-Mn concretions; pH 5.5; diffuse lower boundary.

IIC1 18247 68 to 80 inches. Coarsely mottled, prominently red (2.5YR 5/6 dry and moist) and light gray (10YR 7/2) moist loamy sand with few streaks of white; dense, brittle; weak prismatic to massive structure becoming more massive with depth, roots penetrating to 80 inches, hard, friable; pH 6.5; gradual lower boundary.

IIC2-1 18248 80 to 92 inches. Light gray (10YR 7/2) loamy sand; light brownish gray (10YR 6/2) when moist; with prominent red mottles; weakly cemented with coarser grains than in horizon above and becomes more dense with depth; weak very coarse prismatic structure; hard, friable; pH 5.8.

IIC2-2 92 to 105 inches plus. Same as above, but not sampled.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

IIC1 - sandy loam
IIC2-1 - light sandy loam

SOIL CLASSIFICATION-ARIDIC PALEUSTALF
FINE-LOAMY, MIXED, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SERIES - - - - - - -AMARILLO

SOIL NO - - - - - - - S53TX-153-59 COUNTY - - - LYNN

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K82-87

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (SAND)									PARTICLE SIZE ANALYSIS (A)			(ETHYLENE GLYCOL)			BULK
		SAND 2-.05	SILT .05-.002	CLAY LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY .0002	RETAINED LT 2 MM	LT .002 MM	(B) LT .0002 MM	DEN 4A3A
IN		(- - - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - - -)											(PCT LT.002)		(- - MG/G - - -)			G/CC
000-7	AP	72.7	9.4	17.9		1.4	2.9	53.4	15.0	73.1	13.7	13.3	29	71	13.5	128		
007-20	B1	71.1	9.4	19.5	0.1	1.2	2.7	49.0	18.1	67.5	15.6	16.9	33	67	18.9	145		
020-34	B21T	60.1	14.7	25.2	0.1	1.2	2.2	39.7	16.9	56.1	21.3	22.7				145		
034-54	B22T	52.1	18.7	29.2	0.2	0.8	1.2	31.7	18.2	50.3	23.7	26.0	33	67	27.9	132		
054-75	B23TCA	35.4	26.8	37.8	0.6	2.0	1.6	21.1	10.1							163		
075-93	B3	41.9	25.5	32.6	0.3	1.5	1.4	26.4	12.3	58.5	17.7	23.8	37	63	29.3	157		

DEPTH	(ORGANIC MATTER) 6A1A ORGN CARB	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	(- EXTRACTABLE BASES 5B1A- -) 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	(CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO 8D3 CA TO MG	CA CARB EQ 6E1E	(- - - PH - - -) 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	(- - - - - - - - MEQ / 100G - - - - - - - - -)								PCT		PCT			
000-7	0.46					7.2	1.7	0.1	0.6	9.6	9.8		59A	98	4.2		7.5		
007-20	0.41					8.2	2.0	0.1	0.5	10.8	12.0		61A	90	4.1		7.2		
020-34	0.35					10.4	3.2	0.1	0.8	14.5	15.6		61A	93	3.3		7.5		
034-54	0.29						6.2	0.2	1.0		19.8		69A			7.5	8.0		
054-75	0.17						4.5	0.2	0.4		9.6		75A			53.2	8.4		
075-93	0.12						6.7	0.6	0.6		13.9		71A			37.5	8.4		

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Aridic Paleustalf; fine-loamy, mixed, thermic.
Soil: Amarillo fine sandy loam.
Soil Nos.: S53TX-153-59; K82-87.
Location: Lynn County, Texas; 1.6 miles west of Tahoka and 0.2 mile north of U.S. Highway 380.
Physiography: Nearly level upland of less than 1 percent gradient; cultivated.
Collected and described by: I. C. Mowery and E. H. Templin, June 30, 1953.

Ap 0 to 7 inches. Dark brown (7.5YR 4/4, 3/4 moist) fine sandy loam; friable; noncalcareous; gradual boundary.

B1 7 to 20 inches. Reddish brown (6YR 4/4, 3/4 moist) heavy fine sandy loam; friable, moderately hard; compound moderate medium granular and very coarse prismatic; porous; noncalcareous; gradual lower boundary.

B21t 20 to 34 inches. Reddish brown (6YR 4/4, 3/4 moist) sandy clay loam; friable, very hard; compound and moderate medium granular and very coarse prismatic; porous and permeable; noncalcareous; gradual lower boundary.

B22t 34 to 54 inches. Yellowish red (5YR 5/6, 4/6 moist) sandy clay loam; friable, very hard; weak coarse granular; porous; calcareous; films of $CaCO_3$ coat crevices and aggregates; abrupt lower boundary.

B23tca 54 to 75 inches. Pinkish white (7.5YR 8/2, 7/2 moist) clay loam; friable; porous and permeable; highly calcareous with perhaps 50 percent of $CaCO_3$ which is mostly disseminated but partly in concretions; diffuse lower boundary.

B3 75 to 93 inches plus. Pink (7.5YR 7/4, 6/4 moist) clay loam; friable; porous and permeable; highly calcareous; contains scattered soft white concretions of $CaCO_3$.

SOIL CLASSIFICATION-ARIDIC PALEUSTALF
FINE-LOAMY, MIXED, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SERIES - - - - - - -AMARILLO

SOIL NO - - - - - - S59TX-140-90 COUNTY - - - LAMB

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K853-859

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (SAND)								PARTICLE SIZE ANALYSIS (A)			CRSE FINE CLAY	(ETHYLENE GLYCOL) RETAINED		(B)	BULK DEN
		SAND 2-.05	SILT .05-.002	CLAY LT .002	VCOS 2-1	CORS 1-.5	MEOS .5-.25	FNES .25-.10	VFNS .10-.05	SAND .05-.002	SILT .002-.0002	CLAY LT .0002	.0002-.002	CLAY LT .0002	LT 2 MM	LT .002 MM	LT .0002 MM	4A3A
IN		(- - - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - - -)								(PCT LT.002)					(- - MG/G - - -)			G/CC
000-10	AP	70.9	17.8	11.3	0.0	0.7	1.9	48.1	20.3				27	73	8.8		215	1.41
010-20	B21T	40.0	30.0	30.0	0.0	0.6	1.4	24.1	13.9				24	76	30.8	162	218	1.53
020-28	B22T	35.8	30.2	34.0	0.0	0.5	1.2	21.7	12.5				24	76	33.1	166	227	1.55
028-40	B23T	44.2	28.3	27.5	0.0	0.6	1.5	26.4	15.5				22	78	28.4	144	220	1.61
040-66	B24TCA	54.8	22.8	22.5	0.1	1.0	1.9	34.5	17.3				24	76	25.1	174	242	1.78
066-78	B25TCA	52.5	25.8	21.7	0.3	1.6	2.5	36.5	11.7				21	79	21.8	199	246	
078-108	B26TCA	62.5	17.1	20.4	0.1	1.4	3.7	46.5	10.7				17	83	22.7	202	244	

DEPTH	ORGANIC MATTER 6A1A ORGN CARB	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	EXTRACTABLE BASES 5B1A 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO CA 8D3	CARB EQ 6E1E	CA 8C1A 1/1	PH 8C1C 1/2	8C1E 1/2
IN	PCT	PCT		PCT	PCT	(- - - - - - - - - MEQ / 100G - - - - - - - - -)								PCT	TO MG	PCT	H20	KCL	CACL
000-10	0.46					4.5	3.0	0.5	0.7	8.7	8.7	55A	79A	100	1.5		7.7	7.0	7.4
010-20	0.70					10.0	5.1	1.5	0.9	17.5	19.4	58A	78A	90	2.0		7.6	6.6	7.4
020-28	0.58					11.3	4.1	1.8	0.9	18.1	20.7	59A	81A	87	2.8		7.4	6.3	7.2
028-40	0.29					9.4	3.7	1.4	0.9	15.4	16.7	57A	77A	92	2.5		7.4	6.4	7.2
040-66	0.12						4.4	0.9	0.8		16.5	66A	91A			2.1	7.9	7.5	7.7
066-78	0.12						3.7	0.5	0.6		12.2	71A	92A			21.7	7.9	7.7	7.8
078-108	0.06						4.9	0.4	0.7		14.7	72A	92A			6.6	7.9	7.8	7.8

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A10 AND 7A2A) S59TX-140-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-10	QZ1 MI3	QZ1 FD2 MI3		MI2 KK2 QZ2 FD3	MV1 MI2 KK3
10-20	QZ1 MI3 FD3	QZ1 FD2 MI2 KK3		MI2 KK2 QZ2 FD3	MV1 MI2 KK3
20-28	QZ1 MI3 FD3	QZ1 FD2 MI2 KK3		MI2 KK2 QZ2	MV1 MI2 KK3
28-40	QZ1 MI3 FD3	QZ1 FD2 MI3 KK3		MI2 KK2 QZ2 FD3	MV1 MI2 KK3
40-66	QZ1 FD3 MI3	QZ1 FD2 MI3 KK3		MI2 KK2 QZ2 FD3	MT1 MI2 KK3
66-78	QZ1 MI3	QZ1 FD2 MI3 KK3		MI2 KK2 QZ2 MI3 FD3	MT1 MI2 KK3
78-108	QZ1 FD3 MI3	QZ1 FD2 MI3 KK3		MI2 KK2 QZ2 FD3	MT1 MI2 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT. 2 = 10 - 40 PCT. 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, MV=DIFFUSE, HYDRATED, EXPANSIBLE AND MICACEOUS (12-18A).

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Aridic Paleustalf; fine-loamy, mixed, thermic.
Soil: Amarillo fine sandy loam.
Soil Nos.: S59TX-140-90; K853-859.
Location: Lamb County, Texas. From intersection of Farm Road 54 and Highway 84 on southeast edge of Littlefield east on Highway 54 for 7.6 miles then south on county road for 0.3 mile then 125 feet west from middle of road into field. Cover: Cultivated; planted to dryland grain sorghum in 1958.
Topography: Nearly level convex slope of about 1 percent.
Sampled by: Allen L. Newman and George W. Kunze.
Described by: Allen L. Newman and George W. Kunze, April 1959.

Ap K853 0 to 10 inches. Brown (7.5YR 5/4; 4/4, moist) fine sandy loam; structureless; soft dry, very friable moist, slightly sticky wet; few fine roots; noncalcareous; abrupt boundary.

B21t K854 10 to 20 inches. Reddish brown (5YR 4/4; 3/4, moist) sandy clay loam; weak subangular blocky and granular; hard dry; friable moist, sticky wet; common very fine roots; it appears that this soil may have been plowed to this 20 inch depth at some time; noncalcareous; abrupt boundary.

B22t K855 20 to 28 inches. Reddish brown (5YR 4/4; 3/4, moist) sandy clay loam; moderate coarse prismatic and weak to moderate fine subangular blocky; hard dry, friable moist, sticky wet; common fine and very fine roots, tubes and pores; common earthworm burrows and casts; noncalcareous; gradual boundary.

B23t K856 28 to 40 inches. Yellowish red (5YR 5/6; 4/6, moist) clay loam; weak prismatic and subangular blocky; consistence as above; common fine roots; same organic stains in worm and root channels; noncalcareous; gradual boundary.

B24tca K857 40 to 66 inches. Reddish yellow (5YR 6/6; 4/6, moist) sandy clay loam; weak prismatic; hard dry, very friable moist, slightly sticky wet; many fine and medium pores and tubes; few wormcasts; prism faces have slight coating of $CaCO_3$; calcareous; gradual boundary.

B25tca K858 66 to 78 inches. Pink (5YR 7/4; 6/4, moist) sandy clay loam; porous; common medium concretions and some soft segregated $CaCO_3$; calcareous; gradual boundary.

B26tca K859 78 to 108 inches. Reddish yellow (5YR 7/6; 5/6, moist) sandy clay loam; porous and friable; contains very few fine concretions of $CaCO_3$; calcareous.

SOIL CLASSIFICATION-ARIDIC PALEUSTALF
FINE-LOAMY, MIXED, THERMIC

SERIES - - - - - - -AMARILLO

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S59TX-58-90 COUNTY - - - DAWSON

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K844-852

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (PCT LT 2MM) SAND 2-.05	SILT .05-.002	CLAY LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	PARTICLE SIZE (PCT LT.002) SAND 2-.05	SILT .05-.002	CLAY LT .002	ANALYSIS (A) CRSE CLAY .002-.0002	FINE CLAY LT .0002	ETHYLENE GLYCOL RETAINED (B) 2 MM	LT .002 MM	LT .0002 MM	BULK DEN 4A3A G/CC
000-4	AP	83.6	10.2	6.2	0.3	5.7	8.8	55.8	13.2				37	63	5.3		257	1.50
004-9	A12	65.7	20.2	14.2	0.1	3.1	5.3	41.5	15.7				28	72	13.6	150	262	1.60
009-14	B21T	62.9	18.5	18.6	0.2	3.2	5.0	39.8	14.7				39	61	16.2	167	264	1.49
014-29	B22T	58.3	21.1	20.6	0.2	3.4	4.7	36.8	13.2				28	72	21.7	177	238	1.60
029-38	B23T	49.3	24.9	25.8	0.3	2.5	3.3	30.2	13.1				31	69	28.2	176	241	1.59
038-59	B24TCA	56.6	19.2	24.2	0.4	2.8	3.6	34.7	15.2				25	75	24.6	203	251	1.43
059-75	B25TCA	47.2	30.4	22.4	0.5	3.5	3.7	27.7	11.9				24	76	20.6	207	274	
075-93	B26TCA	50.5	26.8	22.8	0.6	3.7	4.3	29.6	12.5				22	78	26.6	208	277	
093-110	2C	33.8	39.0	27.2	0.5	2.3	2.4	20.1	8.6				18	82	25.3	218	274	

DEPTH IN	ORGANIC MATTER 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON 6C3 EXT FE PCT	PHOS 6S1A TOTL PCT	EXTRACTABLE BASES 5B1A (MEQ / 100G) 6N2E CA	6Q2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO CA 8D3 TO MG	CA CARB EQ 6E1E PCT	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
000-4	0.23					7.4	0.5	0.1	0.5	8.5	6.3	61A	82A	100	14.8		8.1	7.7	7.6
004-9	0.46					8.4	0.8	0.1	0.7	10.0	11.0	59A	80A	91	10.5		7.7	6.9	7.3
009-14	0.41					8.8	1.1	0.1	0.6	10.6	12.5	64A	81A	85	8.0		7.5	6.4	7.1
014-29	0.35					10.5	1.8	0.1	0.5	12.9	14.2	63A	85A	91	5.8		7.5	6.4	7.2
029-38	0.29					13.3	2.6	0.1	0.6	16.6	17.3	63A	88A	96	5.1		7.6	6.6	7.3
038-59	0.17						3.0	0.1	0.6		15.8	73A	90A			2.1	7.9	7.4	7.6
059-75	0.12						3.4	0.2	0.5		12.2	73A	98A			23.8	8.2	7.7	7.8
075-93	0.06						5.0	0.2	0.6		14.7	74A	98A			17.4	8.2	7.6	7.8
093-110	0.06						3.6	0.2	0.4		10.9	78A	103A			44.9	8.3	7.8	7.8

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A10 AND 7A2A) S59TX-58-90.

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-4	QZ1 FD3 MI3	QZ1 FD3		MI2 KK2 QZ2 FD3	MV1 MI2 KK3
4-9	QZ1 FD3 MI3	QZ1 FD3 MI3		MI2 KK2 QZ2 FD3	MV1 MI2 KK3
9-14	QZ1 FD3 MI3	QZ1 FD3 MI3		MI2 KK2 QZ2 FD3	
14-29	QZ1 MI3 FD3	QZ1 FD3 MI3		MI2 KK2 QZ2 FD3	MV1 MI2 KK3
29-38	QZ1 FD3 MI3	QZ1 FD3 MI3		MI2 KK2 QZ2 FD3	MV1 MI2 KK3
38-59	QZ1 FD3 MI3	QZ1 FD3 MI3		MI2 KK2 QZ2 FD3	MV1 MI2 KK3
59-75	QZ1 FD3 MI3	QZ1 FD2 MI3		MI2 KK2 QZ2 FD3	MT1 MI2 KK3
75-93	QZ1 MI3 FD3	QZ1 FD2 MI3		MI2 KK2 QZ2 MT3 FD3	MT1 MI2 KK3
93-110	QZ1 MI3 FD3	QZ1 FD3 MI3		MI2 KK2 QZ2 FD3 MT3	MT1 MI2 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, MV=DIFFUSE, HYDRATED, EXPANSIBLE AND MICACEOUS (13-18A).

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Aridic Paleustalf; fine-loamy, mixed, thermic.
Soil: Amarillo loamy fine sand.
Soil Nos.: S59TX-58-90; K844-852.
Location: Dawson County, Texas. About 14 miles south of Lamesa turn east of U.S. Highway 87 onto county road at junction of Farm Road 828 and Highway 87. Site located 0.05 mile east of Highway 87 on south side of county road, 12 steps south into field south of power pole. Cover: Cultivated; to be in cotton in 1959.
Topography: Nearly level with slopes less than 0.8 percent.
Sampled by: Dupree Sanders and George W. Kunze, April 1959.
Described by: Dupree Sanders and George W. Kunze.

AP K844 0 to 4 inches. Brown (7.5YR 5/4; 4/4, moist) loamy fine sand; (light) weak granular; soft dry, friable moist; noncalcareous; abrupt boundary.

A12 K845 4 to 9 inches. Brown (7.5YR 4/3; 3/3) fine sandy loam; weak fine subangular blocky and granular; soft dry, friable moist; noncalcareous; clear boundary.

B21t K846 9 to 14 inches. Reddish brown (5YR 4/4; 3/4) fine sandy loam; weak to moderate fine subangular blocky; hard dry, friable moist; many fine pores; many wormcasts; noncalcareous; gradual boundary.

B22t K847 14 to 29 inches. Reddish brown (5YR 5/4; 4/4) sandy clay loam; moderate fine and medium subangular blocky; friable moist; many fine pores; common wormcasts; discontinuous clay films; noncalcareous; clear boundary.

B23t K848 29 to 38 inches. Yellowish red (5YR 5/6; 4/6) sandy clay loam; structure same as B22t; very hard dry, friable moist; common fine pores; common wormcasts; discontinuous clay films; clear boundary.

B24tca K849 38 to 59 inches. Yellowish red (5YR 5/6; 4/6) fine sandy loam; weak medium subangular blocky; hard dry, friable moist; common fine pores; few nests of wormcasts, except many at 42 inches to 43 inches; calcareous; many films and threads of calcium carbonate; abrupt boundary.

B25tca K850 59 to 75 inches. Pink (5YR 7/4; 5/4) loam; many hard and soft $CaCO_3$ concretions mostly about 1/2 inch diameter; estimated 40 percent $CaCO_3$.

B26tca K851 75 to 93 inches. Reddish yellow (5YR 6/6; 5/6) sandy clay loam; approximately 10 percent, soft $CaCO_3$ concretions; calcareous.

IIC, K852 93 to 110 inches. Pink (5YR 8/3; 7/3) loam; estimated 60 percent $CaCO_3$.

SOIL CLASSIFICATION-ARIDIC PALEUSTALF
FINE-LOAMY, MIXED, THERMIC

SERIES - - - - - - -AMARILLO

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S59TX-114-90 COUNTY - - - HOWARD

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K836-843

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (PCT LT 2MM) SAND 2-.05	SILT .05-.002	CLAY LT .002	SAND VCOS 2-1	SAND CORS 1-.5	SAND MEOS .5-.25	SAND FNES .25-.10	SAND VFNS .10-.05	PARTICLE SIZE ANALYSIS (A) (PCT LT.002) SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	(ETHYLENE GLYCOL) RETAINED (B) (MG/G) 2 MM	LT .002 MM	LT .0002 MM	BULK DEN 4A3A G/CC
000-5	AP	79.5	12.7	7.8	0.1	5.3	11.1	48.9	14.1				27	73	7.3	155	258	1.42
005-9	A12	64.1	18.0	17.9	0.1	3.8	7.7	39.2	13.4				22	78	17.4	161	259	1.62
009-12	A13	67.5	17.1	15.4	0.1	4.2	8.9	41.8	12.7				25	75	14.4	161	257	1.46
012-26	B21T	55.5	20.2	24.3	0.1	3.7	6.7	32.4	12.6				21	79	23.0	168	249	1.44
026-39	B22T	54.0	22.7	23.3	0.1	3.1	6.0	31.6	13.2				27	73	22.4	167	250	1.57
039-57	B23TCA	56.3	23.0	20.7	0.3	3.4	6.5	33.3	13.0				30	70	19.9	171	247	1.95
057-72	B24TCA	54.8	25.4	19.9	0.2	3.3	6.9	31.6	12.5				33	67	19.7	172	248	
072-96	BCA	52.7	29.3	18.0	0.4	3.6	7.0	31.8	9.9				32	68	18.6	188	275	

DEPTH IN	ORGANIC MATTER 6A1A ORGN PCT	6B1A NITG PCT	C/N	IRON 6C3 EXT FE PCT	PHOS 6S1A TOTL PCT	EXTRACTABLE BASES 5B1A (MEQ / 100G) 6N2B CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .002 MM	BASE SAT 6C2 PCT	RATIO CA TO MG	CA 6E1E CARB PCT	PH 8C1A H2O 1/1	8C1C KCL 1/2	8C1E CACL 1/2
000-5	0.23					5.5	1.2	0.1	0.5	7.3	6.3	62A	85A	100	4.6		8.1	7.7	7.6
005-9	0.35					7.9	2.0	0.1	0.5	10.5	13.0	64A	86A	81	4.0		7.8	7.0	7.4
009-12	0.35					7.2	1.5	0.1	0.6	9.4	11.4	64A	85A	82	4.8		7.6	6.8	7.3
012-26	0.35					8.6	2.6	0.1	0.7	12.0	14.9	66A	90A	81	3.3		7.4	6.5	7.1
026-39	0.23					13.1	2.8	0.1	0.5	16.5	18.8	66A	92A	88	4.7		7.8	7.2	7.5
039-57	0.12						3.8	0.2	0.6		14.0	67A	92A			3.2	8.0	7.6	7.7
057-72	0.12						4.9	0.3	0.6		12.7	68A	93A			6.0	8.1	7.7	7.7
072-96	0.12						5.2	0.5	0.6		11.0	70A	98A			20.8	8.2	7.8	7.8

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S59TX-114-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-5	QZ1 FD3 MI3	QZ1 FD2 MI3 KK3		MI2 KK2 QZ2 FD3	MV1 MI2 KK3
5-9	QZ1 FD3 MI3	QZ1 FD2 MI3		MI2 KK2 QZ2 FD3	MV1 MI2 KK3
9-12	QZ1 FD3 MI3	QZ1 FD2 MI3		MI2 KK2 QZ2 FD3	MV1 MI2 KK3
12-26	QZ1 MI3	QZ1 FD2 MI3 KK3		MI2 KK2 QZ2 FD3	MT1 MI2 KK3
26-39	QZ1 MI3	QZ1 FD2 MI3		MI2 KK2 QZ2 FD3	MT1 MI2 KK3
39-57	QZ1 MI3	QZ1 FD2 MI3 KK3		MI2 KK2 QZ2 FD3	MT1 MI2 KK3
57-72	QZ1 FD3	QZ1 FD2 MI3 KK3		MI2 KK2 QZ2 FD3	MT1 MI2 KK3
72-96	QZ1 FD3 MI3	QZ1 FD2 MI3		MI2 KK2 QZ2 FD3	MT1 MI2 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT. 2 = 10 - 40 PCT. 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, MV=DIFFUSE, HYDRATED, EXPANSIBLE AND MICACEOUS (13-18A).

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Aridic Paleustalf; fine-loamy, mixed, thermic.
Soil: Amarillo loamy fine sand.
Soil Nos.: S59TX-114-90; K836-843.
Location: Howard County, Texas. Eighty six steps south parallel to U.S. Highway 87 from power pole (with transformer) in north boundary fence row. Northwest portion of Big Spring Experiment Station. Cover: Grain sorghum residue.
Topography: Nearly level convex slope of less than 1 percent.
Sampled by: Harvey Oakes and George W. Kunze, April 1959.
Described by: Harvey Oakes and George W. Kunze.

Ap K836 0 to 5 inches. Brown (7.5YR 5/3; 4/3, moist) loamy fine sand; weak granular; slightly hard dry, friable moist; noncalcareous; abrupt boundary.

A12 K837 5 to 9 inches. Brown (7.5YR 5/3; 3/3, moist) fine sandy loam; weak fine and very fine granular; hard dry, friable moist; noncalcareous; clear boundary.

A13 K838 9 to 12 inches. Reddish brown (5YR 4/4; 3/4, moist) fine sandy loam; weak to moderate fine subangular blocky granular; hard dry, friable moist; noncalcareous; gradual boundary.

B21t K839 12 to 26 inches. Reddish brown (5YR 4/4; 3/4, moist) sandy clay loam; moderate fine subangular blocky and medium and coarse prismatic; very hard dry, firm moist; many fine pores; many wormcasts; thin discontinuous clay films more evident on vertical faces of prisms; noncalcareous; diffuse boundary.

B22t K840 26 to 39 inches. Yellowish red (5YR 5/6; 4/6, moist) sandy clay loam; weak fine subangular blocky and medium prismatic; hard dry, friable moist; many fine pores; common wormcasts; noncalcareous but lower 3 inches has few threads of $CaCO_3$ and is grayish brown - maybe as a krotovina; clear boundary.

B23tca K841 39 to 57 inches. Reddish yellow (5YR 6/5; 4/5, moist) sandy clay loam; weak fine subangular blocky; porosity and consistency same as in 26-39 inch horizon; calcareous with many films and threads of lime and few mostly soft $CaCO_3$ concretions 1/4 to 1/2 inch in diameter; gradual and wavy boundary.

B24tca K842 57 to 72 inches. Light reddish brown (5YR 6/4; 4/4, moist) fine sandy loam with about 10 percent of mass consisting of small soft and hard $CaCO_3$ concretions; calcareous; diffuse boundary.

Bca K843 72 to 96 inches. Light reddish brown (5YR 6/4; 4/4, moist) fine sandy loam; calcareous with common, but less visible $CaCO_3$ concretions than horizon just above; mostly soft $CaCO_3$ concretions.

SOIL CLASSIFICATION-ARIDIC PALEUSTALF
FINE-LOAMY, MIXED, THERMIC
SERIES - - - - - - -AMARILLO

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S59TX-114-91 COUNTY - - - HOWARD

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K874-879

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (PCT LT 2MM) SAND 2-.05	SILT .05-.002	CLAY LT .002	SAND VCOS 2-1	SAND CORS 1-.5	SAND MEDS .5-.25	SAND FNES .25-.10	SAND VFNS .10-.05	PARTICLE SIZE ANALYSIS (A) (PCT LT.002) SAND .05-2	SILT .002-.05	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	ETHYLENE GLYCOL RETAINED (B) 2 MM	LT .002 MM	LT .0002 MM	BULK DEN 4A3A G/CC
000-12	AP	53.8	24.7	21.6	0.0	0.4	1.9	31.8	19.7				26	74	21.1	160	225	1.38
012-22	B21T	39.3	28.5	32.2	0.0	0.3	1.2	22.4	15.4				25	75	34.2	172	246	1.44
022-40	B22TCA	38.9	33.4	27.6	0.2	0.6	1.0	21.6	15.7				24	76	27.4	175	255	1.29
040-56	B23TCA	43.2	30.8	26.0	0.2	0.4	1.0	23.9	17.8				21	79	29.9	179	242	1.56
056-84	B24TCA	25.8	37.8	36.4	0.9	1.0	0.8	12.7	10.4				23	77	33.1	213	283	1.69
084-100	B25TCA	27.8	37.8	34.4	0.4	0.8	0.9	13.6	12.1				22	78	38.2	213	281	

DEPTH IN	ORGANIC MATTER 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON 6C3 EXT FE PCT	PHOS 6S1A TOTL PCT	EXTRACTABLE BASES 5B1A (MEQ / 100G) 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A1 LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO 8D3 CA TO MG	CA CARB EQ 6E1E PCT	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
000-12	0.64					9.6	3.2	0.2	0.7	13.7	13.5	59A	83A	100	3.0		7.7	7.4	7.5
012-22	0.70					14.1	6.1	0.2	0.9	19.3	19.9	67A	91A	97	3.4		7.3	6.4	7.1
022-40	0.29						4.4	0.2	0.8		17.1	67A	90A			3.5	8.0	7.4	7.7
040-56	0.17						5.3	0.2	0.9		17.0	68A	87A			2.7	8.0	7.5	7.7
056-84	0.17						3.5	0.2	0.5		11.2	78A	101A			48.7	8.2	7.9	7.9
084-100	0.12						4.1	0.7	0.7		15.3	77A	102A			32.7	8.2	7.7	7.9

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1O AND 7A2A) S59TX-114-91

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-12	QZ1 FD3 MI3	QZ1 FD2 MI3		MI2 KK2 QZ2 FD3	MV1 MI2 KK3
12-22	QZ1 FD3 MI3	QZ1 MI2 FD3 KK3		MI2 KK2 QZ2 FD3	MV1 MI2 KK3
22-40	QZ1 FD3 MI3	QZ1 FD2 MI3 KK3		MI2 KK2 QZ2 MT3 FD3	MV1 MI2 KK3
40-56	QZ1 MI3 FD3	QZ1 FD2 MI3 KK3		MI2 KK2 QZ2 FD3	MV1 MI2 KK3
56-84	QZ1 FD3 MI3	QZ1 FD2 MI3 KK3		MI2 KK2 QZ2 FD3	MT1 MI2 KK3
84-100	QZ1 FD3 MI3	QZ1 FD2 MI3 KK3		MI2 KK2 QZ2 FD3	MT1 MI2 KK3

RELATIVE ABUNDANCE, 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, MV=DIFFUSE, HYDRATED, EXPANSIBLE AND MICACEOUS (13-18A).

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Aridic Paleustalf; fine-loamy, mixed, thermic.
Soil: Amarillo sandy clay loam .
Soil Nos.: S59TX-114-91; K874-879.
Location: Howard County, Texas. Eighty six steps south parallel to U.S. Highway 87 from power pole (with transformer) in north boundary fence row. Northwest portion of Big Spring Experiment Station.
Cover: Grain sorghum residue.
Topography: Nearly level convex slope of less than 1 percent.
Sampled by: Dupree Sanders and George W. Kunze, April 1959.
Described by: Dupree Sanders and George W. Kunze.

Ap K874 0 to 12 inches. Reddish brown (5YR 4/4; 3/4, moist) sandy clay loam; weak subangular blocky; hard dry, friable moist, sticky wet; has some clods from horizon below (about 15 percent) plowed into this layer; noncalcareous; abrupt boundary.

B21t K875 12 to 22 inches. Reddish brown (5YR 4/4; 3/4, moist) clay loam; moderate coarse prismatic and moderate fine subangular blocky; very hard dry, firm moist, very sticky and slightly plastic wet; common very fine roots, tubes and pores; few earthworm burrows and casts; thin patchy clay films on ped surfaces; noncalcareous; gradual boundary.

B22tca K876 22 to 40 inches. Reddish brown (5YR 5/4; 4/4, moist) clay loam; weak subangular blocky; hard dry, friable moist, sticky wet; threads and films of $CaCO_3$ and a few small lumps of soft segregated $CaCO_3$; calcareous; diffuse boundary.

B23tca K877 40 to 56 inches. Yellowish red (5YR 5/6; 5/6, moist) loam; weak subangular blocky; consistence as above; fine threads of $CaCO_3$; few organic stains; calcareous; clear boundary.

B24tca K878 56 to 84 inches. Pink (7.5YR 7/4; 6/4, moist) clay loam; contains much soft segregated $CaCO_3$ and a few concretions up to 15 mm diameter; calcareous; diffuse boundary.

B25tca K879 84 to 100 inches. Similar to horizon just above, except that this horizon contains less $CaCO_3$.

SOIL CLASSIFICATION-ARIDIC PALEUSTALF
FINE-LOAMY, MIXED, THERMIC
SERIES - - - - - - -PATRICIA

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S53TX-153-58 COUNTY - - - LYNN

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K88-95

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 SAND 2-.05	SILT .05-.002	CLAY LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	PARTICLE SIZE ANALYSIS (A) SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	(ETHYLENE GLYCOL) RETAINED (B) 2 MM	LT 2 MM	LT .002 MM	BULK DEN 4A3A G/CC
		(- - - - - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - - - - -)											(PCT LT.002)		(- - MG/G - - -)			
000-12	A1	91.6	2.2	6.2		0.8	2.8	73.5	14.5	91.7	4.7	3.7	59	41	4.2			
012-15	A3	90.5	3.1	6.4	0.1	0.9	3.0	72.7	13.8	89.3	5.1	5.7						
015-24	B21T-1	66.4	1.2	32.4	0.1	0.8	2.5	50.3	12.7	64.0	7.8	28.3	23	77	30.7	147		
024-33	B21T-2	70.5	2.4	27.1		0.7	2.9	53.7	13.2	68.9	8.5	22.7				150		
033-42	B22T-1	76.6	5.9	17.5		0.7	2.8	56.9	16.2	75.2	9.5	15.4				151		
042-51	B22T-2	70.4	5.9	23.7		0.7	2.2	51.7	15.8	68.4	12.1	19.5	25	75	22.7	162		
051-67	B23T	68.3	5.8	25.9		1.0	2.3	47.5	17.5	78.0	11.1	10.9	40	60	26.3	156		
067-75	BCA									62.4	14.5	23.0				155		

DEPTH IN	ORGANIC MATTER 6A1A ORGN PCT	6B1A MTTR PCT	C/N	IRON PHOS 6C3 EXT FE PCT	6S1A TOTL PCT	EXTRACTABLE BASES 5B1A 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A1 LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO CA 8O3 TO MG	CA CARB EQ 6E1E PCT	PH 8C1A 1/1 H20	8C1C 1/2 KCL	8C1E 1/2 CACL
						(- - - - - - - - - MEQ / 100G - - - - - - - - -)													
000-12	0.35					3.1	0.5	TR	0.2	3.8	4.1	55A		93	5.5		7.6		
012-15	0.29					3.1	0.7	TR	0.3	4.1	5.0	57A		82	4.6		7.3		
015-24	0.70					11.4	4.7	0.2	0.8	17.1	20.2	69A		85	2.4		7.2		
024-33	0.46					9.2	4.2	0.2	0.6	14.2	16.4	67A		87	2.2		7.1		
033-42	0.23					6.7	3.2	0.2	0.4	10.5	11.5	65A		91	2.1		7.1		
042-51	0.23					12.1	4.2	0.1	0.5	16.9	14.9	68A		100	2.9		7.3		
051-67	0.17						5.4	0.1	0.6		17.3	74A				8.4	8.3		
067-75	0.46						2.4	0.1	0.4			66A				64.0	8.3		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S53TX-153-58

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-12	QZ1	QZ1 FD2 MI3		NM2 MI2 QZ2	MN1 KK3
12-15	QZ1 FD3	QZ1 FD2 MI3		MI1 KK2 QZ3	MV1 MI3 KK3
15-24	QZ1 FD3	QZ1 FD2 MI3		MI1 KK2 QZ3	MV1 MI2 KK3
24-33	QZ1 FD3	QZ1 FD2 MI3 KK3		MI1 KK2 QZ3	MV1 MI2 KK3
33-42	QZ1 FD3	QZ1 FD2 MI3		MI1 KK2 QZ3	MI1 MI2 KK3
42-51	QZ1 FD3	QZ1 FD2 MI3 KK3		MI1 KK2 QZ3 FD3	MI1 MI2 KK3
51-67	QZ1 FD3	QZ1 FD2		MI1 MN1 KK3 QZ3 FD3	MI1 MI2 KK3
67-75	QZ1 FD3	QZ1 FD2 MI3 KK3		MI1 KK2 QZ3	MI1 MI2 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, MV=DIFFUSE, HYDRATED, EXPANSIBLE AND MICAEOUS (13-18A), MN=ILLITE-MONTMORILLONITE INTERSTRATIFIED.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Aridic Paleustalf; fine-loamy, mixed, thermic.
Soil: Patricia fine sand.
Soil Nos.: S53TX-153-58; K88-95.
Location: Lynn County, Texas, 10.8 miles west of Tahoka and 1.8 miles north of U.S. Highway 380.
Physiography: On a plane surface of 1 percent gradient in undulating upland. Native pasture.
Collected and described by: I. C. Mowery and E. H. Templin, July 1, 1953.

A1 K88 0 to 12 inches. Brown (7.5YR 5/3, 4/3 moist) fine sand; nearly loose; single grained; noncalcareous; slightly darker in upper 3 inches than below; clear lower boundary.

A3 K89 12 to 15 inches. Reddish brown (5YR 4/4 moist) fine sand; very friable; slightly hard; porous-massive; noncalcareous; clear lower boundary.

B21t K90 15 to 24 inches and K91 24 to 33 inches. Yellowish red (5YR 4/6, 3/6 moist) sandy clay loam; friable; very hard; porous; weak to moderate very coarse prismatic; noncalcareous; gradual lower boundary.

B22t K92 33 to 42 inches and K93 42 to 51 inches. Yellowish red (5YR 5/6, 4/6 moist) light sandy clay loam; friable; very hard; porous-massive; noncalcareous; gradual lower boundary.

B23t K94 51 to 67 inches. Yellowish red (5YR 5.5/6, 4.5/6 moist) fine sandy loam; friable; moderately hard; porous-massive; calcareous; films of $CaCO_3$ coat crevices and root channels; abrupt lower boundary.

Bca K95 67 to 75 inches plus. Pink (7.5YR 7/4, 6/4 moist) chalky sandy clay loam containing much $CaCO_3$ which is mostly disseminated but partially concentrated in friable whitish concretions; friable; porous and permeable. The base of this impure soft caliche could not be reached. It probably changes to less whitish and less highly calcareous clay loam at about 80 inches.

Remarks: This pedon was sampled as Brownfield, and the site was mapped Brownfield in the soil survey for Lynn County, Texas, issued March 1959. The Brownfield series is a member of the loamy, mixed, thermic family of Arenic Paleustalfs.

Textures above agree with laboratory data. Field textures where different are given below:

A3 - loamy fine sandy
B23t - light sandy clay loam
Bca - chalky clay loam

SOIL CLASSIFICATION-ARIDIC PALEUSTALF
FINE-LOAMY, MIXED, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SERIES - - - - - - -PATRICIA

SOIL NO - - - - - - S53TX-153-64 COUNTY - - - LYNN

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K96-102

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (- - - - - - SAND - - - - - -) SAND 2-.05 MM	SILT .05-.002 MM	CLAY LT .002 MM	VCOS 2-1 MM	CORS 1-.5 MM	MEDS .5-.25 MM	FNES .25-.10 MM	VFNS .10-.05 MM	PARTICLE SIZE ANALYSIS (- - - - - - PCT LT 2MM - - - - - -) SAND 2-.05 MM	SILT .05-.002 MM	CLAY LT .002 MM	(A) CRSE CLAY .002-.0002 MM	(A) FINE CLAY LT .0002 MM	(ETHYLENE GLYCOL) (B) RETAINED 2 MM	LT 2 MM	LT .002 MM	LT .0002 MM	BULK DEN 4A3A G/CC
000-16	A1	92.6	0.3	7.1		1.2	4.6	74.0	12.8	90.7	6.1	3.2	53	47	2.9				
016-18	A3	90.0	0.8	9.2		1.6	5.3	72.6	10.5	89.2	4.6	6.3						116	
018-27	B21T	70.4	3.0	26.6		0.9	3.2	56.9	9.4	68.6	5.7	25.7	22	78	27.6			148	
027-42	B22T	73.1	2.0	24.9		0.8	2.8	58.1	11.4	70.7	7.4	22.0						148	
042-66	B23T	71.6	4.7	23.7		0.8	2.7	53.1	15.0	69.5	8.1	22.5	23	77	28.4			153	
066-96	B3	76.5	6.7	16.8		0.8	2.5	56.7	16.5	74.3	10.0	15.7						162	
096-110	CCA	40.1	25.9	34.0	0.6	2.0	1.9	26.3	9.3	72.2	13.2	14.7	33	67	14.2			171	

DEPTH IN	ORGANIC MATTER 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON 6C3 EXT FE PCT	PHOS 6S1A TOTL PCT	EXTRACTABLE BASES 5B1A (- - - - - - - - MEQ / 100G - - - - - - - -) 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO 8D3 CA TO MG	CA CARB EQ 6E1E PCT	PH 8C1A 1/1 H2O	PH 8C1C 1/2 KCL	PH 8C1E 1/2 CACL
000-16	0.29					2.5	0.5	TR	0.2	3.2	3.6	62A		89	5.6		7.5		
016-18	0.29					2.5	0.6	0.1	0.4	3.6	4.6	52A		78	4.0		7.3		
018-27	0.29					8.0	5.3	0.2	0.4	13.9	17.8	65A		78	1.5		6.4		
027-42	0.23					6.9	4.6	0.2	0.4	12.1	16.5	62A		73	1.5		6.3		
042-66	0.17					8.1	4.9	0.3	0.5	13.8	16.7	63A		83	1.7		6.8		
066-96	0.12					6.8	4.0	0.3	0.5	11.6	13.1	67A		89	1.7	1.6	7.4		
096-110	0.23						2.9	0.5	0.3		9.0	77A				52.9	8.4		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S53TX-153-64

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-16	QZ1 FD3	QZ1 FD2		MI1 KK2 QZ3 FD3	MV1 MI2 KK3
16-18	QZ1	QZ1 FD2 MI3		MI1 KK2 QZ3	MV1 MI2 KK3
18-27	QZ1 FD3	QZ1 FD2 MI3		MI1 KK2 QZ3	MV1 MI2 KK3
27-42	QZ1 FD3	QZ1 FD1 MI3		MI1 KK2 QZ3	MV1 MI2 KK3
42-66	QZ1 FD3	FD1 QZ1 MI3		MI1 MN2 KK2 QZ3	MV1 MI2 KK3
66-96	QZ1 FD3	QZ1 FD1 MI3		MI1 MN2 KK2 QZ3	MT1 MI2 KK3
96-110	QZ1 FD3	QZ1 FD2 MI3		MI1 MN2 KK2 QZ3	MT1 MI3 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, MV=DIFFUSE, HYDRATED, EXPANSIBLE AND MICAEOUS (13-18A), MN=ILLITE-MONTMORILLONITE INTERSTRATIFIED.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Aridic Paleustalf; fine-loamy, mixed, thermic.
Soil: Patricia fine sand.
Soil Nos.: S53TX-153-64; K96-102.
Location: Lynn County, Texas; 11.9 miles west of Tahoka and 2 miles north of U.S. Highway 380.
Physiography: Gently undulating upland, surface gradient of about 1 percent; native pasture.
Collected and described by: I. C. Mowery and E. H. Templin, July 1, 1953.

A1 K96 0 to 16 inches. Brown (9YR 5/3, 3/3 when moist) fine sand; nearly loose; single grained; noncalcareous; slightly darker in the upper 3 inches than below; gradual lower boundary.

A3 K97 16 to 18 inches. Yellowish red (5YR 5/5, 4/5 when moist) fine sand; very friable, slightly hard; porous-massive; noncalcareous; clear lower boundary.

B21t K98 18 to 27 inches. Red (3YR 5/8, 4/8 when moist) sandy clay loam; friable; very hard; very coarse prismatic; porous and permeable; noncalcareous; gradual lower boundary.

B22t K99 27 to 42 inches. Yellowish red (5YR 5/7, 4/7 when moist) sandy clay loam; friable, very hard; porous-massive; noncalcareous; gradual lower boundary.

B23t K100 42 to 66 inches. Yellowish red (5YR 5/7, 4/7 when moist) light sandy clay loam; friable, moderately hard; porous; massive; noncalcareous; gradual lower boundary.

B3 K101 66 to 96 inches. Yellowish red (5YR 5/8, 4/8 when moist) fine sandy loam; friable, slightly hard; porous-massive; noncalcareous to 90 inches and moderately calcareous below 90 inches; abrupt lower boundary.

Cca K102 96 to 110 inches plus. Pinkish white (7.5YR 8/2, 7/2 when moist) chalky loam (soft caliche); friable, permeable; very highly calcareous.

Remarks: This pedon was sampled as Brownfield, and the site was mapped Brownfield in the soil survey for Lynn County, Texas, issued March 1959. The Brownfield series is a member of the loamy, mixed, thermic family of Arenic Paleustalfs.

Textures above agree with laboratory data. Field textures where different are given below:

A3 - loamy fine sandy
Cca - chalky fine sandy loam

SOIL CLASSIFICATION-ARIDIC PALEUSTALF
FINE-LOAMY, MIXED, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SERIES - - - - - - -SERIES NOT DESIGNATED

SOIL NO - - - - - - - S53TX-153-62 COUNTY - - - LYNN

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K75-81

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (SAND)									PARTICLE SIZE ANALYSIS (A)			(ETHYLENE GLYCOL) RETAINED		(B)	BULK DEN
		SAND 2- .05	SILT .05- .002	CLAY LT .002	VCOS 2- 1	CORS 1- .5	MEDS .5- .25	FNES .25- .10	VFNS .10- .05	SAND 2- .05	SILT .05- .002	CLAY LT .002	CRSE CLAY .002- .0002	FINE CLAY LT .0002	LT 2 MM	LT .002 MM	LT .0002 MM	4A3A
IN		PCT LT 2MM											PCT LT.002		MG/G			G/CC
000-8	AP	78.7	10.5	10.8		0.6	1.3	58.2	18.6	73.5	12.4	14.3	31	69	13.5	119		
008-20	B21T	59.6	13.6	26.8		0.4	1.2	40.2	17.8	57.4	21.6	21.1	27	73	23.1	130		
020-30	B22T	57.9	16.6	25.5	0.1	0.4	1.0	38.2	18.2	52.7	21.8	25.5				130		
030-40	B23T	53.9	15.3	30.8		0.4	1.1	35.7	16.7	50.5	22.2	27.4				130		
040-72	B24TCA	60.0	13.3	26.7	0.1	0.5	1.1	39.2	19.1	57.0	19.9	23.2	57	43	23.6	147		
072-96	B3CA	40.7	26.5	32.8	1.4	2.2	1.4	24.8	10.9	59.8	18.5	21.8				175		
096-120	C	51.2	20.3	28.5	0.9	1.4	1.2	33.6	14.1	64.2	17.6	18.2	59	41	18.9	172		

DEPTH	ORGANIC MATTER 6A1A ORGN CARB	6B1A NITG	C/N	IRON PHOS 6C3 EXT. FE	6S1A TOTL	EXTRACTABLE BASES 5B1A- 6N2E CA	6Q2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A1 LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO CA TO MG	CA EQ 6E1E	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	MEQ / 100G								PCT		PCT			
000-8	0.41					7.0	1.4	0.1	0.6	9.1	9.2	57A		99	5.0		7.7		
008-20	0.41					10.2	3.0	0.1	0.7	14.0	13.7	58A		100	3.4		7.5		
020-30	0.46					10.7	4.2	0.2	0.9	16.0	16.7	62A		96	2.5		7.4		
030-40	0.29					10.8	4.9	0.2	1.1	17.0	18.1	57A		94	2.2		7.7		
040-72	0.23						6.3	0.2	1.1		16.6	65A				6.9	8.1		
072-96	0.17						4.6	0.4	0.5		9.5	70A				51.3	8.4		
096-120	0.12						6.2	0.5	0.6		11.5	72A				36.4	8.4		

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Aridic Paleustalf; fine-loamy, mixed, thermic.
Soil: Series not designated.
Soil Nos.: S53TX-153-62; K75-81.
Location: Lynn County, Texas; 1.4 miles north and 0.4 mile east of Tahoka.
Physiography: Nearly level upland with gradient less than 1 percent; cultivated and irrigated.
Collected and described by: I. C. Mowery and E. H. Templin, June 30, 1953.

Ap 0 to 8 inches. Brown (7.5YR 4/4, 3/4 moist) fine sandy loam; friable; slightly hard; weak fine granular; noncalcareous; clear lower boundary.

B21t 8 to 20 inches. Brown (7.5YR 4/4, 3/4 moist) sandy clay loam; moderately hard; compound moderate medium granular and very coarse prismatic; porous; noncalcareous; gradual lower boundary.

B22t 20 to 30 inches. Reddish brown (6YR 4/4, 3/4 moist) sandy clay loam; friable, moderately hard; compound moderate medium granular and very coarse prismatic; porous; noncalcareous; gradual lower boundary.

B23t 30 to 40 inches. Yellowish red (6YR 4/6, 3/6 moist) sandy clay loam; friable, moderately hard; compound medium granular and coarse prismatic; noncalcareous; gradual lower boundary.

B24tca 40 to 72 inches. Yellowish red (5YR 5/6, 4/6 moist) sandy clay loam; friable, moderately hard; porous; massive to weakly granular; slightly calcareous; films of $CaCO_3$ coat crevices; abrupt lower boundary.

B3ca 72 to 96 inches. Impure whitish soft caliche clay loam in texture consisting of pink (7.5YR 8/5, 7/5 when moist) clay loam intermingled with white masses of impure $CaCO_3$; friable; porous and permeable; diffuse lower boundary.

C 96 to 120 inches plus. Pink (7.5YR 7/5, 6/5 moist) sandy clay loam; highly calcareous; soft $CaCO_3$ concretions occupy about 1/5 of the volume; friable; porous and permeable.

Remarks: This pedon was sampled as Amarillo, and the site was mapped Amarillo in the soil survey for Lynn County, Texas, issued March 1959. Depth to carbonates is greater than allowed in the Amarillo series. The Amarillo series is in the fine-loamy, mixed, thermic family of Typic Haplustalfs.

SOIL CLASSIFICATION Aridic Paleustalf; fine, carbonatic, mesic

SOIL Series not designated LOCATION Hansford County, Texas

SOIL NOS. S57TX-98-7 LAB. NOS. 5782-5787

SOIL SURVEY LABORATORY Lincoln, Nebraska DATE April 25, 1958

GENERAL METHODS 1A, 1B1a, 2A1, 2B

		PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2	
DEPTH INCHES	HORIZON	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 (<19mm.)	TEXTURAL CLASS
0-4	A11	0.9a	2.0a	3.8b	11.7b	14.4b	44.6	22.6	53.2	12.5	1	l
4-9	A12	1.2a	2.1a	4.4b	11.3b	13.3b	36.5	31.2	44.1	12.8	3	cl
9-15	B21ca	0.4a	1.2a	2.4b	7.1b	9.7b	34.8	44.4	31.0	18.2	1	c
15-20	B22ca	0.2a	0.7a	1.6b	5.1b	8.6b	35.2	48.6	24.2	23.1	1	c
20-30	B23tca	0.3a	0.7a	1.8b	6.3b	12.8b	34.2	43.9	31.2	20.4	Tr.	c
30-48	B24tca	0.5a	1.2a	2.7b	8.4b	14.3b	35.3	37.6	36.9	18.4	Tr.	cl

	pH 8C1a		ORGANIC MATTER			8A2	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM 8A1a	6E1a		MOISTURE TENSIONS		4B2
1:1	1:5	1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)		$CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
8.0	8.5	8.8	1.75	.151	12	<0.20	0.6	8				8.7
7.9	8.6	8.8	1.24	.132	9	<0.20	0.7	23				9.9
8.1	8.7	8.8	0.98	.103	10	<0.20	0.6	42				10.1
8.3	8.7	8.9	0.53	.055	10	<0.20	0.6	48				9.7
8.4	8.9	9.2	0.13	.019		<0.20	0.7	39				9.9
8.4	9.1	9.3	0.05			<0.20	0.7	30				11.5

5A1a	EXTRACTABLE CATIONS			5B1a	5D2	8A1 SATURATION EXTRACT SOLUBLE					8A
CATION EXCHANGE CAPACITY NH_4Ac	Ca	Mg	H	6P2a Na	6Q2a K	EXCH. Na %	6P1a Na	6Q1a K				MOISTURE AT SATURATION %
← milliequivalents per 100g. soil →							← milliequivalents per liter →					
14.5				-	0.8	-	0.2	0.4				47.8
13.0				-	0.5	-	0.3	0.2				49.2
11.8				-	0.3	-	0.3	0.1				47.2
9.9				0.1	0.3	1	0.5	0.1				48.8
11.0				0.2	0.4	1	1.2	0.1				52.0
13.4				1.0	0.5	6	3.9	0.1				57.0

a. Many $CaCO_3$ concr.
b. Few $CaCO_3$ concr.

Soil classification: Aridic Paleustalf; fine, carbonatic, mesic.
Soil: Series not designated.
Soil Nos.: S57TX-98-7; 5782-5787.
Location: 800 feet south of the junction of FM Roads 278 and 520 on FM Road 278, then 750 feet southwest on a ranch road. The junction of FM Roads 278 and 520 is 1.5 miles east and 4 miles north of the Morse Community and 10 miles southwest of Gruver. (Northeast corner Sec. 6, Block 5T, Texas and New Orleans Railroad.)
Vegetation: Buffalograss, three-awn grasses, blue grama, side-oats grama, sand dropseed, prickly pear and yucca. A virgin area.
Physiography: Upland.
Area: Hansford County, Texas.
Relief: Complex slope with about 1.5 percent gradient between steeper Potter areas and Pullman soils. Sampled within an area of less than 100 acres.
Collected by: R. E. Daniell, J. S. Allen, W. Brooks, L. Jucquot, M. Turner, P. Mohle, and A. J. Welker.
Described by: R. E. Daniell, June 20, 1957.

A11 5782 0 to 4 inches. Brown (10YR 5/3, 3/3 moist) loam; moderate fine subangular blocky and granular; friable moist; slightly hard dry; common to many wormcasts; many pores about 1 mm in diameter; highly calcareous; few small hard $CaCO_3$ concretions 2 to 6 mm in diameter; gradual boundary.

A12 5783 4 to 9 inches. Pale brown (10YR 5/3, 4/3 moist) clay loam; same structure, consistency and porosity as A11 horizon; few more wormcasts and small hard concretions of $CaCO_3$ in A11; highly calcareous; gradual boundary.

B21ca 5784 9 to 15 inches. Pale brown (10YR 6/2.5, 4.5/3 moist) clay; weak fine subangular blocky and granular; friable moist; slightly hard dry; many wormcasts; many pores about 1 mm in diameter; highly calcareous; common hard and soft $CaCO_3$ concretions up to 15 mm in diameter; clear boundary.

B22ca 5785 15 to 20 inches. Light yellowish brown (10YR 6/3, 5/3) clay; friable, moist; hard dry; common fine pores; common wormcasts; many old biological cavities filled with pale brown fine-earth material; many soft and few hard $CaCO_3$ concretions; estimated 25 percent by volume of $CaCO_3$; highly calcareous; clear boundary.

B23tca 5786 20 to 30 inches. Reddish yellow (7.5YR 6/6, 5/6 moist) clay; weak fine subangular blocky and angular blocky; firm moist; hard to very hard dry; common pores less than 1 mm in diameter; highly calcareous; common soft $CaCO_3$ concretions up to 8 mm in diameter; common specks and threads of $CaCO_3$; gradual boundary.

B24tca 5787 30 to 48 inches. Reddish yellow (7.5YR 7/5, 5/8 moist) clay loam; very weak blocky and subangular blocky; friable to firm moist; very hard dry; few to common pores less than 1 mm in diameter; highly calcareous; common soft and hard $CaCO_3$ concretions up to 8 mm in diameter; many $CaCO_3$ concretions in 30- to 38-inch layer.

Remarks: Roots are numerous in the A11 and A12 horizons and decrease with depth to few at 20 inches and below.

This pedon was sampled as Mansker and appears as Mansker in the soil survey for Hansford County, Texas, issued June 1960; some of the data are listed on pages 37 and 38 of the soil survey. The Mansker series is in the fine-carbonatic, thermic family of the Typic Calciustolls.

Textures above agree with laboratory data. Field textures where different are given below:

A11 - clay loam
B21ca - clay loam
B22ca - clay loam
B24tca - clay

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Udertic Paleustalf; fine, montmorillonitic, thermic

SOIL Axtell very fine sandy loam SOIL Nos. S62TX-129-4 LOCATION Kaufman County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 17768-17774 May 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (In.)	Horizon	Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05) [a]	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 Clay to Clay	Fine Clay to Clay	Coarse fragments 2A2: 3B1 > 2	2 – 19	19 – 76
		Pct. of < 2 mm												Pct.	Pct.	Pct.	Pct. of < 76 mm	
0-6	A1	55.8	38.1	6.1	0.1	0.3	1.1	24.0	30.3	24.8	13.3	73.7	25.5	55	45	-		
6-14	B21t	30.0	29.2	40.8	0.2	0.2	0.6	12.6	16.4	16.8	12.4	42.9	13.6	26	74	-		
14-25	B22t	33.8	33.2	33.0	0.1	0.2	0.6	14.8	18.1	17.6	15.6	47.0	15.7	29	71	-		
25-39	B23t	34.9	32.2	32.9	0.1	0.1	0.5	16.2	18.0	15.6	16.6	45.9	16.9	33	67	-		
39-61	B24t	56.9	21.2	21.9	-	tr	0.6	38.7	17.6	12.8	8.4	59.4	39.3	33	67	-		
61-76	B3	71.0	13.8	15.2	-	tr	0.8	54.3	15.9	7.7	6.1	63.2	55.1	35	65	-		
76-90	IIC1&R	88.4	2.8	8.8	-	0.1	5.3	77.8	5.2	1.1	1.7	39.5	83.2	35	65	-		

Depth (In.)	6A1a Organic carbon [b] Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. Iron as Fe Pct.	6E2a Carbonate as $CaCO_3$ Pct.	Bulk density: 4A1a Field-State g/cc	4A1d 1/3-Bar g/cc	4A1b Air-Dry g/cc	4D1 COLE	Water content: 4B4 Field-State Pct	4B1c 1/3-Bar Pct.	4B2 15-Bar Pct.	4C1 1/3-to 15-Bar in./in.	6G1b KCl-Ext. Al meq/100g	pH: 8C1b Sat. Paste	8C1a 1:1	8C1a 1:10
0-6	0.44	0.030	15	0.2		1.53	1.52	1.51	-	10.0	13.9	2.5	0.17	0.2		5.1	
6-14	0.25	0.031	8	0.8		1.55	1.50	1.80	0.064	19.6	21.4	16.6	0.07	4.4	3.7	4.6	4.6
14-25	0.21	0.020	10	0.6		1.79	1.60	1.86	0.052	10.0	18.3	13.7	0.07	1.8	3.8	4.4	4.7
25-39	0.17			0.4		1.87	1.66	1.91	0.047	9.4	18.2	13.4	0.08	0.2	4.4	5.0	5.3
39-61	0.06			0.4	-(s)	1.86	1.67	1.86	0.036	8.3	16.7	10.2	0.11	-	6.2	6.5	6.7
61-76	0.06			0.4	-(s)							6.8		-	6.0	6.6	6.7
76-90	0.08			0.3	-(s)							3.9		tr	6.1	6.5	6.6

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum	6H1a Ext. Acidity	Cat. Exch. Cap.: 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 8A1: Ca	Mg	6P1a Na	6Q1a K	CO_3	HCO_3	Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter								mmho/cm
0-6	1.4	0.6	tr	0.2	2.2	3.5		3.5									
6-14	8.9	6.6	0.8	0.4	16.7	11.1	25.2	22.5			1.0	tr					0.17
14-25	8.5	6.2	0.9	0.4	16.0	7.1	20.4	19.1			1.6	0.1					0.29
25-39	10.4	7.1	1.4	0.4	19.3	3.8	20.4	19.6			5.4	0.1					0.94
39-61	8.8	6.0	1.8	0.3	16.9	1.4	15.8	15.6			13.2	0.1					2.26
61-76	5.5	3.5	1.2	0.2	10.4	1.2	9.9	9.7			9.9	0.1					1.60
76-90	3.5	1.6	0.4	0.2	5.7	1.2	6.3	5.7			3.9	0.1					0.63

Depth (In.)	8A Water at Saturation Pct	5D1 Exchangeable Na Pct.	5C1 Base Sat. NH_4OAc CEC Pct.	6F1a Gypsum Pct.	Ratios to Clay 8D1: NH_4OAc CEC	Ext. Iron	15-Bar Water
0-6			63		0.57	0.03	0.41
6-14	54.4	3	74		0.55	0.02	0.41
14-25	49.3	4	84		0.58	0.02	0.42
25-39	52.9	5	98		0.60	0.01	0.41
39-61	44.0	8	108	tr	0.71	0.02	0.46
61-76	32.4	9	107	-	0.64	0.03	0.45
76-90	29.0	5	100	-	0.65	0.03	0.44

a. Fe-Mn nodules comprise more than 50 percent of the very coarse and coarse sand and 5 to 25 percent of the medium sand.

b. 4 kg/m^2 to 60 inches (Method 6A).

Soil classification: Udertic Paleustalf; fine, montmorillonitic, thermic.
Soil: Axtell very fine sandy loam.
Soil Nos.: S62TX-129-4; 17768-17774.
Location: About 4.4 miles east of Kemp on FM 1391, south 0.7 mile on oil field road, and right on oil well service road 50 feet; site in post oak timbers on right of road.
Area: Kaufman County, Texas.
Cover: Post oak forest.
Parent material: Consists of sandy clay loams mostly with some stratification of more or less clayey materials in lower pedon.
Topography: Undulating landscape having convex surfaces and gradients of 1 to 3 percent; site near top of slope which terminates in a shallow drainageway.
Moisture at sampling: Variable, upper and lower pedon drier than middle which is about 50 percent field capacity.
Sampled by: J. A. DeMent and R. L. Juve, September 14, 1962.
Described by: M. Stout and W. R. Elder.

Ao 2 to 0 inch. Litter of post oak forest; mostly undecomposed except for lower 0.5 inch.

A1 17768 0 to 6 inches. Light gray (10YR 7/2) very fine sandy loam, brown (10YR 5/3) moist; structureless; massive in place, single grain and weakly cloddy disturbed; very friable to nearly loose; pH 4.5; light-colored coatings along lower boundary which is abrupt and slightly irregular due to tonguing of A1 into upper 1 inch of lower horizon.

B21t 17769 6 to 14 inches. Yellowish red (5YR 5/6) clay, darker yellowish red (5YR 4/6) moist; common coarse distinct mottles of light brownish gray (2.5Y 6/2); moderate medium continuous clay films; extremely hard; extremely firm; dark organic staining on vertical faces as if prismatic structure; pH 4.8; clear wavy lower boundary with horizon ranging from 6 to 10 inches in thickness.

B22t 17770 14 to 25 inches. Mottled grayish brown (2.5Y 5/2) and yellowish red (5YR 5/6) - 60 and 40 percent respectively - clay loam; weak to moderate medium and coarse blocky structure; very thin, faint clay films, continuous on unbroken peds; extremely hard; very firm; common, nearly black filled root channels; pH 4.8; gradual lower boundary.

B23t 17771 25 to 39 inches. Grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; common faint medium mottles of brown (10YR 4/3); strong coarse blocky structure breaking to weak to moderate fine and medium blocky; thin, faint, continuous films which are about 1 value darker in places; extremely hard; very firm; common very fine whitish spots, noncalcareous; pH 5.0; gradual lower boundary.

B24t 17772 39 to 61 inches. Light gray (2.5Y 7/2) light sandy clay loam; light brownish gray (2.5Y 6/2) moist; common medium and coarse distinct yellowish brown (10YR 5/8) mottles; strong very coarse blocky structure breaking to moderate to medium blocky; extremely hard; firm; common (8 percent) soft dark brownish to black Fe-Mn concretions; pH 6.0; gradual lower boundary.

B3 17773 61 to 76 inches. Same color as above; heavy fine sandy loam; weak blocky structure; dense and brittle; pH 6.0; gradual lower boundary.

IIC1&R 17774 76 to 90 inches. Very pale brown (10YR 7/4) weakly cemented sandy loam and sandstone, pale brown (10YR 6/3) moist; fine sand disturbed; fragments are extremely hard but brittle; extremely firm; yellowish brown coatings on upper surface of some partings; pH 6.0; augered.

IIIC2 90 to 112 inches plus. Strata of much mottled sandy clay loam underlain by coarser and less clayey materials at 112 inches; pH 6.0.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

A1 - fine sandy loam
B21t - sandy clay
B22t - sandy clay loam
B23t - sandy clay loam
B3 - light sandy clay loam
IIIC2 - sandy clay

Mineralogy data (Methods 7A1a through 7A1d and 7A2a)

Depth Inches	Sand 2-0.05 mm	Silt 0.05-0.002 mm	Coarse clay 0.002-0.0002 mm	Fine clay < 0.0002 mm
0-6	QZ1 FD3	QZ1 FD3	MI2 KK2 MT2 QZ2 FD2	MT1 MI3 KK3
6-14	QZ1	QZ1 MI3 KK3 FD3	KK1 MI2 MT2 QZ3	MT1 MI3 KK3
14-25	QZ1 FD3	QZ1 MI3 KK3 FD3	KK1 MI2 MT2 QZ3	MT1 MI3 KK3
25-39	QZ1	QZ1 MI3 KK3 FD3	KK1 MI2 MT2 QZ3	MT1 MI3 KK3
39-61	QZ1 FD3	QZ1 MI2 KK2 FD3	KK1 MI2 MT2 QZ3	
61-76	QZ1 FD3	QZ1 MI2 KK2 FD3	KK1 MI2 MT2 QZ3	MT1 MI3 KK3
76-90	QZ1 FD3	QZ1 MI2 KK2 FD3	KK1 MI2 MT2 QZ3	MT1 MI3 KK3

Relative abundance: 1 = > 40 percent, 2 = 10-40 percent, 3 = < 10 percent.
Mineral code: FD = feldspar, MI = mica or illite, KK = kaolinite, MT = montmorillonite, QZ = quartz.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Udertic Paleustalf; fine, montmorillonitic, thermic

SOIL Axtell fine sandy loam SOIL Nos. S62TX-129-5 LOCATION Kaufman County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 17775-17781 May 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1: Total Sand (2–0.05) a.	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: 3B1 ≥ 2 Pct.	2 – 19 Pct. of < 76 mm	19 – 76 Pct. of < 76 mm
		Pct. of < 2 mm																
0-6	A1	60.7	33.2	6.1	0.2	0.3	1.5	30.7	28.0	23.4	9.8	73.1	32.7			-		
6-17	B21t	28.6	24.4	47.0	-	0.1	0.5	13.7	14.3	13.5	10.9	38.0	14.3			-		
17-32	B22t	18.3	33.3	48.4	-	0.1	0.3	7.1	10.8	14.9	18.4	31.1	7.5			-		
32-44	B23t	20.8	45.5	33.7	-	0.1	0.2	4.3	16.2	27.8	17.7	47.5	4.6			-		
44-55	B24t	45.4	28.5	26.1	-	0.1	0.1	7.3	37.9	20.3	8.2	65.2	7.5			-		
55-70	IIC	10.2	48.7	41.1	-	tr	0.1	1.8	8.3	19.1	29.6	28.9	1.9			-		
70-85	R	44.0	33.8	22.2	-	tr	0.1	14.3	29.6	23.3	10.5	66.1	14.4			-		

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. Iron as Fe Pct.	6E2a Carbonate as $CaCO_3$ Pct.	Bulk density g/cc			Water content Pct.		4B2 15-Bar Pct.		6G1b KCl-Ext. Al me/100g	pH 8C1b Sat. Paste	8C1a 1:1	8C1a 1:10
0-6	0.63	0.045	14	0.3							2.8		-	5.5	5.7	5.9
6-17	0.37	0.036	10	0.6							16.4		2.5	3.7	4.4	4.5
17-32	0.24	0.020	12	0.6							17.4		1.9	3.6	4.3	4.4
32-44	0.15			0.7	-(s)						14.1			6.8	6.9	7.0
44-55	0.08			0.6	tr(s)						11.2			7.3	7.4	7.5
55-70	0.08			0.8	tr(s)						16.6			7.4	7.5	7.8
70-85	0.06			0.5	tr(s)						9.6			7.5	7.6	7.8

Depth (in.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum	6H1a Ext. Acidity	Cat. Exch. Cap.: 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	6L1a SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter									mmho/cm
0-6	2.7	0.8	tr	0.2	3.7	2.1		4.3	3.3	1.8	0.7	0.8		-	2.0	-	0.2	0.81
6-17	8.9	5.3	0.7	0.5	15.4	9.9	21.2	19.0	0.7	0.4	2.4	0.1		-	-	3.0	0.3	0.51
17-32	10.2	7.2	1.6	0.5	19.5	7.8	23.4	21.8	2.0	1.5	7.2	0.2		-	-	11.4	-	1.40
32-44	10.1b	6.2c	2.4	0.4	19.1	1.6	19.4	17.0	5.1	3.4	14.4	0.2		-	0.8	20.0	2.5	2.60
44-55	7.6b	4.9c	2.4	0.3	15.2	1.2	14.2	13.7	6.6	4.2	19.1	0.2		-	1.3	25.4	4.3	3.20
55-70	12.0b	7.3c	3.4	0.5	23.2	0.9	21.6	21.0	6.8	4.1	20.0	0.2		-	0.8	28.4	3.3	3.60
70-85	7.0b	4.0c	2.4	0.3	13.7	0.9	12.8	12.5	6.8	3.8	21.4	0.2		-	1.3	30.6	2.3	3.65

Depth (in.)	8A Water at Saturation Pct.	5D1 Exchangeable Na Pct.	5C1 Base Sat. NH_4OAc CEC Pct.	Gypsum Pct.	Ratios to Clay 8D1: NH_4OAc CEC	Ext. Iron	15-Bar Water
0-6	29.7		86		0.70	0.05	0.46
6-17	55.1	3	81		0.40	0.01	0.35
17-32	60.7	5	89		0.45	0.01	0.36
32-44	56.1	8			0.50	0.02	0.42
44-55	50.2	10			0.52	0.02	0.43
55-70	63.0	10			0.51	0.02	0.40
70-85	45.3	11			0.56	0.02	0.43

a. Organic matter fragments comprise most of the very coarse sand above 6 inches.
b. KCl-TEA extraction (Method 6N4b).
c. KCl-TEA extraction (Method 6O4b).

Soil classification: Udertic Paleustalf; fine, montmorillonitic, thermic.
Soil: Axtell fine sandy loam.
Soil Nos.: S62TX-129-5; 17775-17781.
Location: About 5.1 miles east of Kemp on FM 1391, south on graded road 1.6 miles; 150 feet east of road in post oak timbers.
Area: Kaufman County, Texas.
Cover: Post oak forest.
Parent material: Consists of sandy clay loams and sandy loams mostly with stratification of coarser and more clayey materials in lower pedon.
Topography: Undulating landscape having mostly convex surfaces with gradients about 2 percent; site near crest of small knoll but on downslope.
Moisture at sampling: About 40 percent field capacity in solum, becoming less in lower pedon.
Sampled by: J. A. DeMent and R. L. Juve, September 14, 1962.
Described by: M. Stout, H. Oakes, and W. R. Elder.

Ao 2 to 0 inch. Leaf litter of post oak forest, mostly undecomposed.

A1 17775 0 to 6 inches. Light brownish gray (10YR 6/2) light fine sandy loam, grayish brown (10YR 4.5/2) moist; structureless; massive in places breaking to single grain and weak clods; slightly hard to loose; very friable; pH 6.5; streaks of light gray along the abrupt irregular boundary extend 0.5 inch into lower horizon.

B21t 17776 6 to 17 inches. Red (2.5YR 4/6) clay, dark red (2.5YR 3/6) moist; few faint yellowish mottles; moderate medium blocky structure; thin, faint clay films of same color as ped interior; extremely hard; very firm; plastic; pH 5.0; gradual somewhat wavy lower boundary.

B22t 17777 17 to 32 inches. Clay with 60 percent light reddish brown (5YR 6/4) and 40 percent light yellowish brown (2.5Y 6/4), reddish brown (5YR 5/4) and light olive brown (2.5Y 5/4), respectively when moist; moderate medium blocky structure; thin faint continuous clay films; extremely hard; very firm; pH 5.0; gradual lower boundary.

B23t 17778 32 to 44 inches. Mottled reddish brown (5YR 5/4), light brownish gray (2.5Y 6/2), and yellowish brown (10YR 5/6) clay loam; moderate medium blocky structure but less defined than above; some darker coatings on some ped faces and thin faint continuous clay films on others; dark filling in root channels; extremely hard; very firm; few fine $CaCO_3$ concretions; pH 8.0; gradual lower boundary.

B24t 17779 44 to 55 inches. Mottled light yellowish brown (10YR 6/4), reddish brown (5YR 5/4), and light olive brown (2.5Y 5/4) loam; weak prismatic structure breaking easily to weak to moderate blocky; thin, mostly continuous clay films as coatings and bridging between sand grains; hard; friable; pH 8.0; clear lower boundary.

IIC 17780 55 to 70 inches: Mottled light brownish gray (2.5Y 6/2), yellowish brown (10YR 5/4) and reddish brown (5YR 5/4) silty clay; weak prismatic structure breaking to moderate medium blocky; extremely hard; extremely firm; plastic; pH 8.0; clear lower boundary.

R 17781 70 to 85 inches. Strong brown (7.5YR 5/6) weakly cemented sandy shale or sandstone seemingly structureless and without obvious cleavage; fragments are extremely hard, extremely firm and brittle; texture (disturbed) is a loam; pH 8.0; diffuse lower boundary (augered).

R 85 to 115 inches. Coarsely mottled brown and gray sandy clay (augered).

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

B21t - heavy sandy clay loam
B22t - sandy clay loam
B23t - light sandy clay loam
B24t - sandy loam
IIC - sandy clay
R - (disturbed) very fine sandy loam

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Udertic Paleustalf; fine, montmorillonitic, thermic

SOIL Crockett fine sandy loam SOIL Nos. S62TX-129-3 LOCATION Kaufman County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 17760-17767 March 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (In.)	Horizon	Size class and particle diameter (mm) — Total: Sand (2–0.05) [a]; 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 <0.002	Fine Clay to Clay [e] Pct.	Coarse fragments 2A2: 3B1 >2 Pct.; 2–19; 19–76 Pct. of < 76 mm
		Pct. of < 2 mm					
0-6	Ap	70.2 24.8 5.0	0.1 0.4 3.2 37.3 29.2	21.5 3.3 80.8	41.0	5 58	-
6-13	A1	55.7 32.4 11.9	tr 0.4 2.8 29.8 22.7	19.8 12.6 66.1	33.0	12 62	-
13-20	B21t	32.3 24.3 43.4	0.1 0.3 1.6 15.9 14.4	14.5 9.8 41.4	17.9	43 84	-
20-39	B22t	31.4 24.8 43.8	0.1 0.2 1.6 15.3 14.2	14.8 10.0 41.0	17.2	44 83	-
39-54	B23t	33.4 26.9 39.7	0.1 0.2 1.6 15.5 16.0	16.2 10.7 44.3	17.4	40 80	-
54-57	B3	33.2 23.8 43.0	- 0.2 1.4 14.4 17.2	13.4 10.4 42.3	16.0	43 73	tr
57-73	Cca	29.5 46.7 23.8	0.2 0.4 1.1 14.1 13.7	8.9 37.8 34.4	15.8	20 59	tr
73-80	C2	38.8 36.1 25.1	0.5 0.5 1.3 22.2 14.3	8.8 27.3 41.7	24.5	19 52	tr

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct	C/N	Carbonate as $CaCO_3$: 6E1b 6E2a <2mm Pct.; 3A1a <0.002 mm Pct.	6C2a Ext. Iron as Fe Pct.	Bulk density: 4A1a Field-State g/cc; 4A1d 1/3-Bar g/cc; 4A1b Air-Dry g/cc	4D1 COLE	Water content: 4B4 Field-State Pct; 4B1c 1/3-Bar Pct.; 4B2 15-Bar Pct.; 4C1 1/3-to-15-Bar in./in.	pH: 8C1b Sat. Paste; 8C1a 1:1; 8C1a 1:10
0-6	0.59	0.065	9		0.6			2.6	4.3
6-13	0.62	0.054	11		0.4	1.55 1.52 1.56	0.010	15.9 15.0 5.6 0.14	5.6
13-20	0.74	0.066	11		1.4	1.56 1.66		16.8 19.3	5.5
20-39	0.46				1.4	1.48 1.36 1.84	0.11	24.6 30.3 19.0 0.15	5.8
39-54	0.30				1.5	1.66 1.50 1.95	0.092	19.3 25.6 17.1 0.13	5.3 5.9 5.9
54-57	0.18			tr(s)	1.3			18.9	7.1 7.2 7.2
57-73	0.05			50	4 0.6	1.84 1.77 1.86	0.017	11.9 16.0 9.1 0.12	7.9 8.0 8.2
73-80	0.05			29	6 0.6	1.98 2.00		10.4 9.0	8.0 8.0 8.4

Depth (In.)	Extractable bases: 6N2a Ca; 6O2a Mg; 6P2a Na; 6Q2a K	5B1a Sum	6H1a Ext. Acidity	Cat. Exch. Cap.: 5A3a Sum Cations; 5A1a NH_4OAc	6G1b KCl-Ext. Al	Water extract from saturated paste 8B: 6P1a Na; 6Q1a K	8B1a Elec. Cond. mmhos/cm	8E1 Resistivity [d] ohms-cm	8D5 Total Sol. Salts in Soil ppm
	meq/100 g					meq/liter			
0-6	2.4 0.6 tr 0.1	3.1	3.7	6.8 4.8	0.3				
6-13	5.8 1.1 tr 0.1	7.0	3.7	10.7 8.3	tr				
13-20	21.8 2.5 0.1 0.5	24.9	7.9	32.8 26.1	0.2				
20-39	23.1 2.3 0.1 0.5	26.0	6.9	32.9 25.4	0.1				
39-54	25.0 1.8 0.1 0.5	27.4	4.7	32.1 26.2		0.2 0.1	0.12	3,500	70
54-57	29.5b 1.7c 0.1 0.6	31.9	2.6	34.5 29.8		0.4 tr	0.40		
57-73	13.0b 1.0c 0.1 0.2	14.3		10.5		0.4 tr	0.28		
73-80	12.3b 1.1c 0.1 0.2	13.7		10.0		0.4 tr	0.22		

Depth (In.)	8A Water at Saturation Pct.	5D2 Exchangeable Na Pct.	5C1 Base Sat. NH_4OAc CEC Pct.	Gypsum Pct.	Ratios to Clay: 8D2 NH_4OAc CEC	Ext. Iron	15-Bar Water
0-6		<1	64		0.96	0.12	0.52
6-13		<1	84		0.70	0.03	0.47
13-20		<1	95		0.60	0.03	0.44
20-39		<1	102		0.58	0.03	0.43
39-54	59.1	<1	104		0.66	0.04	0.43
54-57	59.8	<1	107		0.69	0.03	0.44
57-73	41.7	<1			0.53	0.03	0.46
73-80	41.0	<1			0.53	0.03	0.47

a. Fe-Mn nodules comprise a major portion of the very coarse and coarse sand above 57 inches. Carbonate comprises 10 to 20 percent of the sand below 57 inches.
b. KCl-TEA extraction (Method 6N4b).
c. KCl-TEA extraction (Method 6O4b).
d. Resistivity measured at saturated paste is similar to that measured at moisture equivalent for medium- and fine-textured soils. For coarse-textured soils, resistivity generally decreases from moisture equivalent to saturated paste. Therefore, minimum values are reported.
e. Soil treated for removal of $CaCO_3$ if present.

	C2 horizon
Liquid Limit (Pct.)	53
Plasticity Index (Pct.)	33
Linear Shrinkage (Pct.)	17.7

Soil classification: Udertic Paleustalf; fine, montmorillonitic, thermic.
Soil: Crockett fine sandy loam.
Soil Nos.: S62TX-129-3; 17760-17767.
Location: One and a half miles north of Terrell on FM 986 (Poetry Road) in cultivated field 100 feet east of road.
Area: Kaufman County, Texas.
Cover: Cultivated, small grain stubble.
Parent material: Residuum or sediments of sandy clay loam to sandy clays.
Topography: Undulating landscape with broad divides and long slopes, convex surfaces, and about 2 percent gradients; site midway downslope.
Moisture at sampling: About 50 percent field capacity in upper solum; much drier below.
Sampled by: J. A. DeMent and R. L. Juve, September 13, 1962.
Described by: M. Stout and W. R. Elder.

Ap 17760 0 to 6 inches. Grayish brown (10YR 5/2) fine sandy loam, dark brown (10YR 3/3) moist; structureless, massive in place breaking out into weak clods; hard; very friable; pH 5.0; abrupt lower boundary.

A1 17761 6 to 13 inches. Dark grayish brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak granular structure to structureless, massive; slightly hard; very friable; pH 6.0; clear wavy boundary (about 1-inch amplitude).

B21t 17762 13 to 20 inches. Grayish brown (10YR 5/2) clay, dark grayish brown (10YR 3.5/2) moist; many medium prominent mottles of dark red (2.5YR 3/6); weak coarse prisms breaking to moderate medium blocky structure having thin distinct continuous clay films; extremely hard; extremely firm; dark grayish streaks in and around old root channels; few medium pores; pH 6.0; clear wavy lower boundary which extends as much as 10 inches into lower boundary.

B22t 17763 20 to 39 inches. Light olive gray (5Y 6/2) light clay, olive gray (5Y 5/2) moist; common prominent medium mottles of reddish brown (5YR 4/4); strong medium and fine angular blocky structure; distinct thin continuous clay films; extremely hard; extremely firm; few pores, mostly closed; common soft fine brownish concretions; dark grayish flows or filled cracks on some vertical cleavages; pH 6.0; gradual lower boundary.

B23t 17764 39 to 54 inches. Light brownish gray (2.5Y 6/2) clay loam, grayish brown (2.5Y 5/2) moist; many medium distinct mottles of yellowish brown (10YR 5/6); strong medium and fine blocky structure; thin distinct continuous clay films; common slickensides up to 5 inches in width and having grooves and ridges oriented with sloping axis, spaced 2 to 4 inches apart; extremely hard; extremely firm; occasional sandy black coatings; common Fe-Mn concretions 2 to 5 mm in diameter; pH 7.0; clear lower boundary.

B3 17765 54 to 57 inches. Light brownish gray (2.5Y 6/2) clay, dark grayish brown (2.5Y 4/2) moist; few faint yellowish mottles; strong medium and fine blocky structure; slickensides more strongly expressed, few, and of greater width; extremely hard, very firm; pH 8.0; abrupt lower boundary.

Cca 17766 57 to 73 inches. Pale yellow (2.5Y 7/4) weakly cemented, brittle altered sandy shale, light olive brown (2.5Y 5/6) moist; breaks down to loam texture; common distinct medium mottles of dark yellowish brown (10YR 4/4) and about 20 to 30 percent white and gray $CaCO_3$ concretions and soft masses; few unidentified fossil forms; extremely hard but brittle; very firm intact, very friable broken; nonsticky; pH 8.0; diffuse lower boundary.

C2 17767 73 to 80 inches. Pale yellow (2.5Y 8/4) weakly cemented sandy shale, light yellowish brown (2.5Y 6/4) moist; crushed texture a loam; estimated 3 to 5 percent $CaCO_3$ soft masses in upper 3 inches, occasional below; becomes more brittle and dense with depth.

C3 80 to 140 inches. Light yellowish brown (2.5Y 6/5) weakly cemented shale, light olive brown (2.5Y 5/5) moist; apparent crushed texture, heavy fine sandy loam or light sandy clay loam; noncalcareous; occasional $CaCO_3$ mass; same as above.

Remarks: Sampled in part of pedon where the A horizon is thicker than average for the pedon. Thickness of A horizon varies from about 5 to 15 inches. Texture of B2 horizon called clay at time of sampling; believed to be a sandy clay to sandy clay loam containing much very fine sand and low silt content.

Textures above agree with laboratory data. Field textures where different are given below:

Ap - light fine sandy clay loam
B21t - sandy clay
B22t - light clay or sandy clay
B23t - sandy clay
B3 - sandy clay loam
Cca - sandy loam
C2 - sandy loam

Mineralogy data (Methods 7A1a through 7A1d and 7A2a) S62Tex-129-3

Depth Inches	Sand 2-0.05 mm	Silt 0.05-0.002 mm	Coarse Clay 0.002-0.0002 mm	Fine Clay < 0.0002 mm
0-6	QZ1	QZ1	KK1 MI2 MT2 QZ2	MV1 KK3 MI3
6-13	QZ1 FD3	QZ1 FD3	KK1 MI2 MV2 QZ2	MV1 KK3 MI3
13-20	QZ1 FD3	QZ1	KK1 MI2 MV2 QZ2	MV1 KK3 MI3
20-39	QZ1	QZ1	KK1 MI2 MV2 QZ2	MV1 KK3 MI3
39-54	QZ1	QZ1 KK3	KK1 MI2 MV2 QZ2	MT1 KK3
54-57	QZ1 FD3	QZ1 MI3 VR3 KK3 FD3	KK2 MI2 MT2 QZ2	MT1 KK3 MI3
57-73	QZ1	QZ1 MI3 KK3 FD3	KK2 MT2 QZ2 MI3	MT1 KK3 MI3
73-80		QZ1 MI3 KK3 FD3	KK2 MT2 QZ2 MI3	MT1 MI3 KK3

Relative abundance: 1 = > 40 percent, 2 = 10-40 percent, 3 = < 10 percent.
Mineral code: FD = feldspar, MI = mica or illite, KK = kaolinite, MT = montmorillonite, QZ = quartz, MV = diffuse, hydrated, expansible and micaceous (13-18Å).

SOIL CLASSIFICATION-UDERTIC PALEUSTALF
FINE, MONTMORILLONITIC, THERMIC

SERIES - - - - - - CROCKETT

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S63TX-175-90 COUNTY - - - NAVARRO

GENERAL METHODS- - -1A2,1B1B,2A1,7B SAMPLE NOS. K1445-1450

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 SAND									PARTICLE SIZE ANALYSIS (A)			(ETHYLENE GLYCOL) RETAINED			BULK
		SAND	SILT	CLAY	VCOS	CORS	MEDS	FNES	VFNS	SAND	SILT	CLAY	CRSE CLAY	FINE CLAY	LT	LT	LT	DEN
		2-.05	.05-.002	LT .002	2-1	1-.5	.5-.25	.25-.10	.10-.05	2-.05	.05-.002	LT .002	.002-.0002	LT .0002	2 MM	.002 MM	.0002 MM	4A3A
IN		PCT LT 2MM											PCT LT.002		MG/G			G/CC
000-8	AP	70.7	19.8	9.5									39	61				
008-19	B21T	34.3	18.1	47.7									20	80				
019-30	B22T	40.1	17.6	42.3									20	80				
030-51	B23T	46.3	18.4	35.2									25	75				
051-73	C1												26	74				
073-90	C2CA	68.0	16.4	15.6									41	59				

DEPTH	ORGANIC MATTER 6A1A ORGN CARB	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	EXTRACTABLE BASES 5B1A CA	MG	NA	K	SUM	CAT EXC CAP 5A2A LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO CA TO MG	CA EQ 6E1E	PH 1/1 H20	1/2 KCL	1/2 CACL
IN	PCT	PCT		PCT	PCT	MEQ / 100G				EXTB				PCT		PCT			
000-8	0.50					0.6	0.1	0.1		7.7	57A	81A					6.0		
008-19	0.90				16.5	2.9	0.1	0.4	19.9	31.3	73A	80A	64	5.7			6.0		
019-30	0.50				16.3	2.9	0.1	0.4	19.7	29.3	76A	83A	67	5.6			5.8		
030-51	0.30				16.1	2.6	0.2	0.3	19.2	25.7	81A	87A	75	6.2			5.8		
051-73	0.10				11.6	1.1	0.1	0.2	13.0	18.0	77A	98A	72	10.5			6.4		
073-90	0.10					0.6	0.1	0.2		11.1	71A	91A				1.0	8.2		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S63TX-175-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-8	QZ1	QZ1 MI3 FD3		MI1 KK2 MT2 QZ2	MV1 MI3 KK3
8-19	QZ1 FD3	QZ1 FD3		MI1 KK2 MT3 QZ2	MV1 MI3 KK3
19-30	QZ1 FD3	QZ1 FD3		MI1 KK2 QZ2	MV1 MI3 KK3
30-51	QZ1 FD3	QZ1 FD3		MI2 KK2 MT3 QZ2	MV1 KK3
51-73	QZ1 FD3	QZ1 MI3 KK3 FD3		MI2 KK2 MT2 QZ3 FD3	MT1 KK3
73-90	QZ1 FD3	QZ1 KK2 MI3 VR3 FD3		KK1 MI2 MT2 QZ3 FD3	MT1 KK3

RELATIVE ABUNDANCE, 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, VR=VERMICULITE, MV=DIFFUSE, HYDRATED, EXPANSIBLE AND MICACEOUS (13-18A).

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Udertic Paleustalf; fine, montmorillonitic, thermic.
Soil: Crockett fine sandy loam.
Soil Nos.: S63TX-175-90; K1445-1450.
Location: Navarro County, Texas; 1.8 miles south of Blooming Grove on Farm Road 55 on east side of road, 50 feet into cultivated field. Cover: Cultivated oats.
Topography: Gently undulating, 1.5 percent gradient.
Sampled by: Harvey Oakes, June 5, 1963.
Described by: Harvey Oakes.

AP K1445 0 to 8 inches. Grayish brown (10YR 5/2), brown (10YR 5/3) moist; fine sandy loam; structureless; very hard; friable; clear smooth lower boundary.

B21t K1446 8 to 19 inches. Mottled dark reddish brown and grayish brown (5YR 3/4 and 2.5YR 5/2) moist clay; moderate medium blocky; extremely hard, firm; few fine pores, distinct clay films; grades to olive gray (5Y 5/2) with 20 percent reddish brown mottles in lower part; gradual boundary.

B22t K1447 19 to 30 inches. Olive (5Y 5/3) moist clay with 10 to 20 percent by volume of medium prominent mottles of red; moderate medium blocky; extremely hard, firm; distinct clay films; few fine pores; red decreases and color becomes lighter with depth; gradual boundary.

B23t K1448 30 to 51 inches. Pale olive (5Y 6/3) dry; sandy clay with about 15 percent by volume of coarse prominent mottles of red and yellow; moderate medium blocky; extremely hard, firm; distinct clay films; few roots and fine pores; clear boundary.

C1 K1449 51 to 73 inches. Thin-bedded olive (5Y 5/4) sandy clay loam and yellow heavy fine sandy loam; no apparent structure.

C2ca K1450 73 to 90 inches plus. Thin-bedded yellow sandy loam and light gray sandy clay; some strata of the sandy loam 1 to 2 inches thick are weakly cemented; $CaCO_3$ concretions in thin strata 2 to 3 inches thick comprise 5 to 10 percent of the mass but only 3 such strata in this horizon.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

B22t - moist clay or sandy clay

SOIL CLASSIFICATION-UDERTIC PALEUSTALF
FINE, MONTMORILLONITIC, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SERIES - - - - - - -CROCKETT

SOIL NO - - - - - - S62TX-89-90 COUNTY - - - GONZALES

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K1224-1229

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1								PARTICLE SIZE ANALYSIS (A)				(ETHYLENE GLYCOL) RETAINED		BULK DEN
		SAND	SILT	CLAY	VCOS	CORS	MEDS	FNES	VFNS	SAND	SILT	CLAY	CRSE CLAY	FINE CLAY	LT 2 MM	LT .002 MM	4A3A
		2-.05	.05-.002	LT .002	2-1	1-.5	.5-.25	.25-.10	.10-.05	2-.05	.05-.002	LT .002	.002-.0002	LT .0002		.0002 MM	
IN		PCT LT 2MM								PCT LT 2MM			PCT LT .002		MG/G		G/CC
000-9	A1	78.6	14.2	7.2	1.2	1.9	0.7	46.1	28.7				40	60			
009-21	B21T	62.4	11.4	46.2	0.6	0.6	0.4	25.0	15.8				28	72			
021-34	B22T	44.8	15.7	39.5	0.4	0.5	0.4	26.3	17.1				35	65			
034-46	B23T	45.7	21.1	33.2	0.1	0.5	0.3	17.0	27.9				29	71			
046-67	B24T	53.2	20.5	26.3	0.2	0.4	0.2	16.0	36.7				23	77			
067-90	CCA	46.4	27.3	26.3	0.2	0.4	0.2	10.7	35.0				30	70			

DEPTH	ORGANIC MATTER 6A1A ORGN CARB	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	EXTRACTABLE BASES 5B1A- 6N2B CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO CA 8D3 TO	CARB EQ 6E1E	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	MEQ / 100G								PCT	MG	PCT			
000-9	0.40					2.8	0.8	0.1	0.1	3.8	5.0	65A	103A	76	3.5		6.2		
009-21	0.60					15.9	8.8	3.8	0.4	29.9	35.9	84A	93A	81	1.8		5.2		
021-34	0.30					16.5	8.9	5.1	0.3	30.8	31.7	84A	105A	97	1.9		5.9		
034-46	0.20						8.5	5.1	0.4		28.9	85A	107A			2.0	7.8		
046-67	0.10						6.5	4.6	0.3		23.8	84A	107A			1.0	7.4		
067-90	0.10						6.7	5.4	0.3		23.3	83A	110A			5.0	7.8		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S62TX-89-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-9	QZ1 FD3	QZ1 MI3 FD3		MT2 MI2 KK2 QZ3 FD3	MT1 KK3
9-21	QZ1	QZ1 MI3 KK3 FD3		MT2 MI2 KK2 QZ3	MT1 KK3
21-34	QZ1	QZ1 MI2 KK3 FD3		MT1 KK2 MI3 QZ3	MT1 KK3
34-46	QZ1 FD3	QZ1 MI3 KK3 FD3		MT1 KK2 MI2 QZ3	MT1 KK3
46-67	QZ1	QZ1 MI2 KK3 FD3		MT1 MI2 KK2 QZ3	MT1 KK3
67-90	QZ1 FD3	QZ1 MI2 KK3 FD3		MT1 MI2 KK2 QZ3	MT1 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELOSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ.

(A) BY CENTRIFUGATION (METHOD 3A1B), CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Udertic Paleustalf; fine, montmorillonitic, thermic.
Soil: Crockett loamy fine sand.
Soil Nos.: S62TX-89-90; K1224-1229.
Location: Gonzales County, Texas; 1.55 miles east on FM Road 532 from intersection of Highways 90 and 532 east of Gonzales. Site is located about 75 yards southeast of residence. Cover: Mesquite and native grasses.
Topography: Gradient of approximately 1.5 percent.
Sampled by: Harvey Oakes, May 30, 1962.
Described by: Harvey Oakes.

A1 K1224 0 to 9 inches. Brown (10YR 4/3; 3/3) loamy fine sand; structureless; friable, hard when dry; few quartzite gravel; pH 6.0; abrupt boundary.

B21t K1225 9 to 21 inches. Reddish brown (5YR 4/4; 3/4) clay with about 30 percent mottles of pale yellow, light brownish gray and other shades of brown; moderate medium blocky distinct clay films of dark olive, few fine pores; very firm; many grass roots, mostly between peds; pH 6.0; clear boundary.

B22t K1226 21 to 34 inches. Brown (10YR 5/3; 4/3) clay loam with common fine and medium mottles of reddish brown and pale yellow; moderate medium and coarse blocky; thick continuous clay films; few fine pores; many roots mostly between peds; very firm; pH 6.5; clear boundary.

B23t K1227 34 to 46 inches. Mottled brown, yellowish brown and light brownish gray sandy clay loam; moderate medium and coarse blocky; firm but less than above, distinct clay films; few fine pores and few roots; pH 7.0; gradual boundary.

B24t K1228 46 to 67 inches. Pale brown sandy clay loam with fine mottles of brown and yellowish brown; moderate coarse blocky; firm to friable; distinct clay films; few grass roots; few $CaCO_3$ concretions; gradual boundary. pH 8.0+. (About 2 percent by volume of small particles of $CaCO_3$).

Cca K1229 67 to 90 inches plus. Thinly stratified fine earth of pale brown sandy clay loam of almost shale hardiness; light brownish gray fine sandy loam and olive sandy clay; few small $CaCO_3$ concretions and soft lumps of $CaCO_3$; weakly calcareous.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

A1 - fine sandy loam
B22t - clay
B23t - sandy clay or clay loam
Cca - sandy clay

SOIL CLASSIFICATION- UDERTIC PALEUSTALF
FINE, MONTMORILLONITIC, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SERIES - - - - - - -SERIES NOT DESIGNATED

SOIL NO - - - - - - - S62TX-11-90 COUNTY - - - BASTROP

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K1250-1256

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (PCT LT 2MM) SAND 2-.05 MM	SAND .05-.002 MM	CLAY LT .002 MM	SAND VCOS 2-1 MM	SAND COS 1-.5 MM	SAND MEDS .5-.25 MM	SAND FNES .25-.10 MM	SAND VFNS .10-.05 MM	PARTICLE SIZE ANALYSIS (A) SAND .05-.002 MM	SILT .002-.0002 MM	CLAY LT .0002 MM	CRSE CLAY .002-.0002 MM	FINE CLAY LT .0002 MM	(ETHYLENE GLYCOL) RETAINED 2 MM (MG/G)	LT .002 MM (MG/G)	LT .0002 MM (MG/G)	BULK DEN 4A3A G/CC
000-4	A1	35.1	53.5	11.5	0.3	0.5	0.3	13.3	20.8				59	41				
004-7	A2	37.3	51.0	11.7	0.2	0.5	0.3	13.3	23.1				68	32				
007-16	B21T	20.6	28.8	50.7	0.2	0.3	0.0	6.1	14.0				26	74				
016-28	B22T	25.0	28.5	46.5	0.1	0.3	0.1	7.3	17.3				35	65				
028-45	B23T	13.4	38.9	47.7	0.1	0.3	0.1	2.6	10.3				36	64				
045-53	C1	20.6	42.2	37.2	1.7	2.2	0.5	5.6	10.6				39	61				
053-73	C2	67.7	20.4	11.8	0.1	0.3	0.2	32.0	35.2				47	53				

DEPTH IN	ORGANIC MATTER 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON 6C3 EXT FE PCT	PHOS 6S1A TOT PCT	EXTRACTABLE BASES 5B1A (MEQ / 100G) 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO CA EQ 8D3 TO MG	CARB 6E1E PCT	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
000-4	1.60					6.4	0.6	0.1	0.2	7.3	9.7	44A	88A	75	10.7		6.2		
004-7	0.80					2.3	0.6	0.1	0.1	3.1	7.0	38A	88A	44	3.8		4.9		
007-16	1.00					10.3	5.6	1.5	0.5	17.9	30.5	62A	84A	59	1.8		4.2		
016-28	0.60					10.4	6.1	2.5	0.5	19.5	25.9	58A	85A	75	1.7		4.2		
028-45	0.30						7.2	4.0	0.5		27.0	57A	84A				4.3		
045-53	0.20					12.1	7.0	4.3	0.5	23.9	25.1	59A	87A	95	1.7		4.8		
053-73	0.20					4.3	1.9	1.8	0.2	8.2	8.1	49A	83A	100	2.3		5.4		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S62TX-11-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-4	QZ1 FD3	QZ1 MI2 KK3 FD3		MI1 KK2 MT2 QZ3	MT1 MI2 KK2
4-7	QZ1 FD3	QZ1 MI2 KK3 FD3		MI1 KK2 MT2 QZ3	MT1 MI3 KK3
7-16	QZ1 FD3	QZ1 MI2 KK3 FD3		KK1 MI2 MT2 QZ3	MT1 MI3 KK3
16-28	QZ1 FD3	QZ2 MI2 KK2 FD3		KK2 MI2 MT2 QZ3	MT1 MI3 KK3
28-45	QZ1 FD3	QZ1 MI2 KK2 FD3		MI2 KK2 MT2 QZ3	MT1 MI3 KK3
45-53	QZ1 FD3	QZ1 MI2 KK2 FD3		MI1 KK2 MT2 QZ3	MT1 MI3 KK3
53-73	QZ1 FD3	MI1 QZ2 KK2 FD3		KK1 MI2 MT2 QZ3	MT1 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Udertic Paleustalf; fine, montmorillonitic, thermic.
Soil: Series not designated.
Soil Nos.: S62TX-11-90; K1250-1256.
Location: Bastrop County, Texas; 2.6 miles south on Highway 304 from intersection of Highways 304 and 21 on west side of Bastrop; thence 2.4 miles west on gravel county road. Site is located on west side of road. Cover: Post oak savanna and scattered red cedar.
Topography: Gradient of approximately 3.5 percent.
Sampled by: Harvey Oakes, May 28, 1962.
Described by: Harvey Oakes.

A1 K1250 0 to 4 inches. Grayish brown (10YR 4/2; 3/2 moist) silt loam; weak granular; friable; pH 7.0; abrupt boundary.

A2 K1251 4 to 7 inches. Light brownish gray (10YR 6/2; 5/2) silt loam; structureless; porous, friable; pH 6.0; abrupt boundary.

B21t K1252 7 to 16 inches. Reddish brown (5YR 4/4; 3/4) clay with common fine mottles of yellow and reddish yellow; moderate to strong medium blocky; thick clay films; very firm; few fine pores; pH 5.0; gradual boundary.

B22t K1253 16 to 28 inches. Reddish brown (5YR 4/4; 3/4) clay with about 20 percent by volume of reddish yellow and pale yellow; moderate medium to coarse blocky; thick clay films; roots mainly in upper part; pH 5.0; gradual boundary.

B23t K1254 28 to 45 inches. Brown (7.5YR 4/2; 3/2) clay with common faint to distinct mottles of reddish brown and reddish yellow that decrease with depth; weak blocky; few thin clay films; thin lenses and particles of yellowish soft weathered sandstone in lower part; pH 6.0; gradual boundary.

C1 K1255 45 to 53 inches. Brown (7.5YR 4.5/2; 3.5/2) shaly clay loam with thin strata ¼ to ½ inch thick of yellowish sandy loam of weathered sandstone; pH 6.0; abrupt smooth boundary.

C2 K1256 53 to 73 inches plus. Thin-bedded light gray (10YR 7/2) very fine sandy loam with thin strata of pale brown sandy shale and yellowish brown fine sandy loam of weathered sandstone; pH 6.0.

Remarks: 1. This pedon was sampled as Axtell fine sandy loam. The soil is outside the range of the Axtell series in being silt loam in the A horizon.

2. Textures above agree with laboratory data. Field textures where different are given below:

A1 - fine sandy loam
A2 - fine sandy loam
C1 - shaly clay
C2 - fine sandy loam

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Udertic Paleustalf; fine, montmorillonitic, thermic

SOIL Series not designated SOIL Nos. S64TX-129-1 LOCATION Kaufman County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 19392-19399 March 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1 — Total Sand (2-0.05) [a]	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 <0.002	Coarse fragments 2A2: 3B1 > 2 (<19) Pct.	2 - 19 Pct. of < 76mm	19 - 76 Pct. of < 76mm
		Pct. of < 2 mm															
0-6	Ap	76.1	16.3	7.6	0.2	0.2	1.8	44.9	29.0	13.0	3.3	81.6	47.1	8	tr		
6-15	A1	60.8	26.1	13.1	-	0.3	1.5	34.7	24.3	16.9	9.2	71.6	36.5	13	tr		
15-27	B21t	28.8	14.8	56.4	-	0.1	0.7	16.2	11.8	8.6	6.2	34.6	17.0	56	-		
27-47	B22t	36.9	19.0	44.1	0.1	0.1	0.8	20.4	15.5	10.9	8.1	44.4	21.4	44	tr		
47-53	B23t	36.4	20.5	43.1	tr	0.2	0.9	20.3	15.0	11.6	8.9	44.4	21.4	43	tr		
53-61	B3	25.9	34.5	39.6	1.0	0.9	1.1	12.6	10.3	9.1	25.4	29.9	15.6	40	1		
61-82	Cca	18.9	44.4	36.7	1.1	0.7	0.4	5.5	11.2	7.8	36.6	23.6	7.7	31	tr		
82-92	C2	28.6	27.6	43.8	tr	0.2	0.6	10.9	16.9	8.0	19.6	34.2	11.7	39	-		

Depth (in.)	6A1a Organic carbon Pct.	Nitrogen Pct.	C/N	Carbonate as $CaCO_3$ 6E1b 6E2a <2mm. Pct.	3A1a <0.002 mm. Pct.	6C2a Ext. Iron as Fe Pct.	Bulk density g/cc	1/3-Bar g/cc	Air-Dry g/cc	COLE	Water content Pct.	1/3-Bar Pct.	4B2 15-Bar Pct.	1/3-to 15-Bar in./in.	pH 8C1a 1:1
0-6	0.72					0.3							2.9		5.1
6-15	0.76					0.4							4.8		5.4
15-27	0.92					1.4							22.3		5.2
27-47	0.41					1.0							17.6		6.0
47-53	0.29			tr(s)		1.0							17.2		7.4
53-61	0.21			24	tr	0.9							15.4		7.9
61-82	0.09			49	6	0.7							13.2		8.0
82-92	0.08			28	5	1.0							17.0		7.7

Depth (in.)	Extractable bases 6N2a Ca	6O2a Mg	6P2a Na	5B1a 6Q2a K	Sum	6H1a Ext. Acidity	Cat. Exch. Cap. 5A3a Sum Cations	5A1a NH_4OAc	6G1d KCl-Ext. Al	8D3 Ca/Mg	Base saturation 5C3 Sum Cations	5C1 NH_4OAc
	meq/100 g										Pct.	Pct.
0-6	3.0	1.0	0.1	0.2	4.3	1.2	5.5	5.7	0.2	3.0	78	75
6-15	6.2	1.2	0.1	0.2	7.7	3.9	11.6	8.9	0.1	5.2	66	87
15-27	25.7	3.2	0.7	0.7	30.3	12.7	43.0	33.3	0.5	8.0	70	91
27-47	24.2	2.6	1.1	0.5	28.4	5.6	34.0	28.3		9.3	84	100
47-53	26.4b	2.0c	1.6	0.5	30.5	2.8	33.3	29.3		13	92	104
53-61	27.2b	2.5c	1.5	0.4	31.6			27.7		11		
61-82	20.4b	1.8c	1.2	0.3	23.7			19.9		11		
82-92	23.7b	1.9c	1.4	0.5	27.5			23.4		13		

Depth (in.)	Ratios to Clay 8D2 NH_4OAc CEC	Ext. Iron	15-Bar Water
0-6	0.75	0.04	0.36
6-15	0.68	0.03	0.37
15-27	0.59	0.02	0.40
27-47	0.64	0.02	0.40
47-53	0.68	0.02	0.40
53-61	0.70	0.02	0.40
61-82	0.64	0.02	0.43
82-92	0.60	0.03	0.44

a. Fe-Mn nodules comprise a major portion of the very coarse and coarse sand above 53 inches. Carbonate comprises 10 to 20 percent of the sand below 53 inches.
b. KCl-TEA extraction (Method 6N4b).
c. KCl-TEA extraction (Method 6O4b).

Soil classification: Udertic Paleustalf; fine, montmorillonitic, thermic.
Soil: Series not designated.
Soil Nos.: S64TX-129-1; 19392-19399.
Location: Kaufman County, Texas. In cultivated field, 225 feet west of center of intersection of FM Road 986 and two county roads, 4.2 miles north of the intersection of U.S. Highway 80 and FM Road 986, along 986; it is 3.9 miles north of that intersection in Terrell, "as a crow flies".
Vegetation and use: Oats and vetch used for grazing, grain and vetch seed.
Topography: Undulating landscape with broad divides of 400 to 600 feet, and long slopes of about 800 to 1,500 feet; convex and plane surfaces; about 1-1/2 percent slope at pedon site; about midway downslope.
Drainage and permeability: Moderately well drained. Runoff is medium. Very slowly permeable.
Parent material: Marine clay of the Navarro (Gulf Cretaceous) group, probably of the Nacatoch geologic formation.
Sampled by and date: G. S. McKee, A. Newman and T. Giddens, March 17, 1964.
Described by: G. S. McKee, A. Newman and T. Giddens.

Ap 19392 0 to 6 inches. Dark grayish brown (10YR 4/2) fine sandy loam; very dark grayish brown (10YR 3/2) when moist; structureless, but breaks in weak clods; hard, very friable; contains numerous fibrous oat and vetch roots; pH 5.5; abrupt smooth boundary.

A1 19393 6 to 15 inches. Dark grayish brown (10YR 4/1.5) fine sandy loam; very dark grayish brown (10YR 2.5/2) when moist; structureless; hard, friable; contains many fibrous roots; contains few wormcasts; pH 5.8; abrupt wavy lower boundary (vertical distance of the wavy boundary varies about 1 foot within a distance of 4 feet to 6 feet).

B21t 19394 15 to 27 inches. Dark grayish brown (10YR 4/2) clay; very dark grayish brown (10YR 3/2) when moist, with common (10 to 15 percent) of fine and medium prominent dark red (2.5YR 3/6) mottles; weak, coarse prismatic, breaking to moderate medium blocky, having continuous clay films; extremely hard, very firm, very sticky and plastic; contains few fibrous roots; peds have occasional pores that can be seen with the naked eye; roots are more concentrated between peds but a few penetrate peds; pH 5.3; clear wavy lower boundary.

B22t 19395 27 to 47 inches. Grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) when moist, with many faint medium light olive brown and yellowish brown mottles, and a few reddish brown mottles; darker stainings on outsides of some peds; moderate coarse blocky structure and has continuous thin clay films; evidence of slickensides; extremely hard, extremely firm and compact; contains few very fine roots throughout, but are more concentrated in crevices; contains occasional very dark brown soft and hard concretions, apparently Fe-Mn; pH 6.0 in upper part, increasing to 7.0 in lower part; gradual boundary.

B23t 19396 47 to 53 inches. Light olive brown (2.5Y 5/4) clay; slightly darker when moist (2.5Y 4.5/4); outsides of some peds, especially in upper part, are olive brown (2.5Y 4/4) when dry; weak blocky structure; some peds have shiny surfaces; slickensides are evident; extremely hard, extremely firm; contains occasional very fine roots; mainly on ped surfaces; contains a few Fe-Mn concretions; pH 7.7; gradual lower boundary.

B3 19397 53 to 61 inches. Light olive brown (2.5Y 5/6) when dry and moist; clay loam; massive, but has some shiny pressure faces; extremely hard, very firm; pH 8.0, soil matrix is noneffervescent with 10 percent HCl in upper part, but effervescent in the lower part; contains common hard $CaCO_3$ concretions up to about 10 mm in diameter; contains occasional soft and semihard Fe-Mn concretions; clear boundary.

Cca 19398 61 to 82 inches. Distinctly mottled gray and olive yellow calcareous silty clay loam with about 30 to 50 percent of whitish hard $CaCO_3$ concretions and soft disseminated $CaCO_3$; contains few soft or incipient, black Fe-Mn concretions; diffuse lower boundary.

C2 19399 82 to 92 inches plus. About same colors as layer above, but weakly stratified and partially weathered sandy shale, clay and sandy loam lenses; contains some 2 to 3 percent of mostly soft $CaCO_3$; contains occasional soft, black stains on the shale fragments; some fragments are noneffervescent with HCl, pH 8.0.

Remarks: Occasional siliceous subrounded pebbles up to about 2-1/2 inch diameter, but mostly less than 1/2-inch in diameter, occur in the B22t, B23t, and B3 horizons. Sampled in the part of the pedon where the A horizon is thickest. The A horizon varies from 5 to 15 inches thick, and is 10 inches or less thick in more than half of the pedon.

Textures above agree with laboratory data. Field textures where different are given below:

A1 - loam
B3 - light clay
Cca - clay loam

SOIL CLASSIFICATION-UDIC PALEUSTALF
FINE-LOAMY, MIXED, THERMIC
SERIES - - - - - - -MILES

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S57TX-132-90 COUNTY - - - KENT

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K535-541

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (PCT LT 2MM) SAND 2-.05	SILT .05-.002	CLAY LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	(A) ETHYLENE GLYCOL RETAINED LT 2 MM	LT .002 MM	LT .0002 MM	(B)	BULK DEN 4A3A G/CC
000-7	A1	53.7	31.8	14.5	0.2	2.5	2.3	21.5	27.2				42	58	147				
007-16	B1	44.2	31.3	24.5	0.1	2.0	2.1	17.5	22.5				36	64	175				
016-37	B21T	37.3	33.3	29.4	0.1	1.6	1.7	14.6	19.3				31	69	167				
037-55	B22T	43.4	30.2	26.4	0.2	2.0	1.8	17.0	22.4				28	72	163				
055-73	B23TCA	44.9	32.6	22.5	0.2	1.8	1.7	16.7	24.5				30	70	160				
073-95	CCA	48.2	38.8	13.0	0.2	0.9	0.8	11.8	34.5				38	62	146				
095-116	C	42.4	47.2	10.4	0.1	0.5	0.4	4.5	36.9				50	50	121				

DEPTH IN	ORGANIC MATTER 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON 6C3 EXT FE PCT	PHOS 6S1A TOTL PCT	EXTRACTABLE BASES 5B1A (MEQ / 100G) 6N2D CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A1 LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO 8D3 CA MG	CA CARB EQ. TO 6E1E PCT	PH 1/1 H20	1/2 KCL	1/2 CACL
000-7	0.70					1.5	0.1	1.3		10.3	61A	83A				0.9	7.9		
007-16	0.58					3.0	0.1	1.3		15.3	72A	82A				1.2	7.6		
016-37	0.35					4.8	0.1	0.7		17.3	66A	80A				1.3	7.7		
037-55	0.23					5.4	0.3	0.5		15.5	68A	79A				1.4	8.1		
055-73	0.17					5.3	0.4	0.4		12.8	68A	85A				2.5	8.2		
073-95	0.12					3.7	0.5	0.3		8.5	63A	79A				8.2	8.2		
095-116	0.12					3.5	0.5	0.3		7.1	53A	76A				7.3	8.2		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A1) S57TX-132-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-7	QZ1 FD2	QZ1 FD2 MT2		MI2 KK2 QZ2 VR3	MV1 MI1 KK3
7-16	QZ1 FD2	QZ1 FD2 MT3		MI2 KK2 QZ2 VR3 CL3	MI1 MI1 KK3
16-37	QZ1 FD3	QZ1 FD2 MT3 KK3		MI2 KK2 QZ2 VR3 FD3	MV1 MI1 KK3
37-55	QZ1 FD3	QZ1 FD2 MT2 KK3		MI2 KK2 QZ2 VR3 FD3	MV1 MI1 KK3
55-73	QZ1 FD2	QZ1 FD2 MT2 KK2 VR3		MI2 KK2 QZ2 CL3 FD3	MT1 MI1 KK3
73-95	QZ1 FD2	QZ1 FD2 MT2 KK2 VR3		MI2 KK2 QZ2 CL2 MC3	MC1 MI2 KK3
95-116	QZ1 FD2	QZ1 FD2 MT2 KK2 VR3		KK2 MI2 CL2 QZ2 MC3	MC1 MI2 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT. 2 = 10 - 40 PCT. 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, VR=VERMICULITE, CL=CHLORITE, MV=DIFFUSE, HYDRATED, EXPANSIBLE AND MICACEOUS (13-18A), MC=CHLORITE-MONTMORILLONITE OR MONTMORILLONITE-CHLORITE INTERSTRATIFIED.

(A) BY CENTRIFUGATION (METHOD 9A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Udic Paleustalf; fine-loamy, mixed, thermic.
Soil: Miles very fine sandy loam.
Soil Nos.: S57TX-132-90; K535-541.
Location: Kent County, Texas. One mile north of Jayton at intersection of State Highway 70 and Farm Road 1228. Sample site is about 100 feet northwest of intersection and 10 feet west of edge of right-of-way. Cover: Native area.
Topography: Nearly level.
Sampled by: I. C. Mowery, July 1957.
Described by: I. C. Mowery.

A1 K535 0 to 7 inches. Brown (6.5YR 4/3; 3/3, moist) very fine sandy loam; weak fine granular; friable hard; noncalcareous; numerous grass roots; clear boundary.

B1 K536 7 to 16 inches. Reddish brown (5YR 4/4; 3/4, moist) loam; weak fine and medium subangular blocky; friable very hard, slightly sticky; numerous pores; noncalcareous; numerous roots; occasional wormcasts; gradual boundary.

B21t K537 16 to 37 inches. Yellowish red (5YR 4/6; 3/6, moist) clay loam; compound weak prismatic and moderate medium subangular blocky; very firm, very hard, sticky; many fine pores; noncalcareous; few wormcasts; few roots through peds; occasional ferromanganese concretions; diffuse boundary.

B22t K538 37 to 55 inches. Yellowish red (5YR 4/6; 3/6, moist) loam; structure same as above; firm, very hard, slightly sticky; few films and occasional concretions of $CaCO_3$; occasional wormcasts; few roots.

B23tca K539 55 to 73 inches. Same as above except slightly more sandy and films of $CaCO_3$ more prominent; has pockets of uncoated sand grains; clear boundary.

Cca K540 73 to 95 inches. Red (2.5YR 5/6; 4/6, moist) loam; massive, friable slightly hard; soft and hard $CaCO_3$ occupy about 2 percent of the mass; gradual boundary.

C K541 95 to 116 inches. Red (2.5YR 4/6; 3/6, moist) loam containing occasional large hard $CaCO_3$ concretions and specks of blue sandstone. This is sandy Permian Red Beds.

Remarks: 1. This pedon is from the type location of the Miles series, according to the standard series description, dated 1/73 by E. R. Blakley.

2. Textures above agree with laboratory data. Field textures where different are given below:

A1 - fine sandy loam
B1 - light sandy clay loam
B21t - sandy clay loam
B22t - sandy clay loam
B23tca - sandy clay loam
Cca - very fine sandy loam
C - very fine sandy loam

SOIL CLASSIFICATION-UDIC PALEUSTALF
FINE-LOAMY, MIXED, THERMIC
SERIES - - - - - - -MILES

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - - S57TX-138-90 COUNTY - - - KNOX

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K634-638

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (- - - - - SAND - - - - -) SAND 2-.05	SILT .05-.002	CLAY LT .002	VCOS 2- 1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	PARTICLE SIZE SAND 2-.05	SILT .05-.002	CLAY LT .002	ANALYSIS (A) CRSE CLAY .002-.0002 (PCT LT.002)	FINE CLAY LT .0002	ETHYLENE GLYCOL RETAINED (B) LT 2 MM	LT .002 MM	LT .0002 MM	BULK DEN 4A3A G/CC
		(- - - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - - -)													(- - MG/G - - -)			
000-8	AP	70.9	12.2	16.9	0.1	4.4	9.2	42.7	14.5				45	55		153		
008-15	B1T	61.3	18.5	20.2	0.1	2.1	5.1	37.1	16.9				46	54		155		
015-43	B21T	50.7	17.1	32.2	0.1	1.9	4.1	31.1	13.5				21	79		174		
043-72	B22T	54.7	21.4	23.9	0.1	1.8	4.1	30.2	18.5				31	69		195		
072-90	BCA	45.6	25.0	29.4	0.9	2.6	3.1	26.0	13.0				47	53		200		

DEPTH IN	ORGANIC MATTER 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON 6C3 EXT FE PCT	PHOS 6S1A TOTL PCT	EXTRACTABLE BASES 5B1A- 6N2E CA	6Q2D MG	6P1A NA	6Q2A K	SUM (- - - - - - - - MEQ / 100G - - - - - - - -)	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO 8D3 CA TO MG	CA CARB EQ 6E1E PCT	PH 8C1A 1/1 H2O	PH 8C1C 1/2 KCL	PH 8C1E 1/2 CACL
000-8	0.46						1.5	0.4	0.6		7.4	63A	75A			0.4	7.6		
008-15	0.81					7.8	2.3	0.6	0.9	11.6	11.4	66A	75A	100	3.4		7.2		
015-43	0.46					11.0	5.2	0.5	0.8	17.5	18.2	74A	76A	96	2.1		6.5		
043-72	0.17					9.6	5.7	0.2	0.6	16.1	15.3	82A	76A	100	1.7		7.2		
072-90	0.12						9.3	0.2	0.9		19.9	84A	90A			10.8	8.2		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S57TX-138-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-8	QZ1 FD3	QZ1 FD2 MI3		MI1 KK2 QZ2	MV1 MI1 KK3
8-15	QZ1 FD3	QZ1 FD2 MI3		MI1 KK2 QZ2	MV1 MI1 KK3
15-43	QZ1 FD3	QZ1 FD2 MI3		MI1 KK2 QZ2	MV1 MI1 KK3
43-72	QZ1 FD3	QZ1 FD2 MI3		MI1 KK2 QZ2 CL3 VR3	MT1 MI1 KK3
72-90	QZ1 FD3	QZ1 FD2 MI3		MI1 KK2 QZ2 MV3	MT1 MI1 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, VR=VERMICULITE, CL=CHLORITE, MV=DIFFUSE, HYDRATED, EXPANSIBLE AND MICACEOUS (13-18A)

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Udic Paleustalf; fine-loamy, mixed, thermic.
Soil: Miles fine sandy loam.
Soil Nos.: S57TX-138-90; K634-638.
Location: Knox County, Texas. From intersection of U.S. Highway 277 and Farm Road 617, west, in Weinert, go north on U.S. 277 for 5.7 miles, turn west on county road and go 3.2 miles, turn south on field road and go 0.5 mile and turn east for 0.2 mile. Cover: Cultivated field.
Topography: Nearly level.
Sampled by: I. C. Mowery, August 1957.
Described by: I. C. Mowery.

Ap K634 0 to 8 inches. Brown (7.5YR 5/4; 4/4, moist) fine sandy loam; weak fine granular; friable slightly hard; noncalcareous; abrupt smooth boundary.

B1t K635 8 to 15 inches. Dark brown (7.5YR 4/2; 3/2, moist) sandy clay loam; weak fine granular and subangular blocky; friable hard; very porous; noncalcareous; gradual smooth boundary.

B21t K636 15 to 43 inches. Reddish brown (5YR 4/3; 3/3, moist) sandy clay loam; when crushed, the soil is a red (2.5YR 4/8; 3/8 moist); moderate medium prismatic; firm, very hard, sticky; many fine pores; noncalcareous; few fine roots; diffuse smooth boundary.

B22t K637 43 to 72 inches. Reddish yellow (5YR 6/6; 5/6, moist) sandy clay loam; consistence and structure same as above; numerous ferromanganese concretions in the lower 6 inches; clear wavy boundary.

Bca K638 72 to 90 inches. Mottled reddish yellow (5YR 7/6; 6/6, moist), and very pale brown (10YR 7/3; 6/3, moist) sandy clay loam containing many soft lumps and hard concretions of $CaCO_3$; numerous splotches and concretions of ferromanganese; calcareous; large, hard $CaCO_3$ concretions.

Remarks:
1. Skeletans not described, but based on soil structure extending to at least 72 inch depth and an increase in clay content in the 72-90 inch horizon, this soil is placed in the Miles series and Udic Paleustalfs.

2. Textures above agree with laboratory data. Field textures where different are given below:

   B21t - sandy clay
   B22t - sandy clay
   Bca - sandy clay

SOIL CLASSIFICATION-UDIC PALEUSTALF
FINE-LOAMY, MIXED, THERMIC
SERIES - - - - - - -MILES

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S57TX-208-90 COUNTY - - - SCURRY

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K516-522

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (PCT LT 2MM) SAND	SILT	CLAY	VCOS	CORS	MEDS	FNES	VFNS	PARTICLE SIZE ANALYSIS (A) (PCT LT.002) SAND	SILT	CLAY	CRSE CLAY	FINE CLAY	ETHYLENE GLYCOL RETAINED (B) LT 2 MM	LT .002 MM	LT .0002 MM	BULK DEN 4A3A G/CC
		2- .05	.05- .002	LT .002	2- 1	1- .5	.5- .25	.25- .10	.10- .05	2- .05	.05- .002	LT .002	.002- .0002	LT .0002	MG/G			
000-4	AP	73.9	17.3	8.8	0.1	2.6	7.1	44.0	20.1				35	65		158		
004-9	A1	70.3	17.6	12.1	0.1	2.3	6.6	42.3	19.0				34	66		163		
009-18	B1	65.1	17.5	17.4	0.1	2.4	5.9	39.3	17.4				28	72		178		
018-43	B21T	52.1	20.8	27.1	0.2	4.5	6.6	26.8	16.2				26	74		181		
043-66	B22T	52.5	21.9	25.6	0.3	3.2	5.0	25.5	18.5				26	74		193		
066-104	CCA	55.1	30.5	14.4	0.3	3.5	5.4	21.9	24.0				31	69		184		
104-112	C	64.1	24.5	11.4	0.1	1.0	1.6	15.3	46.1				20	80		178		

DEPTH IN	ORGANIC MATTER 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON 6C3 EXT FE PCT	6S1A TOTL PCT	PHOS 6N2B CA	EXTRACTABLE BASES 5B1A- 6Q2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO 8D3 CA TO MG	CA CARB 6E1E PCT	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
							MEQ / 100G												
000-4	0.35						0.7	0.1	0.6		7.4	64A	85A			0.4	8.0		
004-9	0.41						1.1	0.1	0.6		9.5	66A	82A			0.5	7.6		
009-18	0.41					8.5	2.1	0.1	0.7	11.4	12.2	71A	84A	93	4.0		6.7		
018-43	0.41					12.7	3.5	0.1	1.0	17.3	17.7	72A	80A	93	3.6		7.0		
043-66	0.23						3.7	0.2	0.8		17.8	74A	93A			1.0	7.6		
066-104	0.12						2.1	0.2	0.4		8.1	70A	88A			16.4	8.2		
104-112	0.06						2.0	0.2	0.4		7.5	60A	90A			16.3	8.2		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S57TX-208-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-4	QZ1 FD3	QZ1 FD2 MI3		MI2 KK2 QZ2 FD3	MT1 MI2 KK3
4-9	QZ1 FD3	QZ1 FD2 MI3		MI2 KK2 QZ2 FD3	MT1 MI2 KK3
9-18	QZ1 FD3	QZ1 FD2 MI3		MI2 KK2 QZ2 FD3	MT1 MI2 KK3
18-43	QZ1 FD3	QZ1 FD2 MI3		MI2 KK2 QZ2 FD3	MT1 MI2 KK3
43-66	QZ1 FD3	QZ1 FD2 MI3		MI2 KK2 QZ2 FD3	MT1 MI2 KK3
66-104	QZ1 FD3	QZ1 FD2 MI3		MI2 KK2 MT2 QZ2 VR3	PG2 MT2 MI2 KK3
104-112	QZ1 FD3	QZ1 FD2 MI3		MI2 KK2 MT2 VC2 PG3 FD3	PG1 MT2 MI3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, VR=VERMICULITE, PG=PALYGORSKITE, VC=CHLORITE-VERMICULITE OR VERMICULITE-CHLORITE INTERSTRATIFIED.

(A) BY CENTRIFUGATION (METHOD 3A1B), CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Udic Paleustalf; fine-loamy, mixed, thermic.
Soil: Miles fine sandy loam.
Soil Nos.: S57TX-208-90; K516-522.
Location: Scurry County, Texas; 2.9 miles southeast of intersection of U.S. Highway 84 and 180 and Texas Highway southeast of Synder; thence south across railroad 0.2 mile, or 62 steps, south of third REA power pole on west side of paved farm road. Cover: Cultivated field.
Topography: About 1 percent gradient.
Sampled by: I. C. Mowery, July 1957.
Described by: I. C. Mowery.

Ap K516 0 to 4 inches. Brown (7.5YR 5/4; 4/4, moist) fine sandy loam; weak fine granular; friable soft; alkaline; occasional gravel 1/4 to 1 inch in diameter; abrupt smooth boundary.

A1 K517 4 to 9 inches. Brown (7.5YR 4/4; 3/4, moist) fine sandy loam; weak and medium granular; friable hard; alkaline; gradual smooth boundary.

B1 K518 9 to 18 inches. Reddish brown (5YR 4/4; 3/4, moist) fine sandy loam; weak medium granular, friable hard; alkaline; gradual smooth boundary.

B21t K519 18 to 43 inches. Reddish brown (5YR 4/4; 3/4, moist) sandy clay loam becoming a yellowish red (5YR 4/6; 3/6, moist) in the lower 10 to 12 inches; compound prismatic and moderate medium and coarse blocky; very firm, very hard, sticky; many fine pores; splotches of ferromanganese; few fine roots; diffuse smooth boundary.

B22t K520 43 to 66 inches. Yellowish red (5YR 5/6; 4/6, moist) sandy clay loam mottled with different shades of red sand grains very noticeable; but less firm than above; less sticky than above; compound moderate prismatic and moderate medium blocky; splotches of ferromanganese; distinctly more sandy in lower 6 inches; very few roots; few small quartzite gravel; few fine specks of $CaCO_3$; clear wavy boundary.

Cca K521 66 to 104 inches. Pink (7.5YR 7/4; 6/4, moist) very fine sandy loam containing 30 to 40 percent, by volume, of soft lumps and hard concretions 1/4 to 1/2 inches in diameter of $CaCO_3$; there are 2 distinct zones of $CaCO_3$; clear wavy boundary.

C K522 104 to 112 inches. Pink (7.5YR 7/4; 6/4, moist) very fine sandy loam; strongly calcareous; massive; appears to be weakly cemented or packed.

Remarks: Textures above agree with laboratory data. Field data where different are given below:

A1 - sandy clay loam
B1 - sandy clay loam
B21t - heavy sandy clay
B22t - light sandy clay
Cca - light sandy clay loam

SOIL CLASSIFICATION-UDIC PALEUSTALF
FINE, MIXED, THERMIC

SERIES - - - - - - -WINDTHORST

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S61TX-67-90 COUNTY - - - EASTLAND

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K1152-1159

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1								PARTICLE SIZE ANALYSIS (A)				(ETHYLENE GLYCOL) RETAINED			BULK DEN
		SAND	SILT	CLAY	SAND VCOS	CORS	MEDS	FNES	VFNS	SAND	SILT	CLAY	CRSE CLAY	FINE CLAY	LT 2 MM	LT .002 MM	LT .0002 MM	4A3A
		2-.05	.05-.002	LT .002	2-1	1-.5	.5-.25	.25-.10	.10-.05	2-.05	.05-.002	LT .002	.002-.0002	LT .0002				
IN		PCT LT 2MM											(PCT LT.002)		(- - MG/G - -)			G/CC
000-10	AP	81.3	12.5	6.1	0.4	1.9	3.6	65.5	9.9				46	54				
010-18	B21T	36.1	8.6	55.4	0.2	1.0	1.8	26.8	6.2				23	77				
018-25	B22T	39.9	13.1	47.0	0.3	1.4	1.7	30.2	6.3				22	78				
025-39	B23T	46.3	19.1	34.6	0.2	1.5	1.6	34.4	8.7				39	61				
039-47	B3	28.9	39.3	31.8	0.0	0.2	0.1	3.3	25.1				41	59				
047-58	C1	30.8	36.9	32.3									44	56				
058-64	C2	21.5	40.1	38.4									42	58				
064-70	2C3	93.0	3.3	3.7	0.0	0.2	0.3	90.1	2.5				44	56				

DEPTH	ORGANIC MATTER 6A1A ORGN CARB	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	EXTRACTABLE BASES 5B1A 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO CA 8D3 TO MG	CARB EQ 6E1E	CA 8C1A 1/1 H2O	PH 8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	(- - - - - - - - MEQ / 100G - - - - - - - - -)								PCT		PCT			
000-10	0.20					3.5	0.4	0.1	0.4	4.4	4.0	47A	74A	100	8.8		7.7		
010-18	0.80					17.0	5.2	0.2	1.0	23.4	27.7	57A	71A	84	3.3		6.9		
018-25	0.40					13.1	5.6	0.2	0.8	19.7	24.7	60A	76A	80	2.3		6.3		
025-39	0.20					10.4	4.9	0.2	0.6	16.1	19.6	62A	84A	82	2.1		6.1		
039-47	0.20					9.0	4.6	0.3	0.6	14.5	17.5	66A	85A	83	2.0		5.9		
047-58	0.20					11.0	5.3	0.3	0.7	17.3	20.4	61A	76A	85	2.1		6.3		
058-64	0.20					12.7	6.7	0.3	0.8	20.5	23.9	62A	82A	86	1.9		6.4		
064-70	0.10					1.3	0.5	0.1	0.1	2.0	2.3	59A	81A	87	2.6		7.0		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S61TX-67-90

DEPTH	SAND	SILT	CLAY	COARSE CLAY	FINE CLAY
INCHES	2 - 0.05MM	0.05 - 0.002MM	LESS THAN 0.002MM	0.002 - 0.0002MM	LT 0.0002MM
0-10	QZ1	QZ1 KK3 MI3 FD3		MI2 KK2 QZ3	MV1 MI3 KK3
10-18	QZ1 FD3	QZ1 KK2 MI2 FD3		MI1 KK2 QZ3	MV1 MI3 KK3
18-25	QZ1 FD3	QZ1 KK2 MI2 FD3		MI1 MV2 KK2 QZ3	MV1 MI3 KK3
25-39	QZ1 FD3	QZ2 KK2 MI2 FD3		MI1 MT2 KK2 QZ3	MT1 MI3 KK3
39-47	QZ1 FD3	QZ2 KK2 MI2 FD3		MI1 KK2 MV2 QZ3	MV1 MI3 KK3
47-58	QZ1 FD3	QZ2 KK2 MI2 FD3		MI1 KK2 MV2 QZ3	MV1 MI3 KK3
58-64	QZ1 FD3	QZ1 KK2 MI2 FD3		MI1 KK2 MV2 QZ3	MV1 MI3 KK3
64-70	QZ1 KK3 FD3	KK1 MI2 QZ3 FD3		MI1 KK1 MV3 QZ3	MV1 MI3 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, MV=DIFFUSE, HYDRATED, EXPANSIBLE AND MICACEOUS (13-18A).

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Udic Paleustalf; fine, mixed, thermic.
Soil: Windthorst loamy fine sand.
Soil Nos.: S61TX-67-90; K1152-1159.
Location: Eastland County, Texas. Two and a half miles south of Carbon on FM 1027; east of highway 200 feet; north of J. E. Jackson residence. Cover: Cultivated; in grain sorghum.
Topography: Undulating upland; convex surface at sampling site with a 1.5 percent gradient.
Sampled by: J. R. Thomas, June 5, 1961.
Described by: J. R. Thomas.

Ap K1152 0 to 10 inches. Brown (7.5YR 5/4) loamy fine sand; dark brown (7.5YR 4/4) when moist; structureless; hard, friable; about neutral. Abrupt smooth boundary.

B21t K1153 10 to 18 inches. Dark red (2.5YR 3/6) clay; same color moist; moderate fine and medium blocky structure; distinct clay films about 1 value darker than interior of peds; extremely hard, very firm; neutral reaction; gradual smooth boundary.

B22t K1154 18 to 25 inches. Red (2.5Y 4/6) clay; dark red (2.5Y 3/6) when moist; few fine distinct mottles of yellowish brown; moderate medium blocky structure; distinct clay films; few fine pores; very firm, plastic; slightly acid. Gradual smooth boundary.

B23t K1155 25 to 39 inches. Red (2.5Y 4/6) sandy clay loam with many fine and medium distinct mottles of light yellowish brown and light brownish gray that increase with depth so that no one color is dominant in lower part; moderate medium blocky structure; few clay films; few fine pores; very firm, plastic; slightly acid. Gradual smooth boundary.

B3 K1156 39 to 47 inches. Mottled red, light yellowish brown and light brownish gray clay loam, with few partly weathered hard and soft particles of yellowish sandstone; no apparent structure; firm, slightly plastic; slightly acid; gradual wavy boundary.

C1 K1157 47 to 58 inches. Thin-bedded reddish brown and yellowish brown clay loam and light gray sandy clay; few small black lumps and particles of ferromanganese; friable; slightly acid. Diffuse wavy boundary.

C2 K1158 58 to 64 inches. Light gray clay loam; thinly laminated; with lenses of yellowish brown sandy loam in lower part; slightly acid. Clear smooth boundary.

IIC3 K1159 64 to 70 inches plus. Very pale brown (10YR 7/3) fine sand of slightly acid reaction.

Remarks: 1. The gray mottles beginning at a depth of 25 inches are considered inherent from the parent materials, and not due to wetness.

2. Textures above agree with laboratory data. Field textures where different are given below:

Ap - light fine sandy loam
B21t - sandy clay
B22t - light sandy clay
B3 - sandy clay loam
C1 - sandy clay loam
C2 - sandy or silty clay
IIC3 - loamy sand

SOIL CLASSIFICATION- UDIC PALEUSTALF
FINE, MIXED, THERMIC

SERIES - - - - - - -SERIES NOT DESIGNATED

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S61TX-249-90 COUNTY - - - WISE

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K1166-1171

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (- - - - - - SAND - - - - - -)								PARTICLE SIZE ANALYSIS (A)			(ETHYLENE GLYCOL) RETAINED			BULK
		SAND 2-.05	SILT .05-.002	CLAY LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	2 MM	.002 MM	.0002 MM	DEN 4A3A
IN		(- - - - - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - - - - -)								(PCT LT.002)			(- - MG/G - - -)			G/CC
000-8	AP	89.8	5.2	5.0	0.3	1.2	1.7	66.4	20.3				49	51				
008-18	B21T	52.9	10.2	36.9	0.3	0.9	0.8	35.8	15.0				32	68				
018-29	B22T	46.9	13.9	39.2									14	86				
029-43	B23T	53.4	19.5	27.1	0.1	0.3	0.3	30.4	22.3				31	69				
043-57	B3	62.3	16.4	21.3	0.1	0.3	0.4	36.9	24.6				30	70				
057-72	C	49.7	24.9	25.5									26	74				

DEPTH	ORGANIC MATTER 6A1A ORGN	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	EXTRACTABLE BASES 5B1A- 6N2E CA	6Q2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO CA TO MG	CA CARB EQ 6E1E	PH 8C1A 1/1 H20	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	CARB PCT	PCT		PCT	PCT	(- - - - - - - - MEQ / 100G - - - - - - - - -)								PCT		PCT			
000-8	0.20					1.6	0.5	0.1	0.2	2.4	2.5	54A	84A	96	3.2		6.8		
008-18	0.50					9.0	5.1	0.2	0.5	14.8	20.7	67A	78A	71	1.8		5.3		
018-29	0.30					8.4	5.9	0.2	0.5	15.0	22.0	70A	89A	68	1.4		5.1		
029-43	0.20					7.1	4.9	0.2	0.4	12.6	15.9	68A	93A	79	1.4		5.4		
043-57	0.10					6.3	4.2	0.2	0.3	11.0	12.9	72A	95A	85	1.5		5.7		
057-72	0.10					8.5	5.6	0.3	0.4	14.8	16.3	74A	96A	91	1.5		5.8		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S61TX-249-90

DEPTH	SAND	SILT	CLAY	COARSE CLAY	FINE CLAY
INCHES	2 - 0.05MM	0.05 - 0.002MM	LESS THAN 0.002MM	0.002 - 0.0002MM	LT 0.0002MM
0-8	QZ1	QZ1 FD3		MI1 KK2 QZ3	MV1 MI3 KK3
8-18	QZ1 FD3	QZ1 MI3 FD3		MI1 KK2 MV2 QZ3	MV1 MI3 KK3
18-29	QZ1	QZ1 FD3		MI1 MV2 KK3 QZ3	MV1 MI3 KK3
29-43	QZ1	QZ1 MI3 FD3		MI1 MT2 KK3 QZ3 FD3	MV1 MI3
43-57	QZ1 FD3	QZ1 MI3 FD3		MI1 MT1 KK3 QZ3	MT1 MI3
57-72	QZ1 FD3	QZ1 MI3 FD3		MT1 MI2 KK3 QZ3	MT1 MI3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, MV=DIFFUSE, HYDRATED, EXPANSIBLE AND MICACEOUS (13-18A).

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Udic Paleustalf; fine, mixed, thermic.
Soil: Series not designated.
Soil Nos.: S61TX-249-90; K1166-1171.
Location: Wise County, Texas; 2.3 miles northwest of Alvord, Texas on Farm Road 1655; 50 feet west of road in old cultivated field. Cover: Cultivated, annual weeds and grasses.
Topography: Ridgetop with 2 percent gradient.
Sampled by: W. M. Walters, June 7, 1961.
Described by: W. M. Walters.

Ap K1166 0 to 8 inches. Brown (7.5YR 5/2) fine sand; dark brown (7.5YR 4/2) when moist; structureless; very friable; common small ironstone and chert fragments on surface; slightly acid; abrupt smooth boundary.

B21t K1167 8 to 18 inches. Red (2.5YR 4/6) sandy clay; dark red (2.5YR 3/6) when moist; moderate fine and medium blocky structure; clay films about one-half value darker than interiors of peds; few fine pores; extremely hard, very firm; slightly acid; gradual smooth boundary.

B22t K1168 18 to 29 inches. Red (2.5YR 4/6) sandy clay with many medium distinct mottles of reddish yellow; moderate medium blocky; clay films as in above horizon; no visible pores; very firm, plastic; medium acid; gradual smooth boundary.

B23t K1169 29 to 43 inches. Red (2.5YR 4/8) sandy clay loam with many medium distinct mottles of light gray and reddish yellow; the red decreases with depth and mottling is more pronounced; moderate medium blocky with few clay films; no apparent pores; consistence as in above horizon; medium acid. Gradual wavy boundary.

B3 K1170 43 to 57 inches. Yellowish red (5YR 4/8) sandy clay loam; slightly darker yellowish red when moist; many medium and fine prominent mottles of light gray and some yellow; weak coarse blocky structure; friable; slightly acid; gradual wavy boundary.

C K1171 57 to 72 inches plus. Thin-bedded light gray sandy clay loam, reddish yellow sandy clay and clay loam without apparent structure; firm to friable; slightly acid.

Remarks: 1. Pedon was sampled as Windthorst series. This soil is outside the range of that series in having an A horizon of fine sand.

2. The gray colors below 29 inch depth are considered to be inherited from the parent materials, and are not due to wetness.

3. Textures above agree with laboratory data. Field textures where different are given below:

Ap - light fine sandy loam
B23t - sandy clay
C - fine sandy loam

SOIL CLASSIFICATION-TYPIC CALCIORTHID
FINE-SILTY, MIXED, THERMIC
SERIES - - - - - - -SERIES NOT DESIGNATED

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - - S58TX-195-91 COUNTY - - - REEVES

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K829-835

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (PCT LT 2MM) SAND	SILT	CLAY	VCOS	CORS	MEDS	FNES	VFNS	PARTICLE SIZE ANALYSIS SAND	SILT	CLAY	CRSE CLAY	FINE CLAY	(A) ETHYLENE RETAINED LT 2 MM	LT .002 MM	GLYCOL (B) LT .0002 MM	BULK DEN 4A3A G/CC
		2-.05	.05-.002	LT .002	2-1	1-.5	.5-.25	.25-.10	.10-.05	.05-2	.002-.05	LT .002	.002-.0002	LT .0002				
000-4	A1	11.4	55.7	32.9	0.2	0.4	0.2	4.2	6.5				42	58	49.9	155	250	
004-25	B21CA	6.1	51.9	42.1	0.1	0.2	0.1	2.2	3.6				37	63	61.4	161	256	
025-45	B22CA	15.0	43.7	41.3	0.2	1.0	0.7	6.3	6.8				40	60	48.3	164	265	
045-64	B23CA	15.0	40.6	44.3	0.2	0.6	0.4	5.7	8.0				30	70	47.1	166	264	
064-78	B24CA	16.4	39.6	44.0	0.1	0.2	0.2	6.4	9.6				34	66	49.2	161	268	
078-96	B25CA	18.6	39.6	41.8	0.2	0.4	0.3	7.6	10.2				32	68	41.3	162	269	
096-114	2B26CA	17.0	41.7	41.3	0.1	0.6	0.4	7.1	8.8				29	71	42.5	171	279	

DEPTH IN	ORGANIC MATTER 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON 6C3 EXT FE PCT	PHOS 6S1A TOTL PCT	EXCHANGEABLE BASES 5B1B 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM	CAT EXC CAP 5A2A) LT 2 MM (MEQ / 100G)	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO 8D3 CA TO MG	CA CARB EQ 6E1E H2O PCT	PH 8C1A 1/1	8C1C 1/2 KCL	8C1E 1/2 CACL
000-4	0.75					7.8	4.9	4.1		22.4	58A	82A				16.9	7.7		
004-25	0.52					9.4	10.2	3.2		25.0	62A	84A				23.5	7.6		
025-45	0.35					12.8	10.0	2.6		21.5	62A	81A				22.3	7.6		
045-64	0.23					7.4	11.4	2.4		19.6	58A	84A				26.9	7.7		
064-78	0.17					8.9	10.4	1.9		18.5	58A	85A				29.1	7.7		
078-96	0.12					7.1	8.7	1.5		16.0	59A	87A				31.2	7.7		
096-114	0.12					7.9	8.3	1.0		16.3	63A	96A				34.1	7.8		

DEPTH IN	SATURATED PASTE 8E1 REST OHM-CM	8C1B PH	8A H2O PCT	NA 5D2 ESP PCT	NA 5E SAR	SALT 8D5 TOTL SOLU PPM	GYP 6F1A PCT	SATURATION EXTRACT 8A1 8A1A EC MMHOS/CM	6N1B CA	6O1B MG	6P1A NA	6Q1A K	6I1A CO3	6J1A HCO3	6K1B CL	6L1A SO4	6M1A NO3 (MEQ / LITER)	ATTERBERG 4F1 LQID LMIT PCT	4F2 PLST INDX PCT
000-4			40	8	3	6500		27.30	131.0	41.1	77.4	6.0	0.2	1.1	217.0	33.9			
004-25			48	12	13	13000		44.00	188.0	75.0	151.0	4.5	0.4	1.0	383.0	36.0			
025-45			46	13	14	12000		40.50	165.0	75.3	158.0	4.2	0.0	0.6	373.0	21.6			
045-64			53	12	16	14000		39.90	159.0	74.0	171.0	3.6	0.2	0.9	385.0	27.6			
064-78			53	14	18	9700		29.50	87.8	48.3	147.0	2.2	0.3	1.1	255.0	37.6			
078-96			52	16	15	7900		24.20	77.6	40.5	119.0	1.7	0.2	1.1	185.0	60.0			
096-114			54	12	17	7600		21.90	61.3	39.1	117.0	1.3	0.2	0.9	151.0	67.6			

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S58TX-195-91

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 = 0.0002MM	FINE CLAY LT 0.0002MM
0-4	QZ1 FD2	QZ1 FD2 MI3 KK3		MI2 KK2 QZ2 FD3	MV1 MI2 KK3
4-25	QZ1 FD2	QZ1 FD2 MI3 KK3			MV1 MI2 KK3
25-45	QZ1 FD2	QZ1 FD2 MI3 KK3		MI2 KK2 QZ2 FD3	MV1 MI2 KK3
45-64	QZ1 FD2	QZ1 FD2 MI3 KK3		MI2 KK2 QZ2	MV1 MI2 KK3
64-78	QZ1 FD2 MI3	QZ1 FD2 MI3 KK3		MI2 KK2 QZ2 FD3	MV1 MI2 KK3
78-96	QZ1 FD2	QZ1 FD2 MI3 KK3		MI2 KK2 QZ2 FD3	MV1 MI2 KK3
96-114	QZ1 FD2	QZ1 FD2 MI3 KK3		MI2 KK2 QZ2 MT3 FD3	MT1 MI2 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, MV=DIFFUSE, HYDRATED, EXPANSIBLE AND MICACEOUS (13-18A).

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Typic Calciorthid; fine-silty, mixed, thermic.
Soil: Series not designated.
Soil Nos.: S58TX-195-91; K829-835.
Location: Reeves County, Texas. Seven miles west of Pecos, Texas, on U.S. Highway 80 and 8 miles south on Farm Road 869. Sample was taken on brushy area bordering the west side of Farm Road 869. Cover: Native brush.
Topography: Less than 2 percent.
Sampled by: Larry Freeman, June 1958.
Described by: Larry Freeman.

A1 K829 0 to 4 inches. Pink (7.5YR 7/4; 5/4) silty clay loam; weak platy and weak subangular blocky; slightly sticky wet, friable moist, slightly hard dry; hard surface crust 1/2 inch thick; few fine roots; apparent low organic matter; calcareous; clear smooth boundary.

B21ca K830 4 to 25 inches. Brown (7.5YR 5/4; 4/4) silty clay; moderate, medium subangular blocky and granular; slightly sticky, friable hard; common fine roots; calcareous; gradual smooth boundary.

B22ca K831 25 to 45 inches. Light brown (7.5YR 6/4; 5/4) silty clay; moderate medium subangular blocky and granular; sticky, friable slightly hard; calcareous; gradual smooth boundary.

B23ca K832 45 to 64 inches. Light brown (7.5YR 6/4; 5/4) silty clay; moderate medium subangular blocky and fine granular; sticky wet, friable moist, slightly hard dry; many soft lumps of $CaCO_3$; calcareous; gradual wavy boundary.

B24ca K833 64 to 78 inches. Light brown clay with a high concentration of finely disseminated $CaCO_3$ and gypsum crystals; weak medium subangular blocky. This horizon was
B25ca K834 78 to 96 inches. divided into 64 inch to 78 inch to 96 inch and 96 inch to 114 inch segments.

IIB26ca K835 96 to 114 inches. Same as above.

Remarks: 1. The family texture is based on 2 sets of Lincoln SCS data from pedons sampled in the general area. These similar pedons contain enough carbonate clay to cause the family texture to be fine-silty instead of fine.

2. Textures above agree with laboratory data. Field textures where different are given below:

A1 - silt loam
B21ca - light silty clay loam
B22ca - silty clay loam
B23ca - silty clay loam
B24ca - silty clay loam

3. Sampled as a representative of Hoban soils (Ustollic Calciorthid); this pedon has less organic carbon in the upper horizons than Hoban pedons.

SOIL CLASSIFICATION-USTOLLIC CALCIORTHID
FINE-SILTY, MIXED, THERMIC

SERIES - - - - - - -HOBAN

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S58TX-195-90 COUNTY - - - REEVES

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K810-816

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (PCT LT 2MM) SAND 2-.05	SILT .05-.002	CLAY LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	PARTICLE SIZE ANALYSIS (A) SAND .05-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002 (PCT LT.002)	FINE CLAY LT .0002	ETHYLENE GLYCOL RETAINED (B) LT 2 MM	LT .002 MM	LT .0002 MM	BULK DEN 4A3A G/CC
000-12	AP	19.4	50.8	29.8	0.2	0.6	0.6	8.6	9.5				36	64	38.8	149	247	
012-21	B21	17.9	46.3	35.8	0.3	0.7	0.6	8.0	8.5				44	56	38.4	153	234	
021-37	B22CA	14.9	41.7	43.4	0.2	0.6	0.5	6.8	6.9				36	64	43.1	159	244	
037-52	B23CA	11.4	40.3	48.3	0.1	0.4	0.3	4.6	6.2				42	58	37.6	161	251	
052-78	2B24CA	6.4	46.3	47.3	0.0	0.1	0.0	1.8	4.5						51.3	173	254	
078-90	2B25CA	5.0	56.2	38.8	0.0	0.1	0.0	1.3	3.6				29	71	57.3	178	267	
090-100	2B26	8.1	45.9	46.0	0.0	0.1	0.1	2.2	5.8				27	73	54.7	176	271	

DEPTH IN	ORGANIC MATTER 6A1A ORGN PCT	6B1A NITG PCT	C/N CARB	IRON 6C3 EXT FE PCT	PHOS 6S1A TOTL PCT	EXCHANGEABLE BASES 5B1B 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO CA 8D3 TO MG	CARB EQ 6E1E PCT	PH 8C1A 1/1 H20	8C1C 1/2 KCL	8C1E 1/2 CACL
						(MEQ / 100G)													
000-12	1.10					4.8	2.1	4.5		18.2	57A	84A				21.5	7.9		
012-21	0.70					3.0	1.9	4.7		17.6	58A	82A				26.4	8.0		
021-37	0.35					4.1	1.8	4.0		16.2	57A	86A				31.4	7.9		
037-52	0.23					5.4	3.8	2.8		15.8	60A	84A				38.9	8.2		
052-78	0.12					7.4	6.2	2.1		15.3	62A	102A				46.0	8.0		
078-90	0.12					10.3	10.0	2.1		17.6	62A	102A				42.0	7.8		
090-100	0.12					13.3	12.9	2.6		21.5	66A	107A				24.1	7.8		

DEPTH IN	SATURATED PASTE 8E1 REST OHM-CM	8C1B PH	8A H20 PCT	NA 5D2 ESP PCT	NA 5E SAR	SALT 8D5 TOTL SOLU PPM	GYP. 6F1A PCT	SATURATION EXTRACT 8A1 8A1A EC MMHOS/CM	6N1B CA	6O1B MG	6P1A NA	6Q1A K	6I1A CO3	6J1A HCO3	6K1B CL	6L1A SO4	6M1A NO3	ATTERBERG 4F1 LQID LMIT PCT	4F2 PLST INDX
									(MEQ / LITER)										
000-12			40	7	7	1300		4.70	17.8	6.9	23.0	3.7	0.6	3.2	27.2	27.6			
012-21			45	6	7	1000		3.40	9.7	3.9	17.1	4.0	0.5	1.7	18.0	17.7			
021-37			52	6	6	1200		3.40	9.4	5.8	16.4	3.6	0.4	1.4	17.5	11.0			
037-52			52	15	13	1300		3.60	3.5	5.4	27.7	1.8	0.3	1.6	19.8	16.0			
052-78			65	18	15	3400		7.80	13.3	12.7	54.0	2.0	0.2	1.5	54.6	31.6			
078-90			60	18	17	8300		22.20	49.7	47.4	115.0	3.2	0.1	0.8	147.0	68.8			
090-100			63	18	19	10000		26.80	47.9	61.2	144.0	3.5	0.0	0.6	199.0	74.8			

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S58TX-195-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-12	QZ1 FD2	QZ1 FD2 MI3 KK3		MI2 KK2 QZ2 FD3	MV1 MI2 KK3
12-21	QZ1 FD2	QZ1 FD2 MI3 KK3		MI2 KK2 QZ2 FD3	MV1 MI2 KK3
21-37	QZ1 FD2	QZ1 FD2 MI3 KK3		MI2 KK2 QZ2 FD3 VC3	MV1 MI2 KK3
37-52	QZ1 FD2	QZ1 FD2 MI3 KK3		MI2 KK2 QZ2 FD3	MV1 MI2 KK3
52-78	QZ1 FD2	QZ2 FD2 MI3 KK3		MI2 KK2 QZ2 FD3	MT1 MI2 KK3
78-90	QZ1 FD2	QZ2 FD2 MI3 KK3		MI2 KK2 QZ2 MT2 FD3	MT1 MI2 KK3
90-100	QZ1 FD2	QZ2 FD2 MI3 KK3		MI2 KK2 QZ2 MT2 FD3	MT1 MI2 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, MV=DIFFUSE, HYDRATED, EXPANSIBLE AND MICACEOUS (13-18A), VC=CHLORITE-VERMICULITE OR VERMICULITE-CHLORITE INTERSTRATIFIED.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Ustollic Calciorthid; fine-silty, mixed, thermic.
Soil: Hoban silty clay loam.
Soil Nos.: S58TX-195-90; K810-816.
Location: Reeves County, Texas; 7 miles west of Pecos, Texas, on U.S. Highway 80 and 8 miles south of Farm Road 869. Sample was taken on Pecos Experiment Station and was designated as site No. 3 on a high-line study by the SCS, May 5-13, 1969 on a later trip. (Not sampled during the high-line study). Cover: Cultivated.
Topography: Predominate slope less than 1 percent.
Sampled by: Larry Freeman, June 1958.
Described by: Larry Freeman.

Ap K810 0 to 12 inches. Brown (7.5YR 5/4; 4/4 moist) silty clay loam; compound moderate, medium blocky and fine granular; sticky wet, friable moist, slightly hard dry; few fine roots; hard surface crust 1 to 4 inches thick when dry; calcareous; clear smooth boundary.

B21 K811 12 to 21 inches. Light brown (7.5YR 6/4; 5/4) silty clay loam; compound weak subangular blocky and weak granular; sticky wet, friable moist, slightly hard dry; few fine roots; calcareous; clear smooth boundary.

B22ca K812 21 to 37 inches. Light brown (7.5YR 6/4; 5/4) silty clay; weak subangular blocky and granular; sticky wet, friable moist, slightly hard dry; few fine roots; few weak $CaCO_3$ spots; calcareous; clear smooth boundary.

B23ca K813 37 to 52 inches. Pink (7/5YR 7/4; 6/4) silty clay; moderate fine subangular blocky; sticky wet, friable moist, slightly hard dry; calcareous; clear wavy boundary.

IIB24ca K814 52 to 78 inches. Omitted.

IIB25ca K815 78 to 90 inches. Light brown (7.5YR 6/4; 5/4) silty clay loam; moderate subangular blocky and granular structure; sticky wet, friable moist, slightly hard dry; many soft white $CaCO_3$ lumps; calcareous; clear boundary.

IIB26 K816 90 to 100 inches. Strong brown (7.5YR 5/6; 4/6) silty clay; moderate subangular blocky; sticky wet, firm moist, hard dry; calcareous.

Remarks:

1. The family texture is based on 2 sets of Lincoln SCS Laboratory data from pedons sampled in the general area.
2. These similar pedons contain enough carbonate clay to cause the family to be fine-silty instead of fine.
3. Textures above agree with laboratory data. Field textures where different are given below:

   IIB25ca - silty clay

SOIL CLASSIFICATION: Ustollic Calciorthid; fine-silty, mixed, thermic

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Hoban loam SOIL Nos. S61TX-195-2 LOCATION Reeves County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 16527-16534

General Methods: 1A, 1B1b, 2A1, 2B

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)	3A1a Non-Carbonate Clay <0.002	Coarse fragments 2A2: >2	2 – 19	19 – 76
		Pct. of <2 mm													Pct	Pct. of <76 mm	
0-3	A1	40.9a	39.0	20.1	0.3	0.9	2.8	13.8	23.1	16.0	23.0	48.3	17.8	16	tr		
3-11	B21	32.5a	40.7	26.8	0.1	0.6	2.1	11.0	18.7	13.9	26.8	40.1	13.8	19	tr		
11-21	B22	27.5b	42.8	29.7	-	0.4	1.5	8.7	16.9	15.0	27.8	37.9	10.6	22	tr		
21-29	B23ca	23.7b	42.9	33.4	0.3	0.4	1.3	7.5	14.2	11.9	31.0	31.3	9.5	20	tr		
29-41	C1ca	22.0b	43.3	34.7	0.2	0.6	1.7	6.2	13.3	11.5	31.8	28.9	8.7	23	tr		
41-46	C2ca	11.2b	46.1	42.7	-	0.2	0.7	2.7	7.6	10.3	35.8	19.7	3.6	29	tr		
46-59	C3cacs														-		
59-85+	C4cs														tr		
(Carbonate and gypsum removed Method 3A3)																	
41-46	C2ca	16.8	37.4	45.8	0.1	0.3	1.0	3.8	11.6	11.4	26.0	25.6	5.2				
46-59	C3cacs	7.0	38.0	55.0	-	tr	0.3	1.0	5.7	10.5	27.5	16.9	1.3				
59-85+	C4cs	11.1	39.2	49.7	0.1	0.2	0.6	2.3	7.9	12.3	26.4	22.4	3.2				

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	Carbonate as $CaCO_3$: 6B1b <2mm	Carbonate as $CaCO_3$: 3A1a <0.002 mm	Ext. Iron as Fe	Bulk density: 1/3-bar	Bulk density: 30-cm	Bulk density: Air-Dry	COLE	Water content: 30-cm.	Water content: 1/3-Bar	Water content: 4B2 15-Bar	Water content: 1/3-to 15-Bar	pH: 8C1b Sat. Paste	pH: 8C1a 1:1	pH: 8C1a 1:10
	Pct.	Pct.		Pct	Pct	Pct.	g/cc	g/cc	g/cc		Pct.	Pct	Pct.	in./in.			
0-3	0.66	0.064	10	18	4								8.7		7.4	8.2	8.6
3-11	0.71	0.081	9	25	8								11.4		7.2	8.0	8.5
11-21	0.55	0.062	9	29	8								10.9		7.2	7.8	8.4
21-29	0.30	0.038	8	38	13								10.2		7.2	7.7	8.4
29-41	0.20			37	12								10.2		7.1	7.8	8.4
41-46	0.18			39	14								11.9		7.2	7.6	8.1
46-59	0.15			17									8 c		7.2	7.5	7.8
59-85+	0.10			21									10 c		7.3	7.5	7.8

Depth (In.)	Extractable bases 5B1a: 6A2b Ca	6A2b Mg	6P2a Na	6Q2a K	Sum	Cat. Exch. Cap.: 5A2a $NaOAc$	5A1a NH_4OAc	Ca	Mg	Water extract from saturated paste 8A1: 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	15.5	1.1	0.1	1.3	18.0	16.9	14.7			0.8	0.5					0.80
3-11	17.3	0.9	0.1	0.9	19.2	18.7	15.6			0.7	0.2					0.76
11-21	17.4	1.3	0.2	0.6	19.5	18.9	15.6			1.2	0.2					1.81
21-29	16.8	0.8	0.2	0.5	18.3	16.9	14.3			1.6	0.2					1.96
29-41	16.6	1.5	0.2	0.6	18.9	17.6	15.3			1.8	0.2					1.52
41-46	21.6	1.5	0.3	0.7	24.1	21.0	18.4			2.7	0.4					3.20
46-59			0.3	0.5		12.6	11.3			3.7	0.4					3.43
59-85+			0.8	0.7			16.6			9.9	0.7	-	0.8	11.9	23.4	6.2

Depth (In.)	8A Water at Saturation	5D2 Exchangeable Na	6F1a Gypsum	Ratios to clay: NH_4OAc CEC	Ratios to clay: Ext. Iron	Ratios to clay: 15-Bar Water
	Pct.	Pct.	Pct.			
0-3	24.9	<1	-	0.92		0.54
3-11	34.4	<1	-	0.82		0.60
11-21	37.9	1	-	0.71		0.50
21-29	37.1	1	-	0.72		0.52
29-41	37.1	1	-	0.66		0.44
41-46	44.2	1	tr	0.68		0.47
46-59	39 c	2	46			
59-85+	42 c		29			

a. Carbonate grains: 25-50 percent (2-1 mm); 5-25 percent (1-0.05 mm).

b. Carbonate grains: 25-50 percent (2-0.1 mm); 5-25 percent (0.1-0.05 mm).

c. Corrected for approximate loss of water associated with gypsum hydrate, resulting from oven-drying at 105 degrees C.

Soil classification: Ustollic Calciorthid; fine-silty, mixed, thermic.
Soil: Hoban loam.
Soil Nos.: S61TX-195-2; 16527-16534.
Location: Southwest 9.6 miles of Texas Highway 17 on U.S. Highway 80; thence 600 feet south of Texas Pacific Railroad.
Area: Reeves County, Texas.
Physiography: Level upland on the Hermosa flat with gradient of less than 0.5 percent.
Vegetation: Desert shrub dominantly creosotebush with subordinate amounts of tarbush. The grass is largely burrograss with few dead tufts of tobosagrass. Ninety-nine percent of the ground surface is bare.
Climate: Mean annual precipitation of about 14 inches; PE index about 18.
Drainage: Slow from surface - water table is below 10 feet on this date. Subsoil permeability is moderate.
Parent material: Calcareous, gypsiferous loamy alluvium - sediments apparently largely from limestone but include some from igneous rocks.
Sampled by: R. H. Jordan and E. D. Rivers, October 25, 1961.
Described by: R. E. Daniell, J. R. Coover, and R. Fox.

A1 16527 0 to 3 inches. Light gray (10YR 7/2, 4.5/3 moist) loam; weak medium platy structure, grading to weak subangular blocky in lower portion; upper 1/4 inch is a platy crust; very friable, soft; strongly effervescent; clear boundary.

B21 16528 3 to 11 inches. Pink (7.5YR 7/3, 5/3 moist) loam; moderate medium and fine subangular blocky; friable slightly hard; strongly effervescent with few films and threads of segregated $CaCO_3$; horizon seems to be completely reworked and consists of about 25 percent wormcasts, old insect channels refilled and numerous root channels - soil is porous; gradual boundary.

B22 16529 11 to 21 inches. Pink (7.5YR 7/4, 5/4 moist) clay loam; structure, consistence, reaction, and lime content as above; insect and wormcasts about as above but decreasing in amount; diffuse boundary.

B23ca 16530 21 to 29 inches. Pink (7.5YR 7/4, 5/4 moist) clay loam; structure, consistence, and reaction as above; about 2 percent of the soil mass consists of films, threads and soft masses of $CaCO_3$; gradual boundary.

C1ca 16531 29 to 41 inches. Pink (7.5YR 7/5, 5/6 moist) clay loam; weak fine subangular blocky; friable slightly hard; strongly effervescent; an estimated 5 percent of the soil mass is segregated $CaCO_3$ mostly in masses up to 3/8 inch in diameter; gradual boundary.

C2ca 16532 41 to 46 inches. Pink (7.5YR 7/5, 5/6 moist) silty clay; weak subangular blocky; friable slightly hard; strongly effervescent; less limy than horizon above; abrupt wavy boundary varying from 43 to 49 inches below the surface.

C3cacs 16533 46 to 59 inches. Pink (7.5YR 8/4, 5/4 moist) clay loam with much gypsum and segregated $CaCO_3$; weakly cemented when dry, friable to firm when moist; massive; probably more than 25 percent gypsum crystals; diffuse boundary.

C4cs 16534 59 to 85 inches plus. Pink (7.5YR 8/3, 5/5 moist) clay loam with gypsum content as above but containing less $CaCO_3$.

Remarks: There are vertical seams in the gypsic horizon, some 1 to 2 inches apart that appear to have coatings of gypsum and darker material, probably organic matter. Vertical seams intersect each other. Roots have not penetrated the gypsic horizon except along the seams, and the old roots are flattened. There are occasional horizontal seams but they are less pronounced than the vertical. There does not appear to be horizontal coatings at the contact of the C2ca and the C3cacs. There are small, mostly igneous gravels throughout the pedon, generally less than 1/2 inch in diameter and occasionally occurring in pockets in the gypsic horizon - average content by volume is less than 1 percent.

Mineralogy (Method 7B1).
Rounded, frosted quartz grains are abundant in the sands. Shell fragments are absent. Quartz in the very fine sands remains constant with depth at 60 to 65 percent. Carbonate increases from 15 percent in the surface to a maximum of 25 percent in the B22 horizon, and then decreases to 10 percent in the C1ca horizon. Feldspars increase from 20 to 25 percent; unidentified aggregates amount to 5 percent.

Textures above agree with laboratory data. Field textures where different are given below:

A1 - heavy silt loam
B21 - light silty clay loam
B22 - light silty clay loam
B23ca - light silty clay loam
C1ca - light silty clay loam
C2ca - light silty clay loam

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Ustollic Calciorthid: fine-silty, mixed, thermic

SOIL Reagan loam SOIL Nos. S61TX-231-1 LOCATION Upton County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 16483-16491

General Methods: 1A, 1B1b, 2A1, 2B

Depth (In.)	Horizon	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)	Int. II (0.2–0.02)	(2–0.1)	3A1a Non-Carbonate Clay <0.002	Coarse fragments 2A2: >2	2 – 19	19 – 76
		Pct. of <2 mm													Pct.	Pct. of <76 mm	
0-1/4	A11	44.8b	40.8	14.4	0.1	2.6	3.7	11.2	27.2	26.0	14.8	62.4	17.6	14	tr		
1/4-3	A12	43.8b	37.7	18.5	0.2	2.2	3.6	11.8	26.0	21.8	15.9	57.6	17.8	19	tr		
3-8	A13	38.8b	35.3	25.9	0.2	2.2	3.1	10.0	23.3	19.5	15.8	51.1	15.5	22	tr		
8-17	B21	34.6b	35.7	29.7	0.2	2.3	2.8	8.7	20.6	19.0	16.7	46.7	14.0	24	tr		
17-30	B22	33.6b	35.9	30.5	0.3	1.7	2.5	8.4	20.7	18.2	17.7	45.9	12.9	25	1		
30-37	C1ca	27.2c	36.1	36.7	0.1	1.5	2.1	6.9	16.6	13.9	22.2	36.1	10.6	16	3		
37-50	C2ca	25.8e	34.7	39.5	0.6	1.7	1.8	6.2	15.5	12.3	22.4	33.0	10.3	16	1		
50-75	C3ca	30.9c	33.2	35.9	0.5	2.0	2.2	7.8	18.4	13.7	19.5	38.6	12.5	17	1		
75-91	C4	28.2c	33.4	38.4	0.4	1.5	1.8	7.2	17.3	12.8	20.6	36.2	10.9	18	2		
17-30	a	41.2	30.4	28.4	-	2.2	2.9	10.3	25.8	11.2	19.2	45.6	15.4				
30-37	a	45.5	27.7	26.8	0.1	2.2	3.1	10.8	29.3	17.0	10.7	55.4	16.2				
37-50	a	47.7	27.2	25.1	0.1	2.7	3.4	11.7	29.8	17.1	10.1	56.7	17.9				

Depth (In.)	6A1a Organic Carbon	6B1a Nitrogen	C/N	Carbonate as $CaCO_3$ 6E1b <2mm	Carbonate as $CaCO_3$ 3A1a <0.002 mm	6C1a Ext. Iron as Fe	Bulk density 4A1c 30-cm	Bulk density 4A1b Air-Dry	4B1 COLE	Water content 4B3 30-cm	Water content 4B1b 1/3-Bar	Water content 4B2 15-Bar	Water content 4C1 1/3-to 15-Bar	pH 8C1b Sat. Paste	pH 8C1a 1:1	pH 8C1a 1:10
	Pct.	Pct		Pct.	Pct.	Pct.	g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	In./in.			
0-1/4	0.96	0.107	9	5	tr	0.5						7.8		7.4	7.9	8.3
1/4-3	0.90	0.096	9	7	tr	0.5					17.3	9.2		7.5	8.0	8.4
3-8	0.97	0.091	11	12	4	0.5		1.36	1.48	0.028	18.1	19.0	11.1	0.11	7.3	7.9	8.4
8-17	0.72	0.080	9	16	6	0.5						20.5	11.8		7.4	7.8	8.3
17-30	0.60	0.066	9	18	6	0.6		1.30	1.40	0.024	20.7	20.6	11.6	0.11	7.3	7.6	8.2
30-37	0.33			42	21	0.4						21.8	9.3		7.3	7.8	8.4
37-50	0.18			45	24	0.4		1.55d	1.64e	0.017	20.1	20.7	9.0	0.18	7.4	7.9	8.5
50-75	0.13			37	19	0.4						18.3	9.5		7.4	7.9	8.5
75-91	0.10			38	20	0.4							10.8		7.5	7.9	8.5

Depth (In.)	Extractable bases 5B1a Ca	5B1b Mg	6P2a Na	6Q2a K	Sum	Cat. Exch. Cap. 5A2a NH_4OAc	5A1a NH_4OAc	Water extract from saturated paste 8A1: Ca	Mg	6P1a Na	6Q1a K	5I1a CO_3	6J1a HCO_3	6K1a Cl	6L1a SO_4	8A1a Electrical conductivity
	meq/100 g							meq/liter								mmho/cm
0-1/4	14.2	1.7	tr	1.1	17.0	15.0	14.8			0.2	0.1					1.10
1/4-3	16.9	1.7	tr	1.3	19.9	18.1	17.2			0.2	0.4					0.57
3-8	17.8	1.2	0.1	0.7	19.8	18.9	17.7			0.3	0.1					0.48
8-17	17.9	1.5	0.1	0.5	20.0	18.6	17.1			0.7	0.1					0.73
17-30	17.8	1.9	0.4	0.5	20.6	18.4	17.1			4.0	0.1					2.50
30-37	11.8	1.7	0.9	0.3	14.7	12.0	10.4			9.9	0.1					2.95
37-50	10.3	2.1	1.4	0.3	14.1	10.4	9.5			16.8	0.1					3.54
50-75	11.0	2.2	2.2	0.4	15.8	11.2	10.5			24.2	0.2		1.5	33.7	8.2	4.64
75-91	11.7	2.9	2.8	0.4	17.8	12.0	11.4			24.2	0.2		1.8	29.5	11.1	4.36

Depth (In.)	8A Water at Saturation	5I2 Exchangeable Na	6F1a Gypsum	Ratios to Clay <2u: NH_4OAc CEC	Ratios to Clay <2u: Ext. Iron	Ratios to Clay <2u: 15-Bar Water
	Pct.	Pct	Pct			
0-1/4	30.4	<1		1.08	0.04	0.54
1/4-3	28.4	<1		0.93	0.03	0.50
3-8	37.8	<1		0.80	0.02	0.32
8-17	39.6	<1		0.71	0.02	0.49
17-30	39.0	1		0.71	0.02	0.48
30-37	36.1	4	-	0.65	0.03	0.38
37-50	34.6	8	-	0.59	0.03	0.36
50-75	37.1	12	-	0.62	0.02	0.36
75-91	51.2	13	-	0.63	0.02	0.60

a. Carbonate removed (Method 3A3).
b. Carbonate grains: > 50 percent (2-1 mm); 5 percent (1-0.05 mm).
c. Carbonate grains: > 50 percent (2-0.5 mm); 5-25 percent (0.5-0.05 mm).
d. Range between duplicate clods is 0.11 g/cc.
e. Range between duplicate clods is 0.12 g/cc.

Soil classification: Ustollic Calciorthid; fine-silty, mixed, thermic.
Soil: Reagan loam.
Soil Nos.: S61TX-231-1; 16483-16491
Location: South-southeast 5 miles and 3.8 miles west-southwest of Midkiff on Farm Road 2401; thence 400 feet south-southeast in pasture - 150 feet east of fence.
Area: Upton County, Texas.
Physiography: Level upland on the Reagan divide with a plane surface of less than 0.5 percent gradient.
Vegetation: Sparse grass cover of largely burrograss but some tobosagrass and a moderate dense overstory of tarbush and scattered scrub mesquite.
Climate: Mean annual precipitation of about 17 inches; PE index about 23.
Drainage: Slow from surface. Subsoil is moderately permeable.
Parent material: Calcareous old alluvium on plains outwash.
Sampled by: R. H. Jordan and E. D. Rivers, October 23, 1961.
Described by: R. E. Daniell, J. R. Coover, and C. Wiendenfield.

A11 16483 0 to 1/4 inch. Light brownish gray (10YR 6/2, 4/2 moist) loam; weak platy crust; soft and very friable; strongly effervescent; abrupt lower boundary.

A12 16484 1/4 to 3 inches. Brown (10YR 5/3, 3/3 moist) loam; weak fine and medium granular, upper 1 inch weak platy; friable slightly hard; strongly effervescent; clear boundary.

A13 16485 3 to 8 inches. Brown (8.5YR 5/3, 3/3 moist) loam; weak to moderate fine and very fine subangular blocky; friable slightly hard; strongly effervescent; about 15 percent by volume of wormcasts, insect cavities and old root channels; diffuse boundary.

B21 16486 8 to 17 inches. Brown (7.5YR 5/3, 4/3 moist) clay loam; moderate fine and medium subangular blocky; friable hard; strongly effervescent with fine films, threads and specks of $CaCO_3$; about 20 percent of the soil mass has been reworked and is now wormcasts and insect cavities filled with material from above, some of which is 1 to 2 units lower in value and chroma; diffuse boundary.

B22 16487 17 to 30 inches. Light brown (7.5YR 6/4, 5/4 moist) clay loam; structure consistence segregated $CaCO_3$ and wormcasts and insect cavities as in horizon above; clear wavy boundary varying from 26 to 40 inches below the surface with 30 inches being dominant in this 4 x 8 foot pit.

C1ca 16488 30 to 37 inches. Pink (7.5YR 7/3, 5/3 moist) clay loam; with 20 to 30 percent of the material as segregated $CaCO_3$; few krotovinas 3 to 4 inches in diameter; diffuse boundary.

C2ca 16489 37 to 50 inches. Light yellowish brown (10YR 6/4, 5/4 moist) clay loam; 30 to 40 percent of the material is segregated $CaCO_3$; this horizon is very weakly cemented and is hard when dry but friable when moist; diffuse boundary.

C3ca 16490 50 to 75 inches. Light yellowish brown (10YR 6/4, 5/4 moist) clay loam; weak subangular blocky to moist; friable hard; strongly effervescent with estimated 5 percent mostly soft $CaCO_3$ concretions; diffuse boundary. Sampled 55- to 65-inch layer.

C4 16491 75 to 91 inches. Light brown (7.5YR 6/4, 5/4 moist) clay loam; similar to the horizon above; gradual boundary. Sampled 75- to 89-inch layer by auger.

C5 91 to 95 inches plus. Similar to horizon above but appears to contain more $CaCO_3$ and had a small percent of gypsum crystals.

Remarks: A few caliche-coated limestone fragments ranging from 1/4 to 2 inches in diameter occur throughout the pedon. Previous studies indicate this soil is underlain by Cretaceous materials at 100 inches.

Mineralogy (Method 7B1).
The sand grains are rounded with the larger grains somewhat more frosted than the smaller grains. Shell fragments are present. Quartz in the very fine sands remains constant with depth at about 60 percent. Feldspars decrease from 25 percent in the surface to 15 percent in the C4 horizon. Carbonate increases from 5 percent to 10 percent; unidentified aggregates remain constant at 5 percent.

Textures above agree with laboratory data. Field textures where different are given below:

A11 - heavy silt loam
A12 - heavy silt loam
A13 - light silty clay loam
B21 - light silty clay loam
B22 - light silty clay loam
C1ca - light silty clay loam
C2ca - light silty clay loam
C3ca - light silty clay loam
C4 - silty clay loam

SOIL CLASSIFICATION: Ustollic Calciorthid; fine-silty, mixed, thermic

SOIL Reagan clay loam SOIL Nos. S61TX-231-2 LOCATION Upton County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 16492-16500

General Methods: 1A, 1B1b, 2A1, 2B

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)	3A1a Non-Carbonate Clay <0.002	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															
0-2	A11	40.3b	40.4	19.3	0.6	2.0	1.9	12.1	23.7	20.8	19.6	53.9	16.6	16	1		
2-8	A12	32.0b	37.8	30.2	0.3	1.6	1.3	9.4	19.4	17.6	20.2	44.8	12.6	23	tr		
8-15	B21	30.6b	36.6	32.8	0.7	1.5	1.4	8.7	18.3	16.2	20.4	41.6	12.3	24	tr		
15-23	B22	28.7c	36.5	34.8	0.8	1.7	1.3	7.9	17.0	15.6	20.9	39.1	11.7	22	tr		
23-29	B23	25.2c	34.7	40.1	1.3	1.2	1.0	6.8	14.9	13.1	21.6	33.5	10.3	21	3		
29-38	C1ca	23.0c	37.9	39.1	1.2	1.4	1.0	5.6	13.8	11.6	26.3	30.0	9.2	17	4		
38-50	C2ca	25.6c	37.3	37.1	1.6	1.5	1.0	6.3	15.2	13.6	23.7	34.0	10.4	19	4		
50-62	C3ca	25.7c	36.9	37.4	1.6	1.8	1.2	6.4	14.7	8.4	28.5	28.3	11.0	19	4		
62-77+	C4	19.5b	44.7	35.8	0.8	1.5	1.1	5.2	10.9	18.1	26.6	33.1	8.6	25	1		
15-23	a	37.0	32.1	30.9	tr	1.6	1.2	9.6	24.6	18.3	13.8	51.1	12.4				
23-29	a	38.0	29.3	32.7	tr	1.5	1.2	10.0	25.3	16.4	12.9	50.3	12.7				
29-38	a	41.6	28.2	30.2	0.1	1.6	1.4	10.9	27.6	17.2	11.0	54.1	14.0				

Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N	Carbonate as $CaCO_3$: 6E1b <2 mm.	Carbonate as $CaCO_3$: 3A1a <0.002 mm	Bulk density			Water content:		4B2 15-Bar	pH: 8C1b Sat. Paste	pH: 8C1a 1:1	pH: 8C1a 1:10
	Pct.	Pct.		Pct.	Pct.	g/cc	g/cc	g/cc	Pct.	Pct.	Pct.			
0-2	1.14	0.114	10	13	3						9.3	7.4	8.1	8.4
2-8	1.08	0.112	10	18	7						11.7	7.4	8.0	8.3
8-15	0.88	0.095	9	22	9						12.6	7.4	7.9	8.2
15-23	0.67	0.074	9	28	13						12.2	7.1	7.6	8.2
23-29	0.51	0.056	9	39	19						10.9	7.1	7.7	8.3
29-38	0.25			51	22						9.1	7.2	7.8	8.3
38-50	0.14			43	18						9.7	7.4	7.8	8.3
50-62	0.17			46	18						9.9	7.4	7.7	8.3
62-77+	0.10			33	11						11 d	7.4	7.6	7.8

Depth (in.)	Extractable bases: 6N4b Ca	6O4b Mg	6P2a Na	5B1a 6Q2a K	Sum	Cat. Exch. Cap.: 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste: Ca	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
0-2	15.8	1.4	tr	1.7	18.9	16.8	16.0			0.1	0.6					0.62
2-8	17.8	1.5	tr	1.2	20.5	18.6	17.2			0.2	0.3					0.54
8-15	17.3	1.4	0.1	0.6	19.4	19.6	16.3			0.6	0.1					0.66
15-23	16.9	1.2	0.2	0.5	18.8	17.3	15.1			1.3	0.1					1.59
23-29	14.1	1.6	0.2	0.4	16.3	14.6	12.8			1.9	0.1					1.59
29-38	10.7	1.8	0.4	0.3	13.2	10.6	9.1			5.0	0.1					2.49
38-50	11.2	2.5	0.7	0.3	14.7	11.5	9.7			9.5	0.2					3.47
50-62	11.0	2.2	0.9	0.3	14.4	10.8	9.2			10.9	0.2					3.80
62-77+		2.0	1.0	0.4		11.1	10.3			12.5	0.5	--	2.5	19.1	35.7	4.68

Depth (in.)	8A Water at Saturation	5D2 Exchangeable Na	6F1a Gypsum	Ratios to Clay 8D2: NH_4OAc CEC	Ratios to Clay 8D2: 15-Bar Water
	Pct.	Pct.	Pct.		
0-2	29.1	<1		1.00	0.58
2-8	38.3	<1		0.75	0.51
8-15	40.6	<1		0.68	0.52
15-23	40.4	1		0.69	0.55
23-29	38.5	1		0.61	0.52
29-38	36.4	2		0.54	0.54
38-50	37.7	3		0.51	0.51
50-62	39.6	5	tr	0.48	0.52
62-77+	48 d	7	18	0.40	0.44

a. Carbonate removed (Method 3A3).

b. Carbonate: > 50 percent (2-1 mm); 5-25 percent (1-0.05 mm).

c. Carbonate: > 50 percent (2-1 mm); 25-50 percent (1-0.25 mm); 5-25 percent (0.25-0.05 mm).

d. Corrected for approximate loss of water associated with gypsum hydrate, resulting from oven-drying at 105 degrees C.

Soil classification: Ustollic Calciorthid; fine-silty, mixed, thermic.
Soil: Reagan clay loam.
Soil Nos.: S61TX-231-2; 16492-16500.
Location: Upton County, Texas. North of Rankin 15 miles on Texas Highway 349 to pipeline and power line; thence 3 miles south-southwest on dirt road; thence 5 miles northwest; thence 570 feet southwest in pasture.
Physiography: Level upland on the Reagan divide with a plane surface of less than 0.5 percent gradient.
Vegetation: Sparse grass cover of largely burrograss but some tobosagrass and a moderate dense overstory of tarbush and scattered scrub mesquite.
Climate: Mean annual precipitation of about 17 inches; PE index about 23.
Drainage: Slow from surface. Subsoil is moderately permeable.
Parent material: Calcareous old alluvium or plains outwash.
Sampled by: R. H. Jordan and E. D. Rivers, October 23, 1961.
Described by: R. E. Daniell, J. R. Coover and C. Wiendenfield.

A11 16492 0 to 2 inches. Light brownish gray (10YR 6/2; 4/3, moist) loam; weak to moderate medium platy structure; friable, slightly hard; highly calcareous; upper 1/4 inch surface crust; clear boundary.

A12 16493 2 to 8 inches. Brown (10YR 5/3; 3.5/3, moist) clay loam; moderate fine subangular blocky structure; friable hard; highly calcareous; gradual boundary.

B21 16494 8 to 15 inches. Brown (7.5YR 5.5/2; 4/3, moist) clay loam; moderate fine subangular blocky structure; friable hard; highly calcareous with an estimated 2 percent by volume of specks, films and threads of segregated $CaCO_3$; diffuse boundary.

B22 16495 15 to 23 inches. Light brown (7.5YR 5.5/3; 4/4, moist) clay loam; structure, consistence, and segregated $CaCO_3$ content as horizon above; diffuse boundary.

B23 16496 23 to 29 inches. Light brown (7.5YR 6.5/4; 4/5, moist) clay loam; weak to moderate fine subangular blocky structure; friable hard; similar to B22 horizon above but has slightly more visible segregated $CaCO_3$; diffuse boundary.

C1ca 16497 29 to 38 inches. Pink (7.5YR 7/3; 5.5/4, moist) clay loam; estimate 40 percent soft masses of $CaCO_3$; weakly cemented and hard when dry; friable; diffuse boundary.

C2ca 16498 38 to 50 inches. Pink (7.5YR 7/4; 5.5/4, moist) clay loam; 10 to 15 percent soft masses of $CaCO_3$; considerable portion of this horizon appears to have been reworked by insects, worms and other animals; diffuse boundary.

C3ca 16499 50 to 62 inches. Similar to horizon above; diffuse boundary.

C4 16500 62 to 77 inches plus. Reddish yellow (7.5YR 7/6; 6/6, moist) light silty clay loam; 10 to 15 percent soft masses of $CaCO_3$ and 5 percent gypsum crystals, mostly sand-size. Auger sample 69- to 77-inch layer.

Remarks: There are a few caliche-coated limestone fragments throughout the pedon. They range from 1/2 inch in diameter up to fragments 4 inches wide and 1 to 1-1/2 inches thick. There are a few roots to the depth examined. This soil is usually dry in the upper 60 inches.

Mineralogy (Method 7B1).
Sand grains are rounded with larger grains somewhat more frosted than smaller grains. Shell fragments are present. The very fine sands contain 75 percent quartz in the surface, decreasing to 50 percent in the C4 horizon. Feldspars decrease from 15 to 10 percent. Carbonate increases with depth from a trace to 25 percent. Five percent unidentified aggregates are present. The C horizon contains 10 percent perthite(?).

Textures above agree with laboratory data. Field textures where different are given below:

A11 - heavy silt loam
A12 - light silty clay loam
B21 - light silty clay loam
B22 - light silty clay loam
B23 - light silty clay loam
C1ca - silty clay loam
C2ca - silty clay loam
C3ca - silty clay loam

SOIL CLASSIFICATION: Ustollic Camborthid; fine-silty, mixed, thermic

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Hodgins silty clay loam SOIL Nos. S61TX-186-1 LOCATION Pecos County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 16501-16509

General Methods: 1A, 1B1b, 2A1, 2B

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)	3A1a Non-Carbonate clay <0.002	Coarse fragments 2A2: ≥ 2	2 – 19	19 – 76
		Pct. of < 2 mm													Pct.	Pct. of < 76 mm	
0-3	A11	15.5b	56.5	28.0	0.1	0.4	1.0	3.8	10.2	21.6	34.9	34.1	5.3	23	tr		
3-7	A12	9.4b	51.1	39.5	tr	0.2	0.4	2.4	6.4	18.4	32.7	26.4	3.0	31	tr		
7-13	B21	9.8c	49.6	40.6	-	0.3	0.4	2.4	6.7	15.6	34.0	23.9	3.1	29	tr		
13-23	B22ca	9.4c	49.6	41.0	-	0.2	0.4	2.3	6.5	15.6	34.0	23.7	2.9	27	tr		
23-33	B23ca	9.4c	46.1	45.5	0.3	0.1	0.4	2.4	6.2	15.4	30.7	23.2	3.2	27	tr		
33-45	C1ca	9.6c	45.5	44.9	0.2	0.2	0.3	2.3	6.6	15.6	29.9	23.8	3.0	27	tr		
45-55	C2ca	9.2c	45.5	45.3	0.1	0.1	0.3	2.3	6.4	15.9	29.6	23.9	2.8	27	tr		
55-65	C3cab	7.8c	48.5	43.7	-	0.1	0.2	2.0	5.5	15.3	33.2	22.2	2.3	26	tr		
65-95+	C4b	12.4c	56.4	31.2	-	tr	0.1	1.6	10.7	28.1	28.3	40.0	1.7	21	tr		
45-55	a	13.0	41.0	46.0	tr	0.1	0.3	2.7	9.9	19.4	21.6	31.1	3.1				
55-65	a	11.5	42.4	46.1	-	tr	0.3	2.3	8.9	19.3	23.1	29.8	2.6				

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	Carbonate as $CaCO_3$: 6E1b <2mm	Carbonate as $CaCO_3$: 3A1a <0.002 mm	6C1a Ext. Iron as Fe	Bulk density: 4A1c 30-cm	Bulk density: 4A1b Air-Dry	4D1 COLE	Water content: 4B3 30-cm	Water content: 4B1b 1/3-Bar	Water content: 4B2 15-Bar	4C1 1/3-to 15-Bar	pH: 8C1b Sat. Paste	pH: 8C1a 1:1	pH: 8C1a 1:10
	Pct.	Pct.		Pct.	Pct.	Pct.	g/cc	g/cc	g/cc	Pct.	Pct.	Pct.	in./in.			
0-3	1.22	0.126	10	22	5	0.7					25.0	13.2		7.4	8.1	8.5
3-7	1.29	0.131	10	27	9	0.6		1.16	1.24	0.020	20.1	27.2	15.2	0.14	7.4	8.0	8.3
7-13	1.07	0.118	9	30	12	0.6						27.1	15.1		7.3	7.9	8.2
13-23	0.92	0.094	10	35	14	0.6		1.26	1.34	0.020	22.6	26.2	14.5	0.15	7.4	7.8	8.3
23-33	0.56	0.058	10	39	17	0.6						25.6	13.9		7.4	7.8	8.3
33-45	0.45			39	18	0.6						26.6	14.1		7.3	7.9	8.4
45-55	0.39			42	18	0.6		1.22	1.34	0.032	32.2	26.1	13.8	0.15	7.3	8.1	8.5
55-65	0.26			48	18	0.5		1.34	1.47	0.032	24.0	24.8	13.2	0.16	7.6	8.1	8.6
65-95+	0.17			37	10	0.6						20.4	10.9		7.7	8.2	8.7

Depth (In.)	Extractable bases 5B1a: 6B1a Ca	6B1a Mg	6P2a Na	6Q2a K	5Bsum	Cat. Exch. Cap.: 5A2a NH_4OAc	5A1a NH_4OAc	Water extract from saturated paste 8A1: Ca	Mg	6F1a Na	6Q1a K	CO_3	HCO_3	Cl	SO_4	8A1a Electrical conductivity
	meq/100 g							meq/liter								mmho/cm
0-3	19.4	2.5	tr	2.2	24.1	23.4	21.4			0.2	0.7					0.65
3-7	21.9	2.3	0.1	1.8	26.1	25.5	22.3			0.3	0.4					0.57
7-13	21.7	2.1	0.1	1.2	25.1	24.9	22.0			0.3	0.2					0.48
13-23	21.2	2.5	0.1	0.9	24.7	22.7	20.3			0.5	0.1					1.03
23-33	17.8	3.6	0.1	0.7	22.2	20.5	18.0			0.9	0.1					1.12
33-45	16.3	4.5	0.2	0.6	21.6	20.2	17.4			1.0	0.1					1.00
45-55	15.1	5.1	0.3	0.6	21.1	18.9	16.9			1.8	0.1					0.95
55-65	13.6	5.9	0.4	0.5	20.4	18.4	16.2			2.6	0.1					1.00
65-95+	12.3	6.0	0.4	0.5	19.2	16.7	15.3			3.4	0.1					0.98

Depth (In.)	8A Water at Saturation	5I2 Exchangeable Na		6F1a Gypsum	Ratios to Clay: NH_4OAc CEC	Ext. Iron	15-Bar Water
	Pct.	Pct.		Pct.			
0-3	34.5	<1			0.79	0.03	0.57
3-7	45.8	<1			0.74	0.02	0.49
7-13	51.2	<1			0.76	0.02	0.52
13-23	45.7	<1			0.78	0.02	0.54
23-33	44.4	<1			0.67	0.02	0.51
33-45	43.7	1			0.69	0.02	0.52
45-55	45.5	1			0.62	0.02	0.51
55-65	43.0	2		-	0.62	0.02	0.51
65-95+	41.5	2		-	0.66	0.02	0.52

a. Carbonate removed (Method 3A3).
b. Carbonate grains: > 50 percent (2-0.05 mm).
c. Carbonate grains: > 50 percent (2-0.5 mm); 25-50 percent (0.5-0.1 mm); 5-25 percent (0.1-0.05 mm).

Soil classification: Ustollic Camborthid; fine-silty, mixed, thermic.
Soil: Hodgins silty clay loam.
Soil Nos.: S61TX-186-1; 16501-16509 .
Location: About 12 miles southwest of Ft. Stockton. 0.65 mile west of Belding along railroad; thence 400 feet southeast of railroad.
Area: Pecos County, Texas.
Physiography: Nearly level semidesertic plain with gradients of less than 0.5 percent.
Vegetation: About 20 percent ground cover. Burrograss comprises 70 percent of the grasses; bush muhly, 15 percent, and tobosa, 15 percent, with traces of side-oats grama and plains bristlegrass in slight depressions. The shrubs consist of a moderate dense stand of tarbush and some scrub mesquite.
Climate: Mean annual precipitation of about 15 inches; PE index about 20.
Drainage: Slow from surface. Subsoil is moderately permeable.
Parent material: Calcareous valley-filled sediments, probably mostly from limestone.
Sampled by: R. H. Jordan and E. D. Rivers, October 24, 1961.
Described by: R. E. Daniell, J. R. Coover, R. Fox and A. Turner.

A11 16501 0 to 3 inches. Light brownish gray (10YR 6.5/2, 4/2 moist) silty clay loam; weak fine medium platy, upper 1/4 inch is surface crust; slightly hard; friable; strongly effervescent; clear boundary.

A12 16502 3 to 7 inches. Light brown (7.5YR 6/3, 3.5/3 moist) silty clay loam; weak to moderate fine subangular blocky; friable, hard; strongly effervescent; clear boundary.

B21 16503 7 to 13 inches. Light brown (7.5YR 6/3, 4/3 moist) silty clay; moderate fine and medium subangular blocky; friable hard; strongly effervescent with very few films and threads of $CaCO_3$; diffuse boundary.

B22ca 16504 13 to 23 inches. Light brown (7.5YR 6.5/3, 4/4 moist) silty clay; moderate fine and medium subangular blocky; friable hard; strongly effervescent with few films and threads of $CaCO_3$; diffuse boundary.

B23ca 16505 23 to 33 inches. Light brown (7.5YR 6.5/4, 5/4 moist) silty clay; structure, consistence, and reaction similar to horizon above; diffuse boundary.

C1ca 16506 33 to 45 inches. Pink (7.5YR 7/4, 5/4 moist) silty clay; weak fine subangular blocky structure; friable hard; strongly effervescent with few films and threads of $CaCO_3$ and few soft masses of $CaCO_3$ up to 1/4 inch in diameter occupying about 2 percent; diffuse boundary.

C2ca 16507 45 to 55 inches. Pink (7.5YR 7/4, 5/4 moist) texture, structure, consistence and $CaCO_3$ similar to horizon above; gradual boundary.

C3cab 16508 55 to 65 inches. Pink (7.5YR 7.5/4, 6/4 moist) silty clay; weak subangular blocky; friable; strongly effervescent; 5 to 10 percent of the mass consists of films, threads and soft masses of $CaCO_3$; diffuse boundary.

C4b 16509 65 to 95 inches plus. Pink (7.5YR 7/5, 5/5 moist) silty clay loam; structure and consistence similar to horizon above; strongly effervescent with 2 to 5 percent films, threads and masses of $CaCO_3$. Sampled the 65- to 82-inch layer.

Remarks: The B horizon has tendencies toward weak fine and medium prismatic structure. All horizons have few to common wormcasts, insect casts and cavities and old root channels. The Cca has common insect casts and nests of stringers of wormcasts which consist of dark grayish brown silty clay loam. The Ca horizons have less than 5 percent more $CaCO_3$ equivalent than the parent material was assumed to have had.

Mineralogy (Method 7B1).
The sand grains are rounded with larger grains somewhat more frosted than the smaller grains. The very fine sands contain 10 percent carbonate in the surface, 45 percent in the B22ca horizon, and 30 percent in the C4b horizon. Quartz varies relative to the carbonate, 65 percent in the surface, 40 percent in the B22ca horizon and 50 percent in the C4b horizon. Feldspar decreases from 20 percent to 15 percent. The surface contains 5 percent unidentified aggregates; the amount decreases with depth.

Textures above agree with laboratory data. Field textures where different are given below:

A11 - heavy silt loam
A12 - light silty clay loam
B21 - light silty clay loam
B22ca - light silty clay loam
B23ca - light silty clay loam
C1ca - light silty clay loam
C2ca - light silty clay loam
C3cab - light silty clay loam
C4b - light silty clay loam

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Ustollic Camborthid; fine-silty, mixed, thermic

SOIL Hodgins silt loam SOIL Nos. S61TX-186-2 LOCATION Pecos County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 16510-16519

General Methods: 1A, 1E1b, 2A1, 2B

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)	3A1a Non-Carbonate Clay <0.002	Coarse fragments 2A2: >2	2-19	19-76
		Pct. of < 2 mm													Pct.	Pct. of < 76 mm	
0-1/4	A11	10.9b	67.5	21.6	tr	0.1	0.1	1.2	9.5	25.7	41.8	36.1	1.4	20		tr	
1/4-2	A12	11.7b	63.6	24.7	0.1	0.2	0.4	2.3	8.7	22.5	41.1	32.7	3.0	19		tr	
2-8	A13	7.4c	61.3	31.3	0.1	0.3	0.2	1.2	5.6	17.1	44.2	23.5	1.8	23		tr	
8-14	B21	6.8e	58.0	35.2	0.1	0.2	0.2	1.0	5.3	16.2	41.8	22.2	1.5	25		tr	
14-25	B22ca	6.4c	56.6	37.0	0.1	0.2	0.2	1.2	4.7	15.4	41.2	20.9	1.7	25		tr	
25-37	B23ca	9.0c	52.2	38.8	0.1	0.2	0.4	2.1	6.2	15.1	37.1	22.8	2.8	24		tr	
37-50	C1ca	9.6d	50.6	39.8	0.1	0.3	0.4	2.2	6.6	14.5	36.1	22.6	3.0	23		tr	
50-59	C2cab	9.1d	46.3	44.6	0.4	0.4	0.6	2.4	5.3	11.7	34.6	18.6	3.8	23		tr	
59-76	C3cab	9.1d	51.5	39.4	0.3	0.4	0.6	2.8	5.0	9.6	41.9	16.5	4.1	15		tr	
76-100+	C4b	7.8d	50.7	41.5	0.1	0.2	0.3	1.6	5.6	14.7	36.0	21.4	2.2	26		tr	
37-50	a	12.4	38.0	49.6	tr	0.1	0.2	1.8	10.3	16.6	21.4	28.3	2.1				
50-59	a	10.5	36.4	53.1	tr	tr	0.2	1.4	8.9	15.9	20.5	25.8	1.6				

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	Carbonate as $CaCO_3$: 6E1b <2mm	Carbonate as $CaCO_3$: 3A1a <0.002 mm	Ext. Iron as Fe	Bulk density: 4A1c 30-cm	Bulk density: 4A1b Air-Dry	4N1 COLE	Water content: 4B3 30-cm	Water content: 1/3-Bar	Water content: 4B2 15-Bar	1/3- to 15-Bar	pH: 8C1b Sat. Paste	pH: 8C1a 1:1	pH: 8C1a 1:10
	Pct.	Pct.		Pct.	Pct.	Pct.	g/cc	g/cc	g/cc	Pct.	Pct.	Pct.	In./in.			
0-1/4	2.06	0.192	11	18	2							11.2		7.2	8.0	8.3
1/4-2	1.16	0.109	11	24	6							13.8		7.4	8.2	8.5
2-8	1.12	0.116	10	29	8							15.4		7.2	7.9	8.2
8-14	1.04	0.101	10	33	10							15.0		7.1	7.8	8.2
14-25	0.75	0.079	9	37	12							14.0		7.0	7.5	8.1
25-37	0.42			42	15							14.1		7.0	7.5	8.1
37-50	0.34			44	17							13.8		7.1	7.6	8.1
50-59	0.25			58	22							11.8		7.2	7.7	8.3
59-76	0.26			69	24			1.53	1.62	0.020	23.4	9.0		7.3	7.9	8.5
76-100+	0.06			42	16							14.8		7.2	7.5	8.4

Depth (In.)	Extractable bases 5H1a: 6N4b Ca	6P2b Mg	6P2a Na	6Q2a K	Sum	Cat. Exch. Cap.: 5A2a $NaOAc$	5A1a NH_4OAc	Water extract from saturated paste 8A1: Ca	Mg	6P1a Na	6Q1a K	6H1a CO_3	6J1a HCO_3	6K1a Cl	6L1a SO_4	8A1a Electrical conductivity
	meq/100 g							meq/liter								mmho/cm
0-1/4	20.8	1.5	tr	1.9	24.0	22.7	22.1			0.1	0.7					1.07
1/4-2	20.6	1.8	tr	2.0	24.4	22.7	21.5			0.2	0.5					0.56
2-8	21.1	2.1	0.1	1.7	25.0	24.3	21.8			0.4	0.4					0.47
8-14	21.2	1.9	0.2	1.3	24.6	23.0	21.6			1.0	0.4					1.48
14-25	20.8	1.8	0.2	1.0	23.8	20.7	18.5			2.4	0.5	-	2.3	10.2	3.6	5.94
25-37	19.2	2.5	0.3	0.8	22.8	19.2	17.4			2.8	0.3	-	2.3	12.9	tr	6.64
37-50	19.1	2.4	0.3	0.6	22.4	19.0	17.0			3.1	0.2	-	2.0	12.4	0.7	5.51
50-59	15.3	2.2	0.4	0.4	18.3	15.7	13.8			3.5	0.2					3.80
59-76	11.7	2.1	0.5	0.3	14.6	12.0	10.7			5.0	0.1					2.47
76-100+	17.3	4.1	1.2	0.6	23.2	19.9	18.9			8.0	0.2					2.90

Depth (In.)	8A Water at Saturation	5B2 Exchangeable Na	6F1a Gypsum	Ratios to Clay: NH_4OAc CEC	Ratios to Clay: Ext. Iron	Ratios to Clay: 15-Bar Water
	Pct.	Pct	Pct			
0-1/4	43.0	<1	-	1.10		0.56
1/4-2	34.0	<1	-	1.13		0.73
2-8	44.7	<1	-	0.95		0.67
8-14	45.1	1	-	0.86		0.60
14-25	42.5	<1	-	0.74		0.56
25-37	41.9	1	-	0.72		0.59
37-50	42.0	1	-	0.75		0.69
50-59	40.0	2	-	0.60		0.51
59-76	36.7	2	-	0.71		0.60
76-100+	48.6	4	tr	0.78		0.77

a. Carbonate removed (Method 3A3).
b. Carbonate grains: > 50 percent (2-0.5 mm); 25-50 percent (0.5-0.25); 5-25 percent (0.25-0.05 mm).
c. Carbonate grains: > 50 percent (2-0.25 mm) 25-50 percent (0.25-0.05 mm).
d. Carbonate grains: > 50 percent (2-0.1 mm 25-50 percent (0.1-0.05 mm

Soil classification: Ustollic Camborthid; fine-silty, mixed, thermic.
Soil: Hodgins silt loam.
Soil Nos.: S61TX-186-2; 16510-16519.
Location: Southwest 3.4 miles on county road toward Belding from the intersection of U.S. Highway 385 and the railroad in west edge of Ft. Stockton; thence 0.7 mile south on oil field road; thence 300 feet east.
Area: Pecos County, Texas.
Physiography: Nearly level semidesertic plain with gradients of less than 0.5 percent.
Vegetation: Sparse cover of burrograss with some bush muhly and tobosagrass and an overstory of tarbush and scrub mesquite. The area is a series of slight depressions which have from 10 to 20 percent ground cover and slight rises or micro ridges which have 2 to 5 percent vegetative cover.
Climate: Mean annual precipitation of about 15 inches; PE index about 20.
Drainage: Slow from the surface. Subsoil is moderately permeable.
Parent material: Calcareous valley-filled sediments, probably mostly from limestone.
Sampled by: R. H. Jordan and E. D. Rivers, October 24, 1961.
Described by: R. E. Daniell, J. R. Coover, R. Fox, and A. Turner.

A11 16510 0 to 1/4 inch. Light brownish gray (10YR 6.5/2, 4/2 moist) silt loam; weak platy crust; soft and very friable; strongly effervescent; abrupt boundary.

A12 16511 1/4 to 2 inches. Light brownish gray (10YR 6.5/2, 4/2 moist) silt loam; weak medium coarse platy; friable; slightly hard; strongly effervescent; clear boundary.

A13 16512 2 to 8 inches. Pale brown (10YR 6/2.5, 4/2.5 moist) silty clay loam; moderate fine subangular blocky; friable hard; strongly effervescent; diffuse boundary.

B21 16513 8 to 14 inches. Pinkish gray (7.5YR 6/2, 4/3 moist) silty clay loam; moderate fine and medium subangular blocky; friable hard; strongly effervescent with few films, threads and specks of $CaCO_3$ occupying less than 2 percent of the mass; diffuse boundary.

B22ca 16514 14 to 25 inches. Light brown (7.5YR 6/3, 4.5/3 moist) silty clay loam; structure, consistence, reaction and visible $CaCO_3$ content as horizon above; diffuse boundary.

B23ca 16515 25 to 37 inches. Light brown (7.5YR 6.5/4, 5/4 moist) silty clay loam; structure, consistence, and reaction similar to horizon above; visible $CaCO_3$ slightly more than B22ca horizon but less than 3 percent of the mass; diffuse boundary.

C1ca 16516 37 to 50 inches. Pink (7.5YR 7/4, 5/4 moist) silty clay loam; weak fine subangular blocky; friable hard; strongly effervescent with few films and threads of $CaCO_3$ and 3 to 5 percent soft masses of $CaCO_3$; gradual boundary.

C2cab 16517 50 to 59 inches. Pink (7.5YR 7/5, 5.5/4 moist) silty clay; moderate medium subangular blocky, friable hard; strongly effervescent with the visible soft mass of films and threads of $CaCO_3$ varying from 10 to 25 percent; there are a few seams and bulges 1 to 2 inches in diameter and extending 5 inches upward from the upper boundary; gradual and wavy boundary which varies from 45 to 60 inches below the surface in this pit.

C3cab 16518 59 to 76 inches. Pink (7.5YR 8/4, 6.5/4 moist) silty clay loam; weak subangular blocky; structureless; weakly cemented; friable, hard to very hard; the $CaCO_3$ content similar to horizon above; gradual boundary.

C4b 16519 76 to 100 inches plus. Pink (7.5YR 7/4, 5/4 moist) silty clay loam; weak subangular blocky; friable hard; strongly effervescent with about 5 percent by volume of films, threads and soft masses of $CaCO_3$. Auger sampled the 85- to 100-inch layer.

Remarks: Insect, wormcast and cavities occupy 2 to 5 percent of the soil mass to 50 inches. Some are filled with dark grayish brown silty clay loam. The Ca horizons have less than 5 percent more $CaCO_3$ equivalent than the parent material is assumed to have had.

Mineralogy (Method 7B1).
Sand grains are rounded with larger grains somewhat more frosted than the smaller grains. The quartz in the very fine sand decreases from 70 percent in the surface to 30 percent in the C4b horizon. Feldspars increase from 10 percent to 15 percent, and carbonate increases from 20 to 55 percent (30 percent in the B22ca horizon). A trace of unidentified aggregates is present.

Textures above agree with laboratory data. Field textures where different are given below:

A11 - heavy silt loam
A12 - heavy silt loam
A13 - light silty clay loam
B21 - light silty clay loam
B22ca - light silty clay loam
B23ca - light silty clay loam
C1ca - light silty clay loam
C2cab - silty clay loam

SCS-420
10-64

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Typic Gypsiorthid; fine-loamy, gypsic, thermic

SOIL Reeves clay loam SOIL Nos. S61TX-195-3 LOCATION Reeves County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 16535-16543

General Methods: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	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 <0.002	Coarse fragments 2A2: > 2	2 – 19	19 – 76
		Pct. of < 2 mm													Pct.	Pct. of < 76 mm	
0-1/4	A11	31.0a	43.4	25.6	tr	0.4	2.3	7.8	20.5	20.4	23.0	46.0	10.5	24	tr		
1/4-2	A12	28.3a	41.8	29.9	-	0.8	2.5	7.5	17.5	16.7	25.1	39.0	10.8	27	tr		
2-5	A13	28.6a	42.2	29.2	-	0.7	2.6	7.5	17.8	16.6	25.6	39.2	10.8	26	-		
5-13	B21ca	25.5b	39.8	34.7	-	0.4	2.0	6.7	16.4	14.2	25.6	35.0	9.1	31	-		
13-22	B22ca	21.6c	40.1	38.3	-	0.4	1.5	5.2	14.5	14.2	25.9	32.2	7.1	30	-		
	(Carbonate and gypsum removed Method 3A3)																
13-22	B22ca	24.6	34.3	41.1	tr	0.5	1.8	5.5	16.8	14.2	20.1	34.7	7.8				
22-33	C1cs	20.0	30.2	49.8	-	tr	0.2	2.7	17.1	15.5	14.7	34.9	2.9		-		
33-46	C2cs	10.3	50.4	39.3	-	tr	tr	0.3	10.0	29.0	21.4	39.3	0.3		-		
46-55	C3cs	15.3	40.5	44.2	-	0.2	0.6	2.6	11.9	17.6	22.9	31.3	3.4		-		
55-70	C4cs	14.4	42.8	42.8	-	0.1	0.4	2.2	11.7	18.9	23.9	32.2	2.7		-		

Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N	Carbonate as $CaCO_3$: 6E1b <2mm	3A1a <0.002 mm	6C1a Ext. Iron as Fe	Bulk density: 4A1c 30-cm.	4A1b Air-Dry	4D1 COLE	Water content: 4B3 30-cm.	4B1b 1/3-Bar	4B2 15-Bar	4C1 1/3-to 15-Bar	pH: 8C1b Sat. Paste	8C1a 1:1	8C1a 1:10
	Pct.	Pct.		Pct.	Pct.	Pct.	g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.			
0-1/4	1.27	0.112	11	12	2	0.4						11.3			7.3	7.9	8.3
1/4-2	0.96	0.094	10	12	3	0.4						12.2			7.6	7.9	8.3
2-5	0.93	0.088	10	12	3	0.5		1.37	1.45	0.020	25.5	19.8	12.8	0.10	7.5	7.9	8.4
5-13	0.63	0.066	10	19	4	0.5							13.4		7.4	7.8	8.3
13-22	0.63	0.068	9	26	8	0.4		1.22	1.33	0.028	30.7	23.1	13.6	0.12	7.3	7.4	7.9
22-33	0.26	0.025	10	10				1.30	1.36	0.014	18 d	18 d	5 d	0.17	7.2	7.6	8.0
33-46	0.14			8									6 d		7.5	7.7	8.0
46-55	0.16			14									10 d		7.6	7.8	8.1
55-70	0.18			11									10 d		7.7	7.9	8.2

Depth (in.)	Extractable bases 6N4b Ca	6O4b Mg	6P2a Na	5B1a 6Q2a K	Sum	Cat. Exch. Cap. 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste: Ca	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
0-1/4	17.7	2.1	0.1	2.2	22.1	20.0	18.8			1.0	1.7					2.50
1/4-2	20.0	2.8	0.9	3.5	27.2	21.8	20.4			9.0	3.3					3.81
2-5	18.2	3.2	1.1	3.2	25.7	21.6	20.0			10.6	3.2	-	3.3	5.4	36.0	4.00
5-13	18.1	3.0	3.6	3.2	27.9	21.0	19.2			41.8	4.4	-	2.5	62.5	37.4	9.2
13-22		3.5	5.1	3.1		21.7	18.3			77.0	13.0	-	1.5	256	22.5	29.1
22-33			1.7	0.7		6.8	5.7			49.2	5.0	-	2.0	198	22.3	21.3
33-46			2.7	0.5		6.0	4.8			68.2	3.6	-	1.5	153	33.7	17.4
46-55			3.8	0.8		9.6	8.4			76.4	2.8	-	2.0	135	46.1	16.6
55-70			5.3	0.6		9.3	8.1			104	2.0	-	1.5	186	52.6	21.3

Depth (in.)	8A Water at Saturation	5D2 Exchangeable Na	6F1a Gypsum	Ratios to Clay 8D2: NH_4OAc CEC	Ext. Iron	15-Bar Water
	Pct.	Pct.	Pct.			
0-1/4	33.0	<1	tr	0.78	0.02	0.47
1/4-2	32.9	3	tr	0.76	0.01	0.45
2-5	34.2	3	tr	0.77	0.02	0.49
5-13	42.0	8	tr	0.62	0.02	0.43
13-22	47.1	7	tr	0.61	0.01	0.45
22-33	38 d	<1	68			
33-46	38 d	2	68			
46-55	43 d	5	47			
55-70	45 d	6	52			

a. Carbonate: 1-5 percent.
b. Carbonate: 5-25 percent.
c. Carbonate: 25-50 percent (1-0.25 mm); 5-25 percent (0.25-0.05 mm).
d. Corrected for approximate loss of water associated with gypsum hydrate, resulting from oven-drying at 105 degrees C.

Soil classification: Typic Gypsiorthid; fine-loamy, gypsic, thermic.
Soil: Reeves clay loam.
Soil Nos.: S61TX-195-3; 16535-16543.
Location: South 1.6 miles of U.S. Highway 80 on Texas Highway 17; thence 0.25 mile east.
Area: Reeves County, Texas.
Physiography: Level plain with gradient of less than 0.5 percent. Probably terrace of Pecos River.
Climate: Mean annual precipitation of about 14 inches; PE index about 18.
Drainage: Slow from surface. Water table apparently within about 10 feet of the surface. Substratum moist in pit.
Vegetation: Four-wing saltbush, tarbush, occasional mesquite with traces of plains bristlegrass and alkali sacaton.
Parent material: Calcareous, gypsiferous alluvium - sediments mostly from limestone but include some from igneous rocks.
Sampled by: R. H. Jordan and E. D. Rivers, October 26, 1961.
Described by: R. E. Daniell, J. R. Coover, and R. Fox.

A11 16535 0 to 1/4 inch. Light gray (10YR 6.5/2, 4.5/3 moist) loam; platy crust; very friable, slightly hard; strongly effervescent; abrupt boundary.

A12 16536 1/4 to 2 inches. Light gray (10YR 6.5/2, 4.5/3 moist) clay loam; weak to moderate medium platy; very friable, slightly hard; strongly effervescent; clear boundary.

A13 16537 2 to 5 inches. Light brownish gray (10YR 6.5/2, 4.5/3 moist) clay loam; weak to moderate fine subangular blocky; friable hard; strongly effervescent; with gradual boundary.

B21ca 16538 5 to 13 inches. Pink (7.5YR 7/3, 5/4 moist) clay loam; weak to moderate and medium fine subangular blocky; friable hard; strongly effervescent with few films and threads of $CaCO_3$ - about 1 percent by volume; diffuse boundary.

B22ca 16539 13 to 22 inches. Pink (7.5YR 7/4, 5.5/4 moist) clay loam; weak fine subangular blocky; consistence, reaction and $CaCO_3$ as above; abrupt wavy boundary varying from 18 to 26 inches below the surface.

C1cs 16540 22 to 33 inches. Very pale brown (10YR 8/3, 7/3 moist) gypsiferous limy clay that is weakly cemented; very hard dry, friable and somewhat brittle when moist; diffuse boundary.

C2cs 16541 33 to 46 inches. Similar to the horizon above but texture silty clay loam; with gradual boundary.

C3cs 16542 46 to 55 inches. Light gray (10YR 7/2, 5/2 moist) similar to above but texture silty clay, contains less $CaCO_3$ and probably more fine earth; gradual boundary.

C4cs 16543 55 to 70 inches plus. Very pale brown (10YR 7/3, 5/3 moist) similar to horizon above.

Remarks: The A1 horizon has peds that are somewhat vesicular and in places has specks of evaporated salts. The B2 horizon has fine to common wormcasts, refilled insect cavities, root channels, but not as many as in the Hoban. The gypsic horizon contains a few roots in places and has less than 1 percent by volume of worm or insect cavities filled with grayish brown or brown clay loam - these were probably formerly relatively large root channels. There are a few fine seams that are in the gypsic horizon coated with gypsum and darker material but these are not as pronounced as in the Hoban (S61Tex-195-1 and 195-2) pedons. Substrata (gypsic horizon) is moist.

Mineralogy (Method 7B1).
Subrounded to rounded quartz grains are abundant in the sands. Larger grains tend to be more frosted than the smaller grains. A few shell fragments are present. Quartz in the very fine sand ranges from 65 to 70 percent for most horizons. Carbonate increases from 5 percent in the surface to a maximum of 15 percent in the B22ca horizon. The feldspar content is 20 percent in the surface and decreases with depth. Unidentified aggregates amount to 5 percent.

Textures above agree with laboratory data. Field textures where different are given below:

A11 - heavy loam
A12 - heavy loam
A13 - heavy loam
B21ca - light clay loam
B22ca - light clay loam
C1cs - limy loam
C2cs - limy loam
C3cs - limy loam
C4cs - limy loam

SOIL CLASSIFICATION: Typic Gypsiorthid; fine-loamy, gypsic, thermic

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Reeves silt loam SOIL Nos. 861TX-195-4 LOCATION Reeves County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 16544-16548

General Methods: 1A, 1B1b, 2A1, 2B

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)	3A1a Micromorphometric clay <0.002	Coarse fragments 2A2: >2 Pct.	2 – 19 Pct. of <2 mm	19 – 76 Pct. of <2 mm
		Pct. of <2 mm															
0-3	A1	29.2a	50.9	19.9	-	0.5	1.2	5.7	21.8	24.1	26.8	49.8	7.4	17	-		
3-10	B21ca	22.2a	45.2	32.6	-	0.4	1.1	5.3	15.4	15.8	29.4	34.9	6.8	27	-		
10-21	B22ca	18.8a	42.7	38.5	-	0.3	0.8	4.1	13.6	15.3	27.4	31.8	5.2	30	-		
(Carbonate and gypsum removed Method 3A3)																	
10-21	B22ca	21.3	34.8	43.9	-	0.2	0.8	4.0	16.3	14.6	20.2	33.7	5.0				
21-26	C1ca	9.4	32.3	58.3	-	-	0.8	2.3	6.3	9.5	22.8	17.2	3.1		-		
26-60+	C2ca	11.2	34.3	54.5	0.2	0.5	1.5	3.4	5.6	11.6	22.7	19.3	5.6		-		

Depth (in.)	6A1a Organic carbon	6H1a Nitrogen	C/N	Carbonate as $CaCO_3$: 6H1b <2mm	Carbonate as $CaCO_3$: 3A1a <0.002 mm	Ext. Iron as Fe	Bulk density: 30-cm	Bulk density: Air-Dry	COLE	Water content: 30-cm	Water content: 1/3-Bar	Water content: 15-Bar	Water content: 1/3- to 15-Bar	pH: 8C1b Sat. Paste	pH: 8C1a 1:1	pH: 8C1a 1:10
	Pct.	Pct.		Pct.	Pct.	Pct.	g/cc	g/cc	g/cc	Pct.	Pct.	Pct.	in./in.			
0-3	1.10	0.117	9	14	5							10.8		7.5	7.9	8.4
3-10	0.77	0.090	8	22	6							14.2		7.0	7.4	8.0
10-21	0.73	0.078	9	28	8							14.7		7.1	7.4	8.0
21-26	0.22	0.016		7								4 b		7.5	7.8	8.1
26-60+	0.18			4								3 b		7.6	7.8	8.0

Depth (in.)	Extractable bases 5H1a: Ca	Mg	6P2a Na	6Q2a K	Sum	Cat. exch. Cap.: 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 8A1: Ca	Mg	6P1a Na	6Q1a K		6T1a CO_3	6J1a HCO_3	6K1a Cl	6L1a SO_4	8A1a Electrical conductivity
	meq/100 g							meq/liter									mmho/cm
0-3	17.1	1.5	0.1	2.1	20.8	18.7	17.6			0.7	1.3						1.71
3-10		2.4	0.6	2.6		21.9	20.4			8.2	4.7		-	2.0	110	1.0	16.8
10-21		5.1	1.4	1.2		22.4	19.6			16.3	1.2		-	1.8	118	11.6	16.5
21-26			0.2	0.1		4.2	2.5			4.6	0.8		-	1.5	20.3	22.4	4.53
26-60+			0.1	0.1		3.5	1.8			3.8	0.8		-	0.8	16.9	29.8	4.03

Depth (in.)	8A Water at Saturation	5H2 Exchangeable Na		6F1a Gypsum	Ratios to Clay Ext. NH_4OAc CEC	Ratios to Clay Ext. Iron	Ratios to Clay 15-Bar Water
	Pct.	Pct.		Pct.			
0-3	32.7	<1		tr	1.04		0.64
3-10	42.6	3		tr	0.76		0.92
10-21	48.1	3		2	0.65		0.49
21-26	26 b			84			
26-60+	26 b			87			

a. Carbonate grains: 25-50 percent (1-0.5 mm); 5-25 percent (0.5-0.05 mm).

b. Corrected for approximate loss of water associated with gypsum hydrate, resulting from oven-drying at 105 degrees C.

Soil classification: Typic Gypsiorthid; fine-loamy, gypsic, thermic.
Soil: Reeves silt loam.
Soil Nos.: S61TX-195-4; 16544-16548.
Location: South 3.1 miles of U.S. Highway 80 on Texas Highway 17; thence 400 feet west of the Pecos Valley Southern Railroad.
Area: Reeves County, Texas.
Physiography: Level plain with gradient of less than 0.5 percent. Probably terrace of Pecos River.
Climate: Mean annual precipitation of about 14 inches; PE index about 18.
Drainage: Slow from surface. Water table apparently within about 10 feet of the surface. Substratum moist in pit.
Vegetation: Four-wing saltbush, tarbush, occasional mesquite with traces of plains bristlegrass and alkali sacaton.
Parent material: Calcareous, gypsiferous alluvium - sediments mostly from limestone but include some igneous rocks.
Sampled by: R. H. Jordan and E. D. Rivers, October 26, 1961.
Described by: R. E. Daniell, J. R. Coover, and R. Fox.

A1 16544 0 to 3 inches. Light gray (10YR 6.5/2, 4.5/3 moist) silt loam; weak to moderate medium and fine platy; very friable, slightly hard; strongly effervescent; peds somewhat vesicular; clear boundary.

B21ca 16545 3 to 10 inches. Pink (7.5YR 7/3, 4.5/3 moist) clay loam; weak to moderate fine subangular blocky; friable hard; strongly effervescent with about 1 percent by volume of fine to common wormcasts, refilled insect cavities and root channels; diffuse boundary.

B22ca 16546 10 to 21 inches. Pink (7.5YR 7/4, 4.5/4 moist) silty clay loam; structure, consistence, reaction and lime content and worm and insect casts as above; abrupt boundary.

C1cs 16547 21 to 26 inches. Very pale brown (10YR 8/3, 7/3 moist) gypsiferous limy clays that are weakly cemented; very hard when dry and friable but weakly brittle when moist; strongly effervescent in most places, weakly in others; strongly cemented upper 1/4- to 1/2-inch portion is discontinuous; diffuse boundary.

C2cs 16548 26 to 60 inches plus. Similar to the horizon above except cementation is somewhat less. Sampled the 30- to 45-inch layer.

Remarks: Substrata (gypsic horizon) is moist. A few solution channels about 1/4 inch in diameter and lined with crystallized gypsum are in the gypsic horizon; very few roots in the gypsic horizon.

Mineralogy (Method 7B1).
Subrounded to rounded quartz grains are abundant in the sands. Large grains tend to be more frosted than the smaller grains. A few shell fragments are present. Quartz in the very fine sand amounts to 65 to 70 percent in most horizons, 50 percent in the B22ca horizon. Carbonate increases from 10 percent in the surface to 30 percent in the B22ca horizon. The feldspar content is 20 percent in the surface, and decreases with depth. Unidentified aggregates amount to 5 percent.

Textures above agree with laboratory data. Field textures where different are given below:

A1 - heavy loam
B21ca - light clay loam
B22ca - light clay loam
C1cs - limy loam
C2cs - limy loam

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Calcic Gypsiorthid; fine-silty, mixed, thermic

SOIL Series not designated SOIL Nos. S61TX-195-1 LOCATION Reeves County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 16520-16526

General Methods: 1A, 1B1b, 2A1, 2B

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)	3A1a Noncarbonate Clay <0.002	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	40.0a	43.2	16.8	0.1	0.2	2.5	12.9	24.3	22.4	20.8	55.4	15.7	16	tr		
1/4-4	A12	36.3a	39.4	24.3	0.1	0.7	2.7	13.0	19.8	17.5	21.9	46.1	16.5	19	tr		
4-12	B21	34.6b	41.0	24.4	0.2	0.7	2.5	12.0	19.2	18.6	22.4	45.8	15.4	18	tr		
12-23	B22ca	32.5b	41.0	26.5	0.2	0.6	2.1	11.0	18.6	17.5	23.5	43.6	13.9	20	tr		
23-38	C1ca	30.3b	40.5	29.2	0.1	0.5	1.6	9.5	18.6	17.3	23.2	42.6	11.7	21	tr		
38-55	C2cacs																
55-80+	C3cs																
(Carbonate and gypsum removed Method 3A3)																	
23-38	C1ca	38.4	32.6	29.0	0.1	0.5	1.8	11.0	25.0	15.9	16.7	48.6	13.4				
38-55	C2cacs	36.0	36.4	27.6	0.3	1.4	1.7	9.0	23.6	17.4	19.0	47.2	12.4				
55-80+	C3cs	27.6	38.3	34.1	tr	0.2	0.7	5.1	21.6	16.8	21.5	42.3	6.0				

Depth (in.)	6A1a Organic carbon Pct	6B1a Nitrogen Pct.	C/N	Carbonate as $CaCO_3$: 6B1b <2mm Pct.	Carbonate as $CaCO_3$: 3A1a <0.002 mm Pct.	6C1a Ext. Iron as Fe Pct.	Bulk density: 4A1c 30-cm g/cc	Bulk density: 4A1b Air-Dry g/cc	4A11 COLE	Water content: 4B3 30-cm Pct.	Water content: 4B1b 1/3-Bar Pct.	Water content: 4B2 15-Bar Pct.	4C1 1/3-to 15-Bar in./in.	pH: 8C1b Sat. Paste	pH: 8C1a 1:1	pH: 8C1a 1:10
0-1/4	1.06	0.108	10	15	1	0.6					18.3	8.5		7.1	8.0	8.5
1/4-4	0.65	0.068	10	21	5	0.5		1.44	1.53	0.020	18.8	16.5	10.2	0.09	7.4	8.2	8.6
4-12	0.55	0.061	9	22	6	0.5						19.4	10.4		7.2	8.0	8.4
12-23	0.42	0.049	8	30	7	0.5		1.30	1.38	0.020	25.6	21.1	9.9	0.15	7.3	7.8	8.4
23-38	0.35	0.039	9	28	8	0.5						22.1	10.2		7.3	7.8	8.4
38-55	0.05			10		0.4		1.36	1.39	0.007	19 c	15 c	6 c		7.1	7.5	7.8
55-80+	0.06			11		0.4						18 c	9 c		7.1	7.5	7.8

Depth (in.)	Extractable bases 6N1b Ca meq/100 g	6N1b Mg meq/100 g	6P2a Na meq/100 g	6Q2a K meq/100 g	5E1a Sum meq/100 g	Cat. Exch. Cap. 5A2a NH_4OAc meq/100 g	5A1a NH_4OAc meq/100 g	Water extract from saturated paste 6P1a Ca meq/liter	6Q1a Mg meq/liter	6Q1a Na meq/liter	6Q1a K meq/liter	8A1 CO_3 meq/liter	8A1 HCO_3 meq/liter	8A1 Cl meq/liter	8A1 SO_4 meq/liter	8A1a Electrical conductivity mmho/cm
0-1/4	15.1	0.6	tr	1.2	16.9	16.0	14.6			0.2	0.6					1.26
1/4-4	15.6	1.4	tr	1.5	18.5	16.9	15.5			0.3	0.7					0.78
4-12	16.0	1.3	0.1	0.7	18.1	16.7	15.2			0.4	0.2					0.73
12-23	16.8	1.1	0.1	0.4	18.4	16.5	15.0			0.6	0.1					1.40
23-38	18.2	0.2	0.1	0.5	19.0	16.9	15.8			1.0	0.1					1.51
38-55			0.1	0.3		11.6	10.4			0.8	0.2					2.86
55-80+			tr	0.5		13.4	11.9			0.3	0.4					2.71

Depth (in.)	8A Water at Saturation Pct.	5I2 Exchangeable Na Pct.	6F1a Gypsum Pct.	Ratios to Clay: NH_4OAc CEC	Ratios to Clay: Ext. Iron	Ratios to Clay: 15-Bar Water
0-1/4	30.3	<1	-	0.91	0.04	0.53
1/4-4	26.3	<1	-	0.82	0.03	0.58
4-12	31.8	<1	-	0.84	0.03	0.58
12-23	38.0	<1	-	0.75	0.03	0.50
23-38	38.0	<1	-	0.75	0.03	0.49
38-55	25 c	1	4			
55-80+	31 c	<1	39			

a. Carbonate grains: 25-50 percent (2-1 mm); 5-25 percent (1-0.05 mm).

b. Carbonate grains: 25-50 percent (2-0.25 mm); 5-25 percent (0.25-0.05 mm).

c. Corrected for approximate loss of water associated with gypsum hydrate, resulting from oven-drying at 105 degrees C.

Soil classification: Calcic Gypsiorthid; fine-silty, mixed, thermic.
Soil: Series not designated[1/].
Soil Nos.: 861TX-195-1; 16520-16526.
Location: About 13 miles southwest of Pecos. Twelve miles southwest of Texas Highway 17 on U.S. Highway 80. Six hundred feet south of milepost 660 on Texas Pacific Railroad.
Area: Reeves County, Texas.
Physiography: Level upland on the Hermosa flat with gradient of less than 0.5 percent.
Vegetation: Desert shrub dominantly creosotebush with subordinate amounts of tarbush. The grass is largely burrograss with few dead tufts of tobosagrass. Ninety-nine percent of the ground surface is bare.
Climate: Mean annual precipitation of about 14 inches; PE index about 18.
Drainage: Slow from surface - water table is below 10 feet on this date. Subsoil permeability is moderate.
Parent material: Calcareous, gypsiferous loamy alluvium - sediments apparently largely from limestone but include some from igneous rocks.
Sampled by: R. H. Jordan and E. D. Rivers, October 25, 1961.
Described by: R. E. Daniell, J. R. Coover, and R. Fox.

A11 16520 0 to 1/4 inch. Light gray (10YR 7/2, 4.5/3 moist) loam; weak platy crust; very friable, soft; strongly effervescent; abrupt boundary.

A12 16521 1/4 to 4 inches. Light brownish gray (10YR 6.5/2, 4.5/3 moist) loam; weak medium platy in upper portion; weak subangular blocky in lower portion; peds are somewhat vesicular; friable, soft to slightly hard; strongly effervescent; clear boundary.

B21 16522 4 to 12 inches. Pink (7.5YR 7/3, 5/4 moist) loam; moderate and medium fine subangular blocky; friable, slightly hard, strongly effervescent with very few films and threads of segregated $CaCO_3$; horizon seems to be completely reworked and consists of about 25 percent wormcasts, old insect channels refilled and numerous root channels - soil is porous; diffuse boundary.

B22ca 16523 12 to 23 inches. Pink (7.5YR 7/4, 5/5 moist) loam; structure and consistence as above; strongly effervescent with few films, threads and soft masses of $CaCO_3$ occupying less than 2 percent of the soil; insect and wormcasts about as above but decreasing in amount; diffuse boundary.

C1ca 16524 23 to 38 inches. Pink (7.5YR 7/5, 5/5 moist) clay loam; weak fine subangular blocky; friable, slightly hard; strongly effervescent; 2 to 4 percent of the mass is segregated $CaCO_3$ in the form of films and threads and soft masses, 1/8 to 1/4 inch in diameter; 5 to 10 percent of the soil is wormcasts, insect cavities, root channels; abrupt wavy boundary varies from 35 to 45 inches below the surface.

C2cacs 16525 38 to 55 inches. Pink (7.5YR 8/4, 5/4 moist) clay loam; with much gypsum and segregated $CaCO_3$; weakly cemented when dry but friable to firm when moist; massive; probably 25 percent or more consists of gypsum crystals; diffuse boundary.

C3cs 16526 55 to 80 inches plus. Pink (7.5YR 7/4, 5/4 moist) clay loam; with probably more than 25 percent gypsum crystals near sand size; similar to horizon above but containing less $CaCO_3$.

Remarks: There are vertical seams in the gypsic horizon, some 1 to 2 feet apart that appear to have coatings of gypsum and darker material, probably organic matter. Vertical seams intersect each other. Roots have not penetrated the gypsic horizon except along the seams, and the roots are flattened. There are occasional horizontal seams but they are less pronounced than the vertical. There do not appear to be horizontal coatings at the contact of the C1ca and the C2cacs horizons. Occasional small igneous gravel less than 1/2 inch in diameter occurs throughout the pedon.

Mineralogy (Method 7B1).
Rounded, frosted quartz grains are abundant in the sands. Shell fragments are absent. Quartz in the very fine sand remains constant with depth at 60 to 65 percent. Carbonate increases from 15 percent in the surface to a maximum of 25 percent in the B22ca horizon. Feldspars increase from 15 to 20 percent; unidentified aggregates amount to 5 percent.

A11 - heavy silt loam
A12 - heavy silt loam
B21 - light silty clay loam
B22ca - light silty clay loam
C1ca - light silty clay loam

1/ This pedon was sampled as a member of the Hoban series in the fine-silty, mixed, thermic family of Ustollic Calciorthids.
Textures above agree with laboratory data. Field textures where different are given below:

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Typic Ustipsamment; mixed, thermic

SOIL Tivoli fine sand SOIL Nos. S58TX-58-1 LOCATION Dawson County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 8411-8413

Depth (In.)	Horizon	Size class and particle diameter (mm)														Coarse fragments		
		Total			Sand					Silt								
		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)			> 2	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76mm	
0-8	A		2.4	1.8	-	1.1	15.7	67.5	11.5		0.6	42.9				-		
8-30	C1		1.3	1.2	-	0.7	14.7	67.0	15.1		0.4	43.5				-		
30-65+	C2		1.8	1.2	-	1.0	14.6	70.9	10.5		0.6	45.8				-		

Depth (In.)	Organic carbon	Nitrogen	C/N		Carbonate as $CaCO_3$		Bulk density				Water content					pH		
																Sat. Paste		(1:1)
	Pct.	Pct.			Pct		g/cc	g/cc	g/cc		Pct.	Pct.	Pct.					
	0.21	0.024	9		-											7.5		
	0.06				-											7.5		
	0.02				-											7.3		

Depth (In.)	Extractable bases				Cat. Exch. Cap. NH_4Ac										Base saturation	
	Ca	Mg	Na	K											NH_4Ac	
	meq/100 g														Pct.	Pct.
	1.7	0.4	-	0.1	1.7										100	
	0.9	0.2	-	0.1	1.0										100	
	0.7	0.2	-	0.1	0.9										100	

Depth (In.)					

Soil classification: Typic Ustipsamment; mixed, thermic.
Soil: Tivoli fine sand.
Soil Nos.: S58TX-58-1; 8411-8413.
Location: Dawson County, 4/10 mile west of northeast corner of S 95, Block M, EL and RR County survey. About 12 miles northwest of courthouse, Lamesa.
Topography: Undulating to gently rolling low dunesy surface; maximum elevation of dunes, 30 feet.
Vegetation: Thick stand of shin oak about 1 to 3 feet high and thin stand of sand dropseed, sand bluestem and annual weeds.
Landscape position: Midslope of low dune with gradient of about 4 percent.
Moisture: Slightly moist to depth of 2 feet; dry below.

A 8411 0 to 8 inches. Brown (10YR 5/3 dry, 3.5/3 moist) fine sand; structureless; loose when dry; very friable to loose moist; few grass roots; noncalcareous; clear boundary.

C1 8412 8 to 30 inches. Very pale brown (10YR 7/3, 6/3 moist) fine sand; structureless; loose when dry or moist; occasional grass root; noncalcareous; invisible boundary--made at arbitrary depth.

C2 8413 30 to 65 inches plus. Fine sand of color and consistence similar to above.

Remarks: Special sample of Tivoli fine sand from Dawson County for laboratory studies for use in classification by the 6th Approximation scheme.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Typic Ustochrept; loamy, carbonatic, thermic, shallow

SOIL Brackett loam SOIL Nos. S63TX-16-1 LOCATION Blanco County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 18137-18140 March 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1: Total Sand (2–0.05) [a]	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 <0.002	Coarse fragments 2A2: 3B1 19-2 Wt. Pct.	3B2 19-2 Vol. of <19mm.
		Pct. of < 2 mm														
0–4	A11	37.3	45.3	17.4	5.1	6.7	4.6	10.1	10.8	16.1	29.2	32.8	26.5	13	14	8
4–10	A12	38.1	42.7	19.2	5.5	7.4	5.1	10.8	9.3	12.1	30.6	27.4	28.8	12	14	8
10–13	B2	39.0	39.3	21.7	5.7	8.5	5.8	11.1	7.9	9.3	30.0	23.3	31.1	13	16	9
13–24	C	30.9	49.8	19.3	5.9	9.0	4.2	6.8	5.0	12.0	37.8	20.7	25.9	11	29	16

Depth (in.)	6A1a Organic carbon [b] Pct	Nitrogen Pct.	C/N	Carbonate as $CaCO_3$: 6E1b <2mm Pct.	3A1a <0.002 mm, Pct.	Ext. Iron as Fe Pct.	Bulk density: 4A1d 1/3-Bar [c] g/cc	4A1d 1/3-Bar g/cc	4A1b Air-Dry g/cc	4D1 COLE [d]	Water content: 4B1c 1/3-Bar Pct.	4B2 15-Bar Pct.	4C1 1/3-to 15-Bar [d] in./in.	pH 8C1a 1:1
0–4	1.73			78	4		1.24	1.35	1.39	0.009	19.4	7.9	0.14	7.8
4–10	1.55			80	7		1.31	1.42	1.46	0.009	17.6	8.1	0.12	7.8
10–13	1.44			81	9		1.21	1.33	1.36	0.006	21.3	10.4	0.13	8.1
13–24	0.23			83	8		1.08	1.28	1.29	0.003	24.1	8.7	0.17	8.2

Depth (in.)	Extractable bases 5E1a: 6N4b Ca	6O4b Mg	6P2a Na	6Q2a K	Sum	Ext. Acidity	Cat. Exch. Cap.: Sum Cations	5A1a NH_4OAc	8D3 Ca/Mg	Base saturation: Sum Cations Pct.	NH_4OAc Pct.
	msq/100 g										
0–4	11.8	0.9	tr	0.5	13.2			10.7			
4–10	11.3	1.0	tr	0.4	12.7			9.9	11		
10–13	11.3	1.3	tr	0.3	12.9			9.1	9		
13–24	8.2	1.0	tr	0.2	9.4			5.7	8		

Depth (in.)	Ratios to Clay: NH_4OAc CEC	Ext. Iron	8D2 15-Bar Water
0–4	0.82		0.61
4–10	0.83		0.68
10–13	0.70		0.80
13–24	0.52		0.79

a. Carbonate comprises more than 50 percent of the sand.
b. 7 kg/m^2 to 13 inches (Method 6A).
c. Calculated to include volume but not weight of 2- to 19-mm material (Method 3B2).
d. Less than 19-mm material.

Soil classification: Typic Ustochrept; loamy, carbonatic, thermic, shallow.
Soil: Brackett loam.
Soil Nos.: S63TX-16-1; 18137-18140.
Location: Blanco County, Texas; 12 miles southwest of Johnson City, Texas; in pasture 250 feet west of county road and 5.3 miles southeast of its junction with U.S. Highway 290, which junction is 4.5 miles east of Blanco-Gillespie County line.
Vegetation and use: Native grass - little bluestem, side-oats grama, seep muhly, queen's delight, yucca, Texas oak.
Topography: Dissected plateau having narrow rounded divides and wide valleys with sloping and steeply sloping valley walls. Site is between two ledges on 15 percent gradient. Immediate area has mild cut-step slope shape due to harder strata.
Drainage and permeability: Well drained. Runoff is rapid. Permeability is moderately slow.
Parent material: Residuum from interstratified calcareous marls and soft thin-bedded limestone and chalks or siltstones.
Sampled by and date: G. Ditmar, H. C. Dean, J. DeMent, J. Hewitt, M. Stout, R. B. Grossman, April 24, 1963.
Described by: M. Stout.

A11 18137 0 to 4 inches. Grayish brown (2.5Y 5.5/2) loam; dark grayish brown (2.5Y 4/2) moist; moderate fine and very fine granular and subangular blocky structure; ped not durable; many fine wormcasts; very hard; firm; surface 3/8- to 1/4-inch a thin crust which is sealed on top and porous below; about 5 percent medium limestone and chalk fragments; moderately alkaline; calcareous; abrupt somewhat wavy lower boundary.

A12 18138 4 to 10 inches. Same color and texture as above; strong fine and very fine granular and subangular blocky structure; many fine rounded wormcasts; very hard; firm; estimated 4 to 6 percent medium and fine subrounded limestone fragments - very soft; few shell fragments; moderately alkaline; calcareous; clear slightly wavy to irregular lower boundary.

B2 18139 10 to 13 inches. Eighty percent light brownish gray (2.5Y 6/1.5) loam; dark grayish brown (2.5Y 4.5/2) moist and 20 percent of light yellowish brown (2.5Y 6/4); light olive brown (2.5Y 5/4) moist; about 4 percent soft whitish masses of $CaCO_3$ and about 10 percent soft limestone and chalk fragments; moderately alkaline; calcareous; abrupt irregular boundary.

C 18140 13 to 24 inches. Faintly mottled very pale brown (10YR 8/4) dry and pale yellow (2.5Y 7/4) dry; loam, coarsely mottled with light olive brown and light gray and white; interbedded soft silty marl and slightly harder thin strata of chalk or limestone; structure of partings and cleavage; very hard; extremely firm to friable; few medium masses of $CaCO_3$; moderately alkaline; calcareous; few wormcasts and insect nests; abrupt wavy lower boundary.

R 24 to 26 inches plus. A very pale brown slightly cemented, dense bed of silty shale or marl breaking out in coarse thin blocks or partings; very moist.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

A11 - clay loam
A12 - clay loam
B2 - clay loam
C - silty clay loam

SOIL CLASSIFICATION: Typic Ustochrept; loamy, carbonatic, thermic, shallow

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Brackett loam SOIL Nos. S63TX-86-1 LOCATION Gillespie County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 18133-18136 March 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1: Total Sand (2–0.05) [a]	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 <0.002	Coarse fragments 2A2: 3B1 19-2 Wt.	3B2 19-2 Vol.
		Pct of < 2 mm													Pct.	of <19mm.
0-4	A11	33.9	44.7	21.4	3.6	8.8	6.0	10.7	4.8	7.3	37.4	17.7	29.1	15		
4-9	A12	27.6	51.2	21.2	4.3	7.7	4.4	8.0	3.2	6.3	44.9	13.7	24.4	14	6	3
9-15	B2	22.3	60.0	17.7	4.3	6.4	3.0	5.8	2.8	5.2	54.8	11.3	19.5	14	6	4
15-26	C	34.9	47.4	17.7	7.9	9.7	4.4	9.5	3.4	3.9	43.5	12.6	31.5	16	38	

Depth (in.)	6A1a Organic carbon [b]	6B1a Nitrogen	C/N	Carbonate as $CaCO_3$: 6E1b <2mm.	Carbonate as $CaCO_3$: 3A1a <0.002 mm.	6C2a Ext. Iron as Fe	Bulk density: 4A1d 1/3-Bar [c]	Bulk density: 4A1d 1/3-Bar	Bulk density: 4A1b Air-Dry	4D1 COLE [d]	Water content: 4B1c 1/3-Bar	Water content: 4B2 15-Bar	Water content: 4C1 1/3-to 15-Bar [d]	pH 8C1a 1:1
	Pct	Pct.		Pct.	Pct	Pct.	g/cc	g/cc	g/cc		Pct.	Pct.	in./in.	
0-4	2.26	0.150	15	80	6	0.3	1.32	1.40	1.47	0.016	19.1	8.7	0.14	7.7
4-9	1.38	0.093	15	84	7	0.2	1.40	1.44	1.50	0.014	19.1	8.9	0.14	7.7
9-15	0.60	0.045	13	87	4	0.2	1.47	1.53	1.56	0.007	18.7	7.6	0.16	8.0
15-26	0.28			81	2	0.2						7.6		8.2

Depth (in.)	Extractable bases 5B1a: 6N4b Ca	6O4b Mg	6P2a Na	6Q2a K	Sum	Ext. Acidity	Cat. Exch. Cap.: Sum Cations	Cat. Exch. Cap.: 5A1a NH_4OAc	Ca/Mg	Base saturation: Sum Cations	Base saturation: NH_4OAc
	meq/100 g									Pct.	Pct.
0-4	13.5	0.6	tr	0.6	14.7			12.0			
4-9	11.6	0.4	tr	0.4	12.4			9.4			
9-15	9.2	0.2	tr	0.3	9.7			6.5			
15-26	9.8	0.3	tr	0.3	10.4			7.3			

Depth (in.)	Ratios to Clay 8D2: NH_4OAc CEC	Ext. Iron	15-Bar Water
0-4	0.80	0.02	0.58
4-9	0.67	0.01	0.64
9-15	0.46	0.01	0.54
15-26	0.46	0.01	0.48

a. Carbonate comprises more than 50 percent of the sand.
b. 7 kg/m^2 to 15 inches (Method 6A).
c. Calculated to include volume but not weight of 2- to 19-mm material (Method 3B2).
d. Less than 19-mm material.

Soil classification: Typic Ustochrept; loamy, carbonatic, thermic, shallow.
Soil: Brackett loam.
Soil Nos.: S63TX-86-1; 18133-18136.
Location: Gillespie County, Texas. Otto Schuman Ranch; 3 miles southwest of Albert, Texas, due east of entrance gate 200 yards.
Vegetation and use: Grasses - little bluestem, tall dropseed, hairy grama, Texas grama, side-oats grama, seep muhly, purple threeawn; Forbs - Texas Stillingia, orange zexmenia; skunkbush sumac, Brouse, mountain grape, live oak.
Topography: Landscape is a deeply dissected former plateau having narrow ridges and divides and steeply sloping side slopes of 15 percent gradient; site between resistant ledges on 15 percent gradient.
Drainage and permeability: Well drained. Runoff is rapid. Permeability is moderately slow.
Parent material: Highly calcareous residuum derived from soft limestone and marly clays.
Sampled by and date: G. Ditmar, H. C. Dean, J. DeMent, J. Hewitt, M. Stout, R. B. Grossman, April 24, 1963.
Described by: M. Stout.

A11 18133 0 to 4 inches. Grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; moderate fine granular and subangular blocky structure; many wormcasts, fine; very hard; very firm; few to common whole and fractured snail shells; about 3 percent fine and medium subrounded fragments of limestone and chalk; horizon is somewhat more compacted than A12 and has a 1/4- to 1/8-inch grayish crust; moderately alkaline; calcareous; abrupt somewhat wavy lower boundary.

A12 18134 4 to 9 inches. Same color as above; silt loam; strong medium and fine granular and subangular blocky structure; peds are weakly cohesive; very hard; very firm; very crumbly; many fine wormcasts; about 3 percent subrounded yellowish, soft, altered, limestone or chalk fragments; about 2 to 4 percent white calcium masses; moderately alkaline; calcareous; mostly abrupt wavy or gently undulating lower boundary.

B2 18135 9 to 15 inches. Light yellowish brown (2.5Y 6.5/4) silt loam, light olive brown (2.5Y 5.5/4) moist; weak to moderate fine subangular blocky structure in soil fines; mass in whitish pure calcium masses; mottled with grayish brown and light yellowish brown; of adjacent horizons; common coarse $CaCO_3$ masses (20 percent); few to common fine wormcasts; common hard fragments of $CaCO_3$ and rock; hard; friable; moderately alkaline; calcareous; clear wavy to irregular lower boundary.

C 18136 15 to 26 inches. Mottled coarsely with light brownish gray (10YR 6/2) moist, and light yellowish brown (2.5Y 6/4) moist, gravelly loam; interbedded marly silty shales and very thin bedded limestones; structure is of the partings of the parent rock; few coarse whitish masses.

R 26 inches plus. Limestone.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

A11 - light clay loam
A12 - light clay loam
B2 - clay loam
C - gritty clay loam

SOIL CLASSIFICATION Aridic Ustochrept; fine-silty, thermic

SOIL Series not designated | LOCATION Carson County, Texas

SOIL NOS. S60TX-33-3 | LAB. NOS. 12711-12714

SOIL SURVEY LABORATORY Lincoln, Nebraska | DATE March 1960

GENERAL METHODS 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	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
0-8	A1	<0.1	0.5a	0.7b	4.9b	24.6b	49.6	19.7	66.1	11.8	-	l
8-22	B21ca	<0.1	0.4a	0.7b	2.9b	16.1b	48.7	31.2	48.7	18.2	tr	cl
22-48	B22ca	<0.1	0.2a	0.4b	1.7b	12.3b	55.4	30.0	47.2	21.7	tr	sicl
48-80	Cca	<0.1	0.3a	0.5b	3.2b	22.7b	48.9	24.4	58.9	15.4	tr	l

8C1a pH 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	NITROGEN %	C/N	EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC x 10³ MILLIMHOS PER CM @25°C.	6E1a $CaCO_3$ equivalent %	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
7.7			1.56					12			
7.8			1.05					24			
8.0			0.24					22			
8.3			0.06					14			

CATION EXCHANGE CAPACITY	EXTRACTABLE CATIONS Ca	Mg	H	Na	K (milliequivalents per 100g. soil)	BASE SAT. % EXCH. Na %	Clay 3A1a Carbonate %	Clay 3A1a Non-Carbonate %	MOISTURE AT SATURATION %
							6	14	
							13	18	
							9	21	
							6	18	

a. Common carbonate concr. ($CaCO_3$?).
b. Few carbonate concr. ($CaCO_3$?).

Soil classification: Aridic Ustochrept; fine-silty, thermic.
Soil: Series not designated.
Soil Nos.: S60TX-33-3; 12711-12714.
Location: North 320 yards and 40 yards west of southeast corner of Section 40, Block 4, 4.5 miles north and 1 mile west of White Deer, Carson County, Texas.
Vegetation: Rangeland in good condition. Vegetation is blue grama and buffalograss with scattered patches of sideoats grama.
Physiography: Rolling upland which drains toward Canadian River.
Relief: Smooth convex slope with gradient of 4 percent facing northeast toward draw. This site is about 30 feet lower than the level of the high plains and 0.3 mile northwest of high plains rim.
Collected and described by: L. Geiger, January 13, 1960.

A1 12711 0 to 8 inches. Dark grayish brown (10YR 4/2, 3/2 moist) loam; weak subangular blocky and granular; slightly sticky wet; friable moist; calcareous; a few very fine hard calcium carbonate concretions; wormcasts common; gradual boundary. Sampled 2 to 8 inches.

B21ca 12712 8 to 22 inches. Brown (7.5YR 5/2, 4/2 moist) clay loam; mostly granular with some weak subangular blocky; calcareous with common very fine calcium carbonate concretions; medium and fine pores common; clear boundary. Sampled 15 to 20 inches.

B22ca 12713 22 to 48 inches: Brown (7.5YR 5/4, 4/4 moist) silty clay loam; weak subangular blocky; slightly sticky wet; friable moist; very highly calcareous, apparently 10 to 20 percent calcium carbonate by volume; fine pores common; a few patches of clay films; gradual boundary. Sampled 26 to 30 inches.

Cca 12714 48 to 80 inches. Light brown (7.5YR 6/4, 5/4 moist) loam; massive; slightly sticky wet; friable moist; hard when dry; highly calcareous; a few fine soft masses of calcium carbonate; many very fine pores. Sampled 60 to 65 inches.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

A1 - clay loam
B22ca - clay loam
Cca - clay loam

SOIL CLASSIFICATION Typic Argiaquoll; fine-silty, mixed, thermic

SOIL Morey silt loam — LOCATION Jefferson County, Texas

SOIL NOS. S59TX-123-5 — LAB. NOS. 11620-11627

SOIL SURVEY LABORATORY Lincoln, Nebraska — DATE March 1961

GENERAL METHODS 1A, 1B1a, 2A1, 2B

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	TEXTURAL CLASS
0-6	Ap	0.1a	0.2a	0.2a	5.2	19.8	57.7	16.8	56.4	25.9	-	sil
6-11	A12	0.1a	0.2a	0.2a	3.2	13.2	57.6	25.5	43.3	30.4	-	sil
11-13	B1	0.2a	0.2a	0.1a	2.5	14.9	52.6	29.5	42.7	27.1	-	sicl
13-19	B21tg	0.2a	0.1a	0.2a	2.6	13.5	48.4	35.0	39.7	24.5	-	sicl
19-26	B22tg	0.3a	0.1a	0.1a	2.6	14.9	47.7	34.3	42.7	22.3	-	sicl
26-35	B23tg	0.4a	0.1a	0.1a	2.5	14.2	47.6	35.1	40.5	23.6	-	sicl
35-49	B3g	0.1a	0.1a	0.1a	2.4	14.3	47.2	35.8	39.8	23.9	-	sicl
49-60	Cg	0.2a	0.1a	<0.1	2.1	13.1	46.9	37.6	36.5	25.5	-	sicl

8C1a pH 1:1	6C1a Free Iron Fe_2O_3%	6G2a Ext. Alum-inum me/100g	ORGANIC MATTER 6A1a ORGANIC CARBON % b	6E1a NITRO-GEN %	C/N	BULK DENSITY 4A1a Field State g/cc	4A1c 30-cm g/cc	4A1h Oven Dry g/cc	MOISTURE TENSIONS 4B4 Field State %	4B3 30-cm %	4B1b 1/3 bar pieces %	4B2 15 Bar %
5.3	0.6	<1	2.08	0.157	13	1.41	1.40	1.51	24.3	26.8	21.3	8.7
5.2	0.9	1	1.30	0.100	13	1.70	1.68	1.81	17.1	18.4	19.6	11.6
5.2	0.9	3	0.98	0.080	12							12.2
5.3	1.3	2	0.88	0.079	11	1.52	1.48	1.76	21.8	24.4	22.0	14.2
5.6	1.6	<1	0.60	0.056	11							15.2
6.9	1.5	<1	0.28			1.69	1.65	1.99	19.7	21.0	20.2	15.3
7.5	1.5	<1	0.17									15.1
7.8	1.4	<1	0.09			1.68	1.66	2.02	19.5	20.5	21.1	15.0

5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 5B1a 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K	BASE SAT. % NH_4OAc EXCH. 5C1	Base Sat. % on Sum Cations 5C3	Sum Ext. Bases 5B1a	SAT EXT SOL. 8A1 6P1a Na	6Q1a K	6E1a $CaCO_3$ Equivalent %	8A Moisture at Saturation %
← milliequivalents per 100g. soil →									me/100 g			
12.1	4.5	2.4	8.8	0.2	0.4	62	46	7.5	1.7	0.3		42.1
14.6	5.6	3.0	9.8	0.5	0.2	64	49	9.3	2.4	<0.1		43.1
15.6	5.0	3.6	11.6	0.8	0.2	62	45	9.6	3.1	<0.1		44.8
16.4	6.0	4.7	10.6	1.3	0.2	74	54	12.2	3.8	<0.1		51.0
18.4	7.9	6.3	6.3	2.1	0.2	90	72	16.5	6.6	<0.1		66.2
19.3	9.4	7.3	2.4	3.2	0.2	104	89	20.1	11.8	0.1	<1	73.7
20.3	9.8	7.7	1.7	4.0	0.2	107	93	21.7	14.9	<0.1	<1	84.7
20.4	10.3	7.7	1.2	4.3	0.2	110	95	22.5	11.4	<0.1	<1	90.6

a. Many (Fe-Mn?) concr.
b. 14 Kg/M^2 to 60 inches (Method 6A).

Soil classification: Typic Argiaquoll; fine-silty, mixed, thermic.
Soil: Morey silt loam.
Soil Nos.: S59TX-123-5; 11620-11627.
Location: Jefferson County, Texas; 0.8 mile west of the county courthouse at Beaumont on Franklin Street, thence south by west on Avenue A 2.2 miles, thence south on West Port Arthur Road 2.4 miles, thence west and south on Hillebrandt Road 6.85 miles, thence 220 feet east of road in pasture.
Setting: The soil was sampled in a nearly level area with less than 0.5 percent slope, once cultivated to rice but is now in pasture. The soil has a dense cover of carpet, dallis, bermuda and vasey grasses and some sedges and annual weeds. The area was last farmed in rice 5 years ago. The soil moisture was at approximately field capacity at the time it was sampled.
Collected by: L. L. Gordon, J. R. Coover, R. B. Grossman, G. J. Post, August 1959.
Described by: L. L. Gordon and R. B. Grossman.

Ap 11620 0 to 6 inches. Very dark gray (10YR 3/1.5) silt loam; weak granular; slightly sticky and slightly plastic; surfaces of some root channels were coated dark brown to dark reddish brown, particularly in the lower part of the horizon; contains some wormcasts and many fine fibrous roots; pH 6.0; abrupt boundary.

A12 11621 6 to 11 inches. Very dark gray (10YR 3/1.5) silt loam with root channels and some ped surfaces coated dark reddish brown; this is the plow sole portion and is massive to weak blocky; firm to very firm, slightly sticky and slightly plastic; very few fine pores and few fine fibrous roots; there is less blanching of root channels and ped surfaces than in the horizons above and below; pH 5.5; abrupt to clear boundary.

B1 11622 11 to 13 inches. Dark gray (10YR 3.5/1) silty clay loam with few to common faint fine yellowish brown mottles; weak to moderate medium to fine blocky with few subrounded peds; sticky and plastic but stiff; some staining or coating of dark reddish brown along root channels; common fine roots; occasional small soft concretion apparently of ferromanganese; pH 5.5; clear boundary.

B21tg 11623 13 to 19 inches. Dark gray (10YR 3.5/1) silty clay loam with common fine yellowish brown and a few strong brown mottles mostly in the interior of the peds; moderate medium blocky; very firm moist, sticky and plastic but stiff; surface of peds is very dark gray to very dark brown and contains very few pores; few fine pores and occasional medium pore mostly inside the peds; surface of many root channels coated dark reddish brown; few fine fibrous roots mostly between peds; thin clay films are almost continuous; pH 5.5; clear boundary.

B22tg 11624 19 to 26 inches. Dark gray (10YR 4/1) silty clay loam with common to many distinct fine mottles of strong brown and yellowish brown, mostly in the interior of the peds; surfaces of most peds coated dark gray (10YR 3.5/1) and some also coated dark gray rather than dark reddish brown as in above horizon; moderate medium and fine blocky; very firm moist, sticky and plastic but stiff wet; clay films almost continuous; few fine and very fine pores mostly inside the peds; few fine fibrous roots mostly between peds, some being flattened; pH 5.5; clear boundary.

B23tg 11625 26 to 35 inches. Grayish brown (2.5Y 5/2) silty clay loam with common to many fine and medium yellowish brown mottles; wedge-shaped structural units, of fine to medium blocky size due to pressure faces of swelling and shrinking are moderately expressed; sticky and plastic but stiff; very few fine roots; very few very fine pores; aggregate surfaces are not coated or stained as in above horizon; krotovinas of dark gray to very dark gray light clay 1 to 1-1/2 inches in diameter occur occasionally in this horizon; pH 7.0; gradual boundary.

B3g 11626 35 to 49 inches. Gray (10YR 5/1) silty clay loam with many medium distinct yellowish brown (10YR 5/6) mottles; medium angular wedge-shaped structural units due to pressure faces are weakly to moderately expressed; some nonintersecting striated slickensides are evident; sticky and plastic but stiff; very few very fine roots and very fine pores; occasional dark gray krotovina as in above horizon; pH 7.5; gradual boundary.

Cg or B32g 11627 49 to 60 inches. Light gray (2.5Y 6/0) silty clay loam with common to many distinct medium mottles of yellowish brown (10YR 5/8); contains few dark soft to semihard concretions up to 8 mm in diameter, apparently of ferromanganese; angular wedge-shaped structural units of medium to coarse blocky size formed by pressure faces are moderately expressed (more strongly expressed than in B3g horizon); sticky and plastic but stiff; few soft to hard ferromanganese concretions; krotovinas as in above horizon; pH 8.0.

Remarks: The color designations herein refer to moist soil. Some of the data for this pedon are published in the soil survey for Jefferson County, Texas, issued February 1965, pages 64, 65 and 66.

Micromorphology (Method 4E1). Thin sections from the A12 (11621), B21tg (11623), B23tg (11625) and Cg (11627) were examined. Segregation of hydrous iron oxides appears strong throughout the pedon. Some of the hydrous iron oxide concentrations show weak extinction, suggestive of oriented silicate clay concentrations masked by iron. Segregation of clay is strong in the B21tg horizon. The clay concentrations occur mainly in subsurface positions, although the evidence is fairly strong for some clay films in the B21tg. As a percentage of the clay, however, they are exceedingly small. The A12 horizon has a few subsurface oriented silicate bodies but far fewer than the B21tg horizon, and no clay films were observed.

Textures above agree with laboratory data. Field textures where different are given below:

Ap - clay loam
A12 - clay loam
B1 - clay
B21tg - clay
B22tg - clay
B23tg - clay
B3g - clay
Cg or B32g - clay

SOIL CLASSIFICATION Typic Argiaquoll; fine-silty, mixed, thermic

SOIL Morey silt loam LOCATION Jefferson County, Texas

SOIL NOS. S59TX-123-6 LAB. NOS. 11628-11635

SOIL SURVEY LABORATORY Lincoln, Nebraska DATE March 1961

GENERAL METHODS 1A, 1B1a, 2A1, 2B

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	TEXTURAL CLASS
0-8	Ap	0.2a	<0.1	0.1a	2.8	16.9	53.5	26.5	47.2	25.8	-	sil
8-11	A12	<0.1	<0.1	<0.1	2.9	17.7	54.6	24.8	49.2	25.9	-	sil
11-14	B1	0.1a	<0.1	0.1a	3.8	16.2	52.6	27.2	46.9	25.5	-	cl
14-21	B21tg	<0.1	<0.1	0.1a	3.6	15.1	48.9	32.3	44.6	22.8	-	sicl
21-30	B22tg	0.1a	<0.1	0.1a	3.1	14.7	46.4	35.6	43.1	20.9	-	sicl
30-41	B23tg	<0.1	<0.1	0.1a	3.0	14.3	44.1	38.5	42.0	19.3	-	sicl
41-51	B3g	<0.1	<0.1	<0.1	2.7	14.2	45.0	38.1	41.6	20.2	-	sicl
51-60	Cg	<0.1	<0.1	<0.1	2.4	13.4	46.3	37.9	39.0	23.0	-	sicl

8C1a pH 1:1	6C1a Free Iron Fe_2O_3 %	6G2a Ext. Aluminum me/100g	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	BULK DENSITY 4A1a Field State g/cc	4A1c 30-cm g/cc	4A1h Oven Dry g/cc	MOISTURE TENSIONS 4B4 Field State %	4B3 30-cm %	4B1b 1/3 bar pieces %	4B2 15 Bar %
5.4	0.6	<1	1.49	0.110	14	1.43	1.41	1.59	23.3	24.3		11.6
5.4	0.5	1	0.88	0.074	12							10.4
5.3	0.6	2	0.79	0.069	11							11.9
5.1	0.8	3	0.70	0.065	11	1.59	1.54	1.77	18.9	21.7		15.5
5.1	1.0	3	0.68	0.065	10							13.5
5.1	1.0	2	0.52			1.53	1.48	1.84	22.8	25.8		15.4
5.2	1.3	<1	0.30									15.2
5.4	1.2	<1	0.14			1.72		1.99	18.2			14.7

5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 5B1a 6N2b Ca	6G2b Mg	6H1a H	6P2a Na	6Q2a K	BASE SAT. % NH_4OAc EXCH. 5C1	Base Sat. % on Sum Cations 5C3	Sum Ext. Bases 5B1a	Sum Ext. Cations 5A3a	8D3 Ca/Mg	8D1 1/ CEC per 100 g. clay
← milliequivalents per 100g. soil →											
18.8	11.1	3.3	8.4	0.2	0.2	79	64	14.8	23.2	3.4	71
15.1	8.2	2.8	7.9	0.3	0.2	76	59	11.5	19.4	2.9	61
17.0	7.9	3.1	9.9	0.4	0.2	68	54	11.6	21.5	2.5	62
19.1	8.8	3.2	11.1	0.6	0.2	67	54	12.8	23.9	2.8	59
21.2	10.2	3.7	11.6	0.9	0.3	71	56	15.1	26.7	2.8	60
22.1	12.6	4.1	9.7	1.1	0.3	82	65	18.1	27.8	3.1	57
22.1	14.7	4.9	6.1	1.2	0.3	95	78	21.1	27.2	3.0	58
22.0	16.4	5.2	4.4	1.1	0.3	104	84	23.0	27.4	3.2	58

a. Many (Fe-Mn?) concr.

b. 14 Kg /M² to 60 inches (Method 6A).

1/ Calculated value. CEC by NH_4OAc $\frac{\quad}{\% \text{ clay}} \times 100$

Soil classification: Typic Argiaquoll; fine-silty, mixed, thermic.
Soil: Morey silt loam.
Soil Nos.: S59TX-123-6; 11628-11635.
Location: Jefferson County, Texas; 0.8 mile west of county courthouse at Beaumont, Texas, on Franklin Street, thence south by west on Avenue A 2.2 miles, thence south on West Port Arthur Road 2.4 miles, thence west and south on Hillebrandt Road 5.7 miles, thence east on private road 0.2 mile to fork in road, thence to the right in a southeasterly direction 0.1 mile to road fork, thence left in an easterly direction 0.55 mile across canal, thence north by east 0.4 mile to road fork, thence east 0.1 mile, south of road 150 feet in pasture.
Setting: The soil here is nearly level area with gradient of less than 0.5 percent, is used for pasture, and has a thick cover of carpet, vasey and dallis grasses, common lespedeza and some white clover. The area was last farmed in rice 10 years ago. The soil moisture was at approximately field capacity when sampled.
Collected by: L. L. Gordon, J. R. Coover, R. B. Grossman, and G. J. Post, August 1959.
Described by: L. L. Gordon and R. B. Grossman.

Ap 11628 0 to 8 inches. Very dark gray (10YR 3/1.5) silt loam with faint staining or coating of dark yellowish brown along root channels and between peds; weak granular; firm moist, slightly sticky and plastic; many fine fibrous roots; pH 6.0; abrupt boundary.

A12 11629 8 to 11 inches. Dark gray (10YR 4/1) silt loam with few fine yellowish brown mottles and staining or coating along root channels; massive; slightly sticky and slightly plastic; common fine fibrous roots; pH 5.5; abrupt to clear boundary.

B1 11630 11 to 14 inches. Dark gray (10YR 4/1) clay loam with few to common fine distinct yellowish brown mottles mostly inside of peds; some dark reddish brown coatings along root channels; weak to moderate medium blocky with some subrounded peds; very sticky and plastic; very firm moist; pH 5.5; clear boundary.

B21tg 11631 14 to 21 inches. Dark gray (10YR 4/1) silty clay loam with common to many fine distinct mottles of brownish yellow mostly inside peds; surface of peds stained or coated very dark gray (10YR 3/1.5); some root channels coated dark reddish brown; moderate medium blocky; very firm, sticky and plastic; few fine pores mostly inside peds; common fine roots mostly between peds; few streaks of gray sandy clay loam; clay films evident and almost continuous; pH 5.5; gradual boundary.

B22tg 11632 21 to 30 inches. Dark gray (10YR 4/1) silty clay loam with many fine distinct yellowish brown and strong brown mottles mostly inside of peds; surface of peds slightly coated very dark gray (10YR 3/1); moderate medium and fine blocky with some angular blocky peds; very firm moist, sticky and plastic but stiff; clay films evident but thinner than in above horizon; some strong brown mottling on ped surfaces; few fine pores mostly inside peds; very dark gray coatings on walls of root channels; weak slickensides evident; very few fine fibrous roots; pH 5.5; gradual boundary.

B23tg 11633 30 to 41 inches. Dark gray (10Y 4/1) silty clay loam with many distinct fine mottles of strong brown and yellowish brown; surface of aggregates not coated as in above horizon; wedge- or rhombohedrally-shaped structural units of fine and medium blocky size delineated by slickensides are moderately expressed; sticky and plastic but stiff; very few very fine roots and pores; pH 5.5; gradual boundary.

B3g or B31 11634 41 to 51 inches. Gray (10YR 5/1.5) silty clay loam with common fine distinct yellowish brown mottles and some reddish brown coating along channels; wedge-shaped structural units medium blocky in size are weakly outlined by slickensides; sticky and stiff, very firm; very few very fine pores and roots; few root channels coated reddish brown; pH 6.5; gradual boundary.

Cg or B32 11635 51 to 60 inches. Light gray (10YR 6/1) silty clay loam with many distinct medium and fine mottles of brownish yellow and few distinct fine strong brown mottles; weak to moderately expressed slickensides which delineate medium blocky-sized wedge-shaped structural units; sticky and plastic but stiff; few very fine pores; occasional very fine root; pH 7.5.

Remarks: Occasional krotovinas of very dark gray light clay 1 to 1-1/2 inches in diameter occur in B23tg and lower horizons. Gray streaks of sandy clay loam or clay loam about 1 inch in diameter occur through all other B horizons. These are apparently old well leached krotovinas formed by crawfish and apparently improved internal drainage. The color designations herein refer to moist soil.

Textures above agree with laboratory data. Field textures where different are given below:

Ap - clay loam
A12 - clay loam
B1 - clay
B21tg - clay
B22tg - clay
B23tg - clay
B3g or B31 - clay
Cg or B32 - clay

SOIL CLASSIFICATION-VERTIC ARGIAQUOLL
FINE, MONTMORILLONITIC, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SERIES - - - - - - -BERNARD

SOIL NO - - - - - - S55TX-79-91 COUNTY - - - FORT BEND

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K271-276

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (PCT LT 2MM) SAND 2-.05	SILT .05-.002	CLAY LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	PARTICLE SIZE ANALYSIS (B) SAND .05-2	SILT .002-.05	CLAY LT .002	CRSE CLAY .002-.0002 (PCT LT.002)	FINE CLAY LT .0002	ETHYLENE GLYCOL RETAINED LT 2 MM (MG/G)	LT .002 MM	LT .0002 MM	BULK DEN 4A3A G/CC
000-9	A1	10.6					0.8A	2.6	7.2				22	78				
009-17	B1TG	11.7	50.7	37.6			1.0A	2.9	7.8				21	79				
017-29	B21TG	8.2	39.8	52.0			0.7A	2.0	5.5				15	85				
029-49	B22TG	9.4	44.7	45.9			0.8A	2.3	6.3				18	82				
049-61	B23TG	11.0	46.8	42.2			2.3A	2.6	6.1				21	79				
061-72	2CCA	8.7	50.1	41.1			3.6A	1.3	3.8				33	67				

DEPTH IN	ORGANIC MATTER 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON 6C3 EXT FE PCT	PHOS 6S1A TOTL PCT	EXTRACTABLE BASES 5B1A (MEQ/100G) 6N2E CA	6Q2D MG	6P1A NA	6Q2A K	SUM	CAT EXC CAP 5A2A LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO CA TO MG 8D3	CA CARB EQ PCT 6E1E	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
000-9	3.42					16.0	5.6	0.3	0.5	22.4	32.2	72B	97B	70	2.9		4.9		
009-17	1.86					17.2	5.5	0.3	0.3	23.3	32.9	77B	100B	71	3.1		5.0		
017-29	0.93					21.6	7.6	0.5	0.4	30.1	39.7	84B	102B	76	2.8		5.3		
029-49	0.58					20.5	7.7	0.5	0.4	29.1	34.9	82B	101B	83	2.7		6.1		
049-61	0.29						8.6	0.7	0.4		31.6	82B	103B				7.8		
061-72	0.17						7.5	0.6	0.5		26.4	72B	86B				7.9		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S55TX-79-91

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-9	QZ1	QZ1 FD3		QZ2 MI2 KK2	MT1 KK3
9-17	QZ1	QZ1 FD3		MI2 QZ2 KK2	MT1 KK3
17-29	QZ1	QZ1 FD3		MI2 QZ2 KK2	MT1 KK3
29-49	QZ1	QZ1 FD3		QZ2 MI2 KK2	MT1 KK3
49-61	QZ1	QZ1 FD3		MI2 QZ2 KK2 MT3	MT1 KK3
61-72	QZ1 FD3 CA3	QZ2 MI2 KK3 FD3		MI1 QZ2 KK2 MT3	MT1 MI3 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, CA=CALCITE.

(A) THE VERY COARSE, COARSE, AND MEDIUM SAND FRACTIONS HAVE BEEN COMBINED.
(B) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Vertic Argiaquoll; fine, montmorillonitic, thermic.
Soil: Bernard silty clay loam.
Soil Nos.: S55TX-79-91; K271-276.
Location: Fort Bend County, Texas; 2.8 miles southeast of Rosenberg, 0.7 mile northwest of a county road and 50 feet north of a field road in the corner of a native pasture. Cover: Brown-seeded paspalum, bermudagrass stipa, dallisgrass, weeds and scattered huisache trees.
Topography: Nearly level upland with a weak microrelief.
Sampled by: I. C. Mowery, May 1955.
Described by: I. C. Mowery.

A1 K271 0 to 9 inches. Very dark gray (10YR 3.5/1; 2/1 moist) silty clay loam; compound moderate medium granular and fine subangular blocky; moderately firm when moist, sticky when wet, and aggregates very hard when dry, very crumbly when moist; occasional ferromanganese concretions; pH 6.0; grass roots abundant; gradual boundary.

B1tg K272 9 to 17 inches. Dark gray (10YR 3.5/1; 2/1 moist) silty clay loam with a few fine dark yellowish brown mottles, moderate medium subangular blocky; firm when moist, sticky when wet, and aggregates are hard when dry; occasional ferromanganese concretions; pH 6.0; grass roots present but less numerous than above; gradual boundary.

B21tg K273 17 to 29 inches. Dark gray (10YR 4/1; 3/1 moist) clay with common fine distinct strong brown (7.5YR 1/4; 4/4 moist) mottles and a few fine yellowish red spots; the strong brown mottles are associated with ferromanganese concretions which are numerous; moderate fine blocky and moderate medium subangular blocky; very firm, very sticky; pH 6.3; few fine roots; gradual boundary.

B22tg K274 29 to 49 inches. Gray (2.5Y 5/1; 4/1 moist) silty clay with few faint fine light olive brown mottles; weak coarse blocky; very firm, very hard, very sticky; numerous ferromanganese concretions; pH - 6.5; occasional fine roots; gradual boundary.

B23tg K275 49 to 61 inches. Gray (2.5Y 5/1; 4/1 moist) silty clay with a few fine light olive brown mottles; weak coarse blocky; very firm, very hard, very sticky; numerous small hard $CaCO_3$ concretions; gradual boundary.

IICca K276 61 to 72 inches. Yellowish red (5YR 5/8; 4/8 moist) silty clay with a few distinct pale olive mottles; massive; not as firm, sticky or hard as 3 horizons above; about 5 percent of mass is soft lumps and small, hard $CaCO_3$ concretions.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

A1 - clay loam
B1tg - heavy clay loam
B22tg - clay
B23tg - clay
IICca - clay

SOIL CLASSIFICATION: Aquic Argiudoll; fine, mixed, thermic

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Bonham silt loam SOIL Nos. S62TX-74-1 LOCATION Fannin County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 17727-17735 May 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (In.)	Horizon	Size class and particle diameter (mm) 3A1: Total Sand (2–0.05) [a]	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 <0.002	Fine Clay to Clay [f]	Coarse fragments 2A2: 3B1 > 2	2 – 19	19 – 76
		Pct. of < 2 mm												Pct.	Pct.	Pct	Pct. of < 76 mm	
0-10	A1	17.8	58.6	23.6	0.2	0.4	0.7	2.9	13.6	44.0	14.6	59.6	4.2	24	76	tr		
10-17	B1	15.2	54.9	29.9	0.1	0.3	0.6	2.5	11.7	40.3	14.6	53.7	3.5	30	77	tr		
17-28	B21t	13.3	49.2	37.5	tr	0.2	0.5	2.2	10.4	35.3	13.9	47.2	2.9	38	85	tr		
28-39	B22t	12.0	48.7	39.3	0.2	0.2	0.4	1.9	9.3	33.0	15.7	43.6	2.7	39	78	tr		
39-56	B23t	11.1	49.5	39.4	-	0.2	0.4	1.8	8.7	33.1	16.4	43.0	2.4	39	79	tr		
56-66	B24t	9.8	50.2	40.0	0.1	0.2	0.3	1.4	7.8	32.6	17.6	41.4	2.0	40	77	tr		
66-75	C1	9.5	52.2	38.3	0.7	0.6	0.5	1.5	6.2	31.0	21.2	38.2	3.3	38	75	tr		
75-93	C2ca	5.0	45.8	49.2	0.4	0.3	0.3	0.9	3.1	15.6	30.2	19.3	1.9	48	69	tr		
93-123	C3	1.5	33.9	64.6	0.2	0.1	0.1	0.3	0.8	3.0	30.9	4.0	0.7	57	63	tr		

Depth (In.)	6A1a Organic carbon [b]	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	Carbonate as $CaCO_3$: 6E1b 6E2a < 2 mm	Carbonate as $CaCO_3$: 3A1a < 0.002 mm	Bulk density: 4A1a Field-State	Bulk density: 4A1d 1/3-Bar	Bulk density: 4A1b Air-Dry	4D1 COLE	Water content: 4B4 Field-State	Water content: 4B1c 1/3-Bar	Water content: 4B2 15-Bar	4C1 1/3- to 15-Bar	6G1b KCl-Ext. Al	pH: 8C1b Sat. Paste	pH: 8C1a 1:1	pH: 8C1a 1:10
	Pct.	Pct		Pct.	Pct.	Pct.	g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.	me/100g			
0-10	1.75	0.125	14	0.8			1.37	1.36	1.51	0.036	24.0	23.2	11.5	0.16	tr		5.6	
10-17	1.08	0.076	14	1.0				1.4c					13.6		0.3		5.4	
17-28	0.72	0.056	13	1.1			1.44	1.42	1.73	0.068	24.2	25.2	16.1	0.13	0.4		5.3	
28-39	0.38			1.2			1.62	1.47	1.85	0.082	17.6	24.9	16.5	0.12	0.1		5.7	
39-56	0.30			1.0	-(s)		1.62	1.52	1.94	0.087	20.2	24.7	17.2	0.11		6.4	6.5	6.9
56-66	0.14			0.8	tr(s)	-		1.5c					17.5			7.7	7.9	8.4
66-75	0.07			0.8	4	-	1.60	1.47	1.90	0.092	21.3	26.4	17.6	0.13		7.8	7.9	8.7
75-93	0.06			1.0	18	1							21.3			7.9	8.0	8.9
93-123	0.05			1.6	22	8							26.4			7.9	8.0	9.0

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum	6H1a Ext. Acidity	Cat. Exch. Cap.: 5A2a NaOAc	5A1a NH_4OAc	Water extract from saturated paste 8A1: Ca	Mg	6P1a Na	6Q1a K	CO_3	HCO_3	Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter								mmho/cm
0-10	14.1	3.3	0.1	0.2	17.7	7.8		18.7									
10-17	14.9	3.7	0.3	0.3	19.2	8.5		21.0									
17-28	18.3	4.4	0.7	0.4	23.8	8.6		24.8									
28-39	21.4	4.5	1.1	0.5	27.5	5.9		26.8									
39-56	23.5	4.3	1.5	0.5	29.8	3.1	30.0	27.0			2.7	tr					0.39
56-66	25.3d	4.5e	1.8	0.5	32.1		32.9	28.7			4.2	tr					0.63
66-75	26.6d	4.6e	2.0	0.5	33.7		32.9	30.4			4.5	tr					0.63
75-93	30.3d	5.2e	2.5	0.6	38.6		37.8	34.5			4.5	tr					0.64
93-123	31.7d	5.7e	3.2	0.8	41.4		42.0	39.1			6.8	0.1					1.00

Depth (In.)	8A Water at Saturation	5D1 Exchangeable Na	5C1 Base Sat. NH_4OAc CEC	Gypsum	Ratios to Clay 8D2: NH_4OAc CEC	Ext. Iron	15-Bar Water
	Pct.	Pct.	Pct.	Pct			
0-10			95		0.78	0.03	0.48
10-17			91		0.70	0.03	0.45
17-28			96		0.65	0.03	0.42
28-39			103		0.69	0.03	0.42
39-56	58.9	4			0.69	0.03	0.44
56-66	61.1	4			0.72	0.02	0.44
66-75	60.8	5			0.80	0.02	0.46
75-93	69.8	6			0.72	0.02	0.44
93-123	91.2	6			0.69	0.03	0.46

a. Fe-Mn nodules comprise more than 50 percent of the very coarse and coarse sand above 66 inches. Carbonate comprises 10 to 20 percent of the sand between 66 and 75 inches, and more than 50 percent of the sand below 75 inches.

b. 15 kg/m^2 to 60 inches (Method 6A).

c. Estimated.

d. KCl-TEA extraction (Method 6N4b).

e. KCl-TEA extraction (Method 6O4b).

f. Soil treated for removal of $CaCO_3$ if present.

Soil classification: Aquic Argiudoll; fine, mixed, thermic.
Soil: Bonham silt loam.
Soil Nos.: S62TX-74-1; 17727-17735.
Location: West 1.9 miles of intersection of State Highway 121 and U.S. 82 in Bonham, Texas, on Highway 82; north 0.7 mile on county road; 74 yards east and 24 yards south of gate to native pasture.
Area: Fannin County, Texas.
Cover: Native meadow of mid and tall grasses, dominated by little bluestem.
Parent material: Weathered residuum of silty and sandy shales or old alluvial materials.
Topography: Slightly convex surface having a gradient of about 1 percent in an undulating landscape having low divides and slopes of less than 3 percent gradient.
Moisture when sampled: About 70 percent field capacity.
Sampled by: J. A. DeMent and R. L. Juve, September 10, 1962.
Described by: M. Stout.

A1 17727 0 to 10 inches. Dark gray (10YR 4/1) silt loam, very dark brown (10YR 2/2) moist; weak medium and fine granular structure; hard; friable; slightly sticky and moderately plastic; common wormcasts; common white sand grains; abundant roots; pH 6.0; clear wavy boundary having an amplitude of 2 to 3 inches.

B1 17728 10 to 17 inches. Dark grayish brown (10YR 4/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; common faint fine brownish mottles; moderate medium and fine subangular blocky structure; thin, indistinct, continuous clay films (crushed color, 10YR 4/2 moist); very hard; firm; plastic; common white very fine sand grains; common fine pores; pH 5.5; gradual smooth boundary.

B21t 17729 17 to 28 inches. Grayish brown (2.5Y 5/2) silty clay loam; dark grayish brown (2.5Y 4/2) moist; many medium distinct mottles of reddish brown and brown; moderate medium blocky structure; thin distinct continuous clay films; common fine pores, some partially closed; extremely hard; very firm; clean, whitish, fine sand grain common on ped surfaces; pH 5.5; gradual smooth boundary.

B22t 17730 28 to 39 inches. Much mottled pale olive, yellowish brown, and reddish brown silty clay loam; moderate medium structure; less strong than above; clay films are thin, distinct, and continuous; extremely hard; very firm; pH 5.5; diffuse boundary.

B23t 17731 39 to 56 inches. Light brownish gray (2.5Y 6/2) silty clay loam, light olive brown (2.5Y 5/4) moist; common distinct medium mottles of olive yellow and yellowish brown or pale yellow; moderate medium and fine blocky structure; thin distinct continuous clay films; extremely hard; very firm; few fine Fe-Mn concretions; pH 5.5; gradual smooth boundary.

B24t 17732 56 to 66 inches. Pale yellow (2.5Y 7/3) silty clay on the boundary of silty clay loam, light olive brown (2.5Y 5/3) moist; common fine faint yellow and pale yellow mottles; moderate medium and fine blocky structure; shiny ped faces; extremely hard; very firm; common nearly black Fe-Mn concretions; clear smooth boundary.

C1 17733 66 to 75 inches. Silty clay loam having same color as above; medium distinct mottles of same color; estimated about 5 percent calcium carbonate as hard concretions and soft masses; about 3 percent Fe-Mn as pellets and soft masses; extremely hard; very firm; soil mass noncalcareous; clear smooth boundary.

C2ca 17734 75 to 93 inches. Light gray (10YR 7/2) silty clay, light brownish gray (10YR 6/2) moist; many medium, distinct yellowish brown mottles; strong fine and medium blocky structure having shiny faces; extremely hard; very firm; calcareous; clear smooth boundary.

C3 17735 93 to 153 inches. Mottled olive yellow and pale yellow weakly cemented clay; partings are apparent in augered material (sample taken from 99- to 123-inch depth).

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

A1 - light clay loam
B1 - clay loam
B21t - light clay
B22t - light clay
B23t - light clay
B24t - light clay
C1 - light clay
C2ca - light clay
C3 - sandy loam or sandy shale

Mineralogy data (Methods 7A1a through 7A1d and 7A2a)

Depth Inches	Sand 2-0.05 mm	Silt 0.05-0.002 mm	Coarse clay 0.002-0.0002 mm	Fine clay < 0.0002 mm
0-10	QZ1	QZ1 FD3	MT2 MI2 KK2 QZ2 FD3	MT1
10-17	QZ1	QZ1 FD3	MT2 MI2 KK2 QZ2 FD3	MT1
17-28	QZ1 FD3	QZ1 FD3	MI2 MT2 KK2 QZ2 FD3	MT1
28-39	QZ1	QZ1 FD3	MI2 MT2 KK2 QZ3 FD3	MT1
39-56	QZ1 FD3	QZ1 MI2 KK3 FD3	MI2 MT2 KK2 QZ3 FD3	MT1
56-66	QZ1 FD3	QZ1 MI2 KK3 FD3	MI2 MT2 KK2 QZ2 FD3	MT1
66-75	QZ1 FD3	QZ1 MI2 KK3 FD3	MT2 MI2 KK2 QZ3 FD3	MT1
75-93	QZ1 FD3	QZ1 MI2 VR2 VM3 KK3 FD3	MT2 MI2 KK2 QZ3 FD3	MT1
93-123		QZ1 MI2 VR3 KK3 FD3	MT2 MI2 KK2 QZ3 FD3	MT1

Relative abundance: 1 = > 40 percent, 2 = 10-40 percent, 3 = < 10 percent.
Mineral code: FD = feldspar, MI = mica or illite, KK = kaolinite, MT = montmorillonite, QZ = quartz, VR = vermiculite, VM = vermiculite-illite or illite-vermiculite interstratified.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Aquic Argiudoll; fine, mixed, thermic

SOIL Bonham silt loam **SOIL Nos.** S62TX-74-2 **LOCATION** Fannin County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska **LAB. Nos.** 17736-17745 May 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

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)		3A1a Non-carbonate <0.002	Coarse fragments 2A2: 3B1 ≥ 2	2 – 19	19 – 76
		Pct. of < 2 mm													Pct.	Pct.	Pct. of < 76 mm	
0-10	Ap	14.3	63.2	22.5	0.1	0.3	0.5	2.2	11.2	44.1	19.1	56.8	3.1		23	-		
10-18	B1	13.3	55.6	31.1	0.1	0.2	0.5	2.1	10.4	37.6	18.0	49.4	2.9		31	-		
18-32	B21t	11.4	51.7	36.9	0.1	0.2	0.4	1.7	9.0	35.0	16.7	45.2	2.4		37	-		
32-44	B22t	12.4	53.1	34.5	0.2	0.2	0.5	1.5	10.0	34.6	18.5	45.6	2.4		35	-		
44-59	B23t	12.3	55.0	32.7	0.2	0.4	0.3	1.6	9.8	37.2	17.8	48.1	2.5		33	tr		
59-79	B24t	13.2	55.8	31.0	0.1	0.4	0.4	1.7	10.6	38.2	17.6	50.0	2.6		31	tr		
79-99	C1	11.5	56.0	32.5	tr	0.2	0.3	1.4	9.6	37.1	18.9	47.7	1.9		33	tr		
99-112	C2	11.1	54.5	34.4	tr	0.1	0.3	1.6	9.1	35.7	18.8	45.9	2.0		34	tr		
112-127	C3ca	12.9	54.5	32.6	0.8	0.8	0.8	3.6	6.9	22.3	32.2	31.7	6.0		31	tr		
127-145	C4	23.1	41.7	35.2	2.0	3.2	3.2	8.4	6.3	13.4	28.3	25.1	16.8		27	tr		

Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N		Carbonate as $CaCO_3$: 6E1b 6E2a < 2mm	3A1a <0.002 mm	Bulk density: g/cc	g/cc	g/cc		Water content: Pct.	Pct.	4B2 15-Bar Pct.		6G1b KCl-Ext. Al	pH: 8C1b Sat. Paste	8C1a 1:1	8C1a 1:10
	Pct.	Pct.			Pct.	Pct.									me/100g			
0-10	1.40	0.103	14										10.5		tr		6.1	
10-18	1.07	0.079	14										13.9		0.1		5.2	
18-32	0.56	0.044	13										15.9		0.6		5.0	
32-44	0.30												14.8		0.4		5.1	
44-59	0.18												14.1		0.1	4.7	5.2	5.2
59-79	0.12												14.3		tr	5.4	5.5	5.6
79-99	0.09				tr(s)								15.3			6.6	6.8	7.1
99-112	0.04				tr(s)								16.3			7.2	7.3	7.8
112-127	0.02				32	2							13.7			7.7	7.8	7.8
127-145	0.02				54	8							13.2			7.8	8.0	8.0

Depth (in.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum	6H1a Ext. Acidity	Cat. Exch. Cap. 5A1a NH_4OAc	Water extract from saturated paste 8A1: Ca	Mg	6P1a Na	6Q1a K	CO_3	HCO_3	Cl	SO_4	8A1a Electrical conductivity
	meq/100 g							meq/liter								mmho/cm
0-10	17.3	2.7	0.1	0.2	20.3	4.7	20.2									
10-18	16.7	3.3	0.1	0.4	20.5	8.8	22.6									
18-32	18.1	3.3	0.1	0.4	21.9	8.1	23.5									
32-44	18.0	3.0	0.2	0.5	21.7	6.4	21.9									
44-59	19.0	3.0	0.2	0.5	22.7	4.5	22.2			0.7	0.1					0.25
59-79	20.2	3.1	0.3	0.5	24.1	3.5	22.6			1.0	tr					0.32
79-99	24.1	2.9	0.4	0.6	28.0	1.9	25.3			1.2	tr					0.39
99-112	23.5b	2.6c	0.4	0.6	27.1	1.4	26.4			1.3	0.1					0.50
112-127	22.7b	2.0c	0.3	0.5	25.5		22.4			1.0	tr					0.41
127-145	19.3b	1.7c	0.3	0.5	21.8		18.9			1.1	0.1					0.39

Depth (in.)	8A Water at Saturation Pct.	5D2 Exchangeable Na Pct.	5C1 Base Sat. NH_4OAc CEC Pct.	Gypsum Pct.	Ratios to clay 8D4: NH_4OAc CEC		15-Bar Water
0-10			100		0.88		0.46
10-18			91		0.73		0.45
18-32			93		0.64		0.43
32-44			99		0.63		0.42
44-59	52.4	< 1	102		0.67		0.43
59-79	55.2	< 1	107		0.73		0.46
79-99	57.7	< 1			0.77		0.46
99-112	64.4	< 1			0.78		0.48
112-127	53.4	< 1			0.72		0.44
127-145	49.1	< 1			0.70		0.49

a. Fe-Mn nodules comprise more than 50 percent of the very coarse and coarse sand above 112 inches. Below 112 inches carbonate comprises 30 to 40 percent of the sand.
b. KCl-TEA extraction (Method 6N4b).
c. KCl-TEA extraction (Method 6O4b).

Soil classification: Aquic Argiudoll; fine, mixed, thermic.
Soil: Bonham silt loam.
Soil Nos.: S62TX-74-2; 17736-17745.
Location: Sam Raeburn farm about 1 mile west of Bonham on U.S. Highway 82 in an alfalfa field east of farm buildings.
Area: Fannin County, Texas.
Cover: Alfalfa meadow.
Parent material: Seemingly alluvium of an old outwash plain.
Topography: Nearly level, plane surface having less than 1 percent gradient on a broad nearly level alluvial plain containing several hundred acres of this soil.
Moisture when sampled: About 80 percent field capacity in upper 4 horizons and becoming considerably drier below.
Sampled by: J. A. DeMent and R. L. Juve, September 10, 1962.
Described by: M. Stout and H. Oakes.

Ap 17736 0 to 10 inches. Very dark gray (10YR 3/1) silt loam, black (10YR 2/1) moist; weak medium and fine granular structure; hard; friable; slightly sticky and nonplastic; common wormcasts; abundant roots; pH 6.5; clear smooth lower boundary.

B1 17737 10 to 18 inches. Very dark grayish brown (10YR 3/2) silty clay loam, very dark brown (10YR 2/2) moist; very faint common fine brownish mottles; moderate to medium and fine subangular blocky structure; peds have shiny surfaces coated with common very fine white sand (crushed color moist, 10YR 3/2); very hard; firm; common fine pores; pH 5.5; gradual smooth lower boundary.

B21t 17738 18 to 32 inches. Dark gray (10YR 4/1) heavy silty clay loam, very dark gray (10YR 3/1) moist; about 20 percent distinct common medium reddish brown and grayish mottles; moderate medium and fine blocky structure; thin distinct continuous clay films; common fine pores; very fine whitish sand grains are common on ped surfaces; extremely hard; very firm; pH 5.5; gradual smooth lower boundary.

B22t 17739 32 to 44 inches. Gray (2.5Y 6/1) heavy silty clay loam, dark gray (2.5Y 5/1) moist; mottled with pale yellow, yellowish and reddish browns; moderate medium and fine blocky structure; thin distinct continuous clay films; common very fine pores; extremely hard; very firm; pH 5.5; diffuse lower boundary.

B23t 17740 44 to 59 inches. Gray (2.5Y 6/1) silty clay loam, a darker gray (2.5Y 5/1) moist; common distinct medium mottles of yellowish brown and pale yellow; strong medium blocky structure; thin distinct continuous clay films; few fine rounded Fe-Mn concretions; extremely hard; very firm; pH 5.5; clear lower boundary.

B24t 17741 59 to 79 inches. Light gray (2.5Y 7/2) silty clay loam, light brownish gray (2.5Y 6/2) moist; common medium mottles of yellow and yellowish brown; moderate medium and coarse blocky structure; thin distinct continuous clay films; many medium brownish and black Fe-Mn concretions and soft masses; diffuse lower boundary.

C1 17742 79 to 99 inches. Horizon augered; color and texture same as above; structure not determined; apparent increase in Fe-Mn concretionary material, becoming softer with depth. Split for sampling purposes.

C2 17743 99 to 112 inches. Same as above as determined from augered material. The 59- to 112-inch depth considered as same horizon in respect to color and texture - split into 3 horizons for sampling purposes.

C3ca 17744 112 to 127 inches. Same as above with same color and slightly less clayey texture; about 25 to 30 percent $CaCO_3$ visible as soft masses and hard concretions; few to common soft masses Fe-Mn; gradual boundary, suspect variations in both upper and lower boundaries (augered).

C4 17745 127 to 145 inches. Coarsely mottled yellow and light gray clay loam; few calcium and Fe-Mn concretions, augered.

C5 145 to 175 inches. Same as above; no partings observed but less altered than above; heavy silty clay loam, having an occasional whitish calcium concretion. Augered.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

Ap - light clay loam
B1 - clay loam
B21t - light clay
B22t - light clay
B23t - light clay
B24t - light clay
C1 - light clay
C2 - light clay
C3ca - slightly less clayey texture than Ca
C4 - light clay or sandy clay

SOIL CLASSIFICATION- TYPIC ARGIUSTOLL
MONTMORILLONITIC, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SERIES - - - - - - -SERIES NOT DESIGNATED

SOIL NO - - - - - - S62TX-21-90 COUNTY - - - BRAZOS

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K1243-1249

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1								PARTICLE SIZE ANALYSIS (A)			ETHYLENE GLYCOL RETAINED			BULK DEN
		SAND	SILT	CLAY	SAND					SAND	SILT	CLAY	CRSE CLAY	FINE CLAY	LT 2 MM	LT .002 MM	LT .0002 MM	4A3A
		2-.05	.05-.002	LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	2-.05	.05-.002	LT .002	.002-.0002	LT .0002				
IN		PCT LT 2MM								PCT LT 2MM			PCT LT .002		MG/G			G/CC
000-10	A	44.6	30.4	24.9									9	91				
010-16	B21T	35.1	27.8	37.2									33	67				
016-30	B22T	30.3	25.6	44.1	0.8	1.3	0.5	15.6	12.1				21	79				
030-44	B23T	32.7	27.5	39.8	2.7	2.1	0.7	15.0	12.4				24	76				
044-54	B24T	30.6	29.1	40.4	1.3	1.2	0.6	15.0	12.5				26	74				
054-70	C1	42.8	22.8	34.4	15.9	6.6	1.5	11.8	7.1				32	68				
070-90	C2CA	20.3	27.2	52.4	2.8	2.8	0.8	8.8	5.3				30	70				

DEPTH	ORGANIC MATTER 6A1A ORGN CARB	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	EXTRACTABLE BASES 5B1A- 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A1 LT 2 MM	LT .002 MM	LT .0002 MM	BASE RATIO SAT SC2	8D3 CA TO MG	CARB 6E1E	8C1A H2O	8C1C KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	MEQ / 100G								PCT		PCT			
000-10	1.60					13.2	3.9	0.2	0.2	17.5	24.1	69A	110A	73	3.4		5.9		
010-16	1.50					17.2	5.3	0.3	0.3	23.1	31.6	75A	106A	73	3.2		5.7		
016-30	0.80					16.7	5.2	0.2	0.4	22.5	29.4	75A	100A	77	3.2		5.8		
030-44	0.40					17.4	4.3	0.2	0.3	22.2	28.4	77A	104A	78	4.0		5.6		
044-54	0.30					18.5	4.2	0.3	0.3	23.3	29.2	76A	105A	80	4.4		5.7		
054-70	0.20					22.9	3.2	0.3	0.4	26.8	29.9	74A	107A	90	7.2		6.2		
070-90	0.20						4.4	0.4	0.5		43.3	74A	98A			13.0	7.7		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A1) S62TX-21-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-10	QZ1	QZ1	KK1 MI2 MT2 QZ2 FD3	MT1 KK3	
10-16	QZ1	QZ1 FD3	KK2 MI2 MT2 QZ3	MT1 KK3	
16-30	QZ1 FD3	QZ1 FD3	KK1 MI2 MT2 QZ2 FD3	MT1 KK3	
30-44	QZ1	QZ1 MI3 FD3	KK1 MI2 MT2 QZ3	MT1 KK3	
44-54	QZ1	QZ1 FD3	KK1 MT2 MI2 QZ3	MT1 KK3	
54-70	QZ1 FD3	QZ1 MI3 KK3	KK2 MT2 MI3 QZ3	MT1 KK3	
70-90	QZ1	QZ1 MI3 KK3 FD3	KK2 MT2 MI3 QZ3	MT1 KK3	

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Typic Argiustoll; montmorillonitic, thermic.
Soil: Series not designated.
Soil Nos.: S62TX-21-90; K1243-1249.
Location: Brazos County, Texas; 6.3 miles north of Bryan from intersection of Highways 21 and 6 on north side of Bryan; then 100 yards east on OSR (Old San Antonio Road). Sampling site is located on south side of road (OSR) about 25 yards from fence.
Cover: Grass (idle field).
Topography: Gradient approximately 1.5 percent.
Sampled by: Harvey Oakes, June 7, 1962.
Described by: Harvey Oakes.

A K1243 0 to 10 inches. Very dark grayish brown (10YR 3/2) loam; very dark brown (10YR 2/2 moist) moderate medium granular; crumbly; friable; few earthworm casts; pH 6.0; clear boundary.

B21t K1244 10 to 16 inches. Very dark grayish brown (10YR 3/2; 2/2 moist) clay loam with common medium and fine distinct mottles of brown; compound moderate medium subangular blocky and granular; crumbly and friable when slightly moist, plastic wet; mottling increases in lower part; clear boundary. pH 6.0.

B22t K1245 16 to 30 inches. Reddish brown (5YR 4/4; 3/4 moist) clay with many distinct fine mottles of olive over pale yellow comprising some 20 percent of mass; moderate medium blocky; firm, sticky and plastic wet; distinct clay films; few fine pores and root channels; pH 6.0; gradual boundary.

B23t K1246 30 to 44 inches. Mottled yellowish and olive clay loam; red mottles are coarse; moderate medium blocky; very firm, very sticky and plastic; pH 6.5; gradual boundary.

B24t K1247 44 to 54 inches. Olive (5Y 5/3) moist or dry clay mottled with 10 to 15 percent of firm and medium distinct red mottles; moderate medium blocky with distinct clay films; very firm; few ferromanganese lumps 5 mm in diameter; few quartzite; fine granular; pH 6.5; gradual boundary.

C1 K1248 54 to 70 inches. Light olive brown (2.5Y 5/4 moist) clay loam with 10 to 15 percent of gravel of ironstone and ferromanganese concretions and hard lumps of some particles of ironstone up to ½ inch. pH 7.0.

C2ca K1249 70 to 90 inches. Light olive brown (2.5Y 5/6 moist) clay mottles with some 10 percent of pale yellow with some 10 percent by volume of soft lumps of $CaCO_3$ and few ferromanganese concretions and particles of ironstone.

Remarks: 1. Pedon was sampled as Bonham but it is outside the range of the Bonham series in lacking mottles due to wetness. Also, this soil has an ustic moisture regime.

2. Textures above agree with laboratory data. Field textures where different are given below:

A - clay loam
B21t - light clay
B23t - clay
C1 - clay

SOIL CLASSIFICATION Pachic Argiustoll; fine-loamy, mixed, hyperthermic

SOIL Series not designated — LOCATION Jim Wells County, Texas

SOIL NOS. S56TX-125-1 — LAB. NOS. 5040-5047

SOIL SURVEY LABORATORY Lincoln, Nebraska — DATE April 3, 1958

GENERAL METHODS 1A, 1B1a, 2A1, 2B

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	0.02-0.00	2A2 > 2 (<19mm.)	TEXTURAL CLASS
0-5	Ap	0.2	0.5	2.3	32.8	19.5	19.1	25.6	56.1	8.2	-	scl
5-11	A12	-	0.5	2.0	29.8	18.0	18.9	30.8	52.4	8.0	-	scl
11-18	B1	-	0.6	1.9	29.5	17.6	18.1	32.3	53.6	5.7	-	scl
18-25	B21tca	0.2	0.4	1.7a	27.5a	17.4a	19.0	33.8	49.9	8.6	-	scl
25-33	B22tca	0.2	0.4	1.4	23.3	15.7	22.1	36.9	44.5	12.1	-	cl
33-38	B3ca	2.4	0.9	1.4	18.7	14.0	27.3	35.3	40.3	16.8	3	cl
38-47	C1ca	0.6	0.6	1.4	16.5	12.8	34.1	34.0	37.1	23.5	7	cl
47-59	C2ca	1.1	0.8	1.2	15.9	12.2	37.1	31.7	35.5	27.3	14	cl

pH 8C1a 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	8A2 EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC x 10³ MILLIMHOS PER CM 8A1a	6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
7.2	7.1	7.2	1.57	.108	14.5	<0.20	0.6	-				11.1
7.5	7.6	7.6	1.56	.120	13.0	<0.20	0.7	-				14.5
7.6	7.7	7.8	1.30	.096	13.5	<0.20	0.7	-				14.7
7.7	7.9	8.0	0.93	.074	12.6	<0.20	0.6	4				14.5
7.9	8.0	8.2	0.54			<0.20	0.6	14				13.6
7.9	8.0	8.2	0.49			<0.20	0.7	23				12.7
7.9	8.0	8.3	0.32			<0.20	0.6	33				11.3
7.9	8.1	8.3	0.18			<0.20	0.6	36				11.0

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P1a Na	5B1a 6Q1a K	5D2 EXCH. Na %	8A1 SATURATION EXTRACT SOLUBLE 6P2a Na	6Q2a K				8A MOISTURE AT SATURATION %
← milliequivalents per 100g. soil →							← milliequivalents per liter →					
23.2	20.1	2.7	1.6	0.1	1.8	-	0.4	0.7				43.7
27.4	27.1	1.2	0.8	0.1	1.4	-	0.4	0.4				56.3
26.7		1.8	-	0.1	1.1	-	0.4	0.2				57.4
24.1		2.2	-	0.1	0.8	-	0.4	0.1				57.9
20.7		1.9	-	0.1	0.7	-	0.4	0.1				60.1
17.5		2.2	-	0.1	0.7	-	0.5	0.1				55.5
14.5				0.1	0.6	1	0.5	0.1				53.3
12.8				0.1	0.6	1	0.4	0.2				52.7

a. Few $CaCO_3$ concr.

Soil classification: Pachic Argiustoll; fine-loamy, mixed, hyperthermic.
Soil: Series not designated.
Soil Nos.: 856TX-125-1; 5040-5047.
Location: South 1.6 miles of Orange Grove on Highway 359 and 100 yards east of road in field.
Area: Jim Wells County, Texas.
Cover: None; plowed field.
Moisture when sampled: Nearly dry through the B2 horizons and only slightly moist below.
Parent material: Very pale brown highly calcareous clayey earth of Pleistocene age (Lissie formation).
Topography: Very gently sloping with gradient of about 1 percent.
Landscape position: Nearly level to very gently undulating plain (interior margin of a broad coastal terrace).
Collected by: J. S. Allen, J. R. Coover, R. E. Daniell, H. C. Dean, G. Darby, G. E. Franki, and H. Oakes.
Described by: H. Oakes, November 8, 1956.

Ap 5040 0 to 5 inches. Very dark gray (10YR 3/1, 2/1 moist) sandy clay loam; weak granular; crumbly and friable; hard when dry; very thin light gray weak platy crust on surface when dry; pH 7.5 by field test.

A12 5041 5 to 11 inches. Very dark gray (10YR 3/1, 2/1) sandy clay loam; compound weak subangular blocky and moderate fine granular; crumbly and friable moist; moderately sticky and plastic wet; few fine pores; noncalcareous but pH 8.0 by field test; clear boundary.

B1 5042 11 to 18 inches. Very dark gray (10YR 3/1 dry) sandy clay loam; color of crushed peds is 10YR 2/1.5, moist; compound moderate fine subangular blocky and weak granular; friable moist; when dry the soil is easily crumbled to a mass of very hard fine peds; many fine and few very fine pores; thin patchy clay skins on the larger peds; noncalcareous but pH 8.0 by field test; clear boundary.

B21tca 5043 18 to 25 inches. Dark grayish brown (10YR 4/2, 3/2) sandy clay loam apparently more clayey than above; moderate fine and medium prismatic and moderate medium blocky; distinct patchy (not continuous) clay skins on both horizontal and vertical faces of peds; many fine pores; moderately friable; very hard dry; slightly calcareous; contains an estimated 3 percent by volume of brown spots that appear to be the remains of insect casts; clear boundary.

B22tca 5044 25 to 33 inches. Grayish brown (10YR 5/2.5, 4/2.5) clay loam; structure and consistence similar to above but clay skins more distinct; many fine pores; slightly calcareous with few soft lumps and hard concretions of $CaCO_3$ up to 4 mm in diameter; clear boundary.

B3ca 5045 33 to 38 inches. Grayish brown (10YR 5/2, 4/2) clay loam; structure similar to but weaker than that of the B21t; moderately friable; calcareous; contains an estimated 5 percent by volume of soft lumps and hard concretions of $CaCO_3$; many nests of wormcasts ranging up to 5 mm in diameter; grades shortly to horizon below.

C1ca 5046 38 to 47 inches. Mottled gray (10YR 5/1 dry) and grayish brown (10YR 5/2 dry) highly calcareous clay loam containing an estimated 30 percent or more by volume of soft lumps of $CaCO_3$ ranging up to 1 inch in diameter; friable; very hard dry; many nests of wormcasts.

C2ca 5047 47 to 59 inches. Very pale brown (10YR 8/3, 7/3) fine earth of clay loam that appears to be mainly soft $CaCO_3$ and containing some 30 percent by volume of small nests of grayish brown wormcasts of fine sandy clay.

Remarks: This pedon was sampled as Clareville, and it appears as Clareville in the soil survey for Nueces County, Texas, issued June 1965. The pedon description is on page 58; some of the data are given on pages 56 and 57.

When sampled nearly dry through the B2t horizons and only slightly moist below.

Textures above agree with laboratory data. Field textures where different are given below:

Ap - clay loam
A12 - clay loam
B1 - fine sandy clay
B21tca - fine sandy clay
B22tca - fine sandy clay
B3ca - fine sandy clay
C1ca - fine sandy clay

SOIL CLASSIFICATION Pachic Argiustoll; fine-loamy, mixed, hyperthermic

SOIL Series not designated LOCATION Nueces County, Texas

SOIL NOS. S56TX-178-2 LAB. NOS. 5025-5031

SOIL SURVEY LABORATORY Lincoln, Nebraska DATE April 3, 1958

GENERAL METHODS 1A, 1B1a, 2A1, 2B

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	TEXTURAL CLASS
0-7	Ap	0.4	5.5	11.7	36.0	15.9	13.9	16.6	45.1	5.1	-	fsl
7-14	A12	0.6	4.8	10.3	33.3	15.6	14.3	21.1	43.7	5.4	-	scl
14-20	B1	1.4	4.4	8.5	30.8	15.8	14.4	24.7	43.0	5.4	Tr.	scl
20-32	B2t	2.1	4.6	7.4	25.8	13.7	16.6	29.8	38.0	7.4	Tr.	scl
32-41	Bca	1.2	3.3	5.9	18.6	12.1	26.2	32.7	33.3	17.0	-	cl
41-52	C1ca	0.9	2.8	5.7	18.4	10.8	34.4	27.0	31.0	26.4	-	cl/l
52-63	C2ca	0.6	3.0	7.0	20.9	12.3	30.6	25.6	35.6	21.0	-	l

pH 1:1	pH 1:5	8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	8A2 EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM. 8A1a	6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
7.6	7.7	7.8	1.09	.091	12.0	<0.20	1.0	-				7.9
7.2	7.2	7.3	0.93	.080	11.6	<0.20	1.2	-				10.6
7.7	7.6	7.7	0.74	.064	11.6	<0.20	0.9	-				11.8
7.9	8.0	8.3	0.41	.037	11.1	<0.20	0.9	3				12.2
8.0	8.2	8.4	0.27			<0.20	0.9	22				11.3
8.1	8.3	8.7	0.19			<0.20	0.9	27				10.0
8.1	8.5	8.7	0.08			<0.20	0.9	19				10.6

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P1a Na	5B1a 6Q1a K	5D2 EXCH. Na %	8A1 SATURATION EXTRACT SOLUBLE 6P2a Na	6Q2a K	8A MOISTURE AT SATURATION %
← milliequivalents per 100g. soil →							← milliequivalents per liter →		
16.7	16.2	2.6	0.8	0.2	0.6	1	0.8	0.4	39.2
21.2	18.6	1.8	0.8	0.1	0.5	-	1.2	0.2	43.5
22.7	22.0	3.8	0.8	0.2	0.5	1	1.1	0.1	49.6
23.5		4.2	-	0.2	0.5	-	1.4	0.1	54.2
19.4				0.3	0.4	1	1.8	0.1	50.6
16.8				0.4	0.4	2	2.4	0.1	48.3
17.9				0.5	0.5	2	3.0	0.1	50.3

Soil classification: Pachic Argiustoll; fine-loamy, mixed, hyperthermic.
Soil: Series not designated.
Soil Nos.: S56TX-178-2; 5025-5031.
Location: East 4.2 miles of Orange Grove on FM Road 624; thence south 0.25 mile on FM Road 70; east side of road.
Area: Nueces County, Texas.
Cover: None; plowed after preceding crop.
Parent material: Pale brown highly calcareous fine sandy clay of Pliocene or Pleistocene age (Lissie formation).
Topography: Nearly level; gradient less than 1 percent.
Landscape position: Near level to very gently undulating plain (coastal terrace) near the interior margin of the Coastal Prairie.
Moisture when sampled: Dry through the B2 horizons and only slightly moist below.
Collected by: J. S. Allen, J. R. Coover, R. E. Daniell, H. C. Dean, G. Darby, G. E. Franki, and H. Oakes.
Described by: H. Oakes, November 8, 1956.

Ap 5025 0 to 7 inches. Very dark gray (10YR 3/1.5, 2/1.5 moist) fine sandy loam; weak granular; friable; thin gray weak surface crust when dry; very hard; pH 8.0 but noncalcareous by field test; clear boundary.

A12 5026 7 to 14 inches. Very dark gray (10YR 3/1.5 dry) sandy clay loam; more clayey than above; compound weak subangular blocky and granular; friable; very hard dry; plastic and slightly sticky wet; pH 7.3 by field test; clear smooth boundary.

B1 5027 14 to 20 inches. Very dark gray (10YR 3/1, 2/1 moist) sandy clay loam; compound weak subangular blocky and moderate fine granular; crumbly and friable moist; very hard dry; few large pores and cavities; noncalcareous but pH 8.0 by field test; contains an occasional small rounded gravel of quartzite; gradual boundary.

B2t 5028 20 to 32 inches. Grayish brown (10YR 5/2, 4/2 moist) sandy clay loam; compound strong medium prismatic and blocky; the prisms are readily separated to distinct cuboidal blocks; nearly continuous clay skins on vertical and horizontal surfaces of peds are 10YR 4/2 dry; very few fine pores; firm; extremely hard dry; slightly calcareous; contains an occasional small rounded gravel or quartzite; gradual boundary.

Bca 5029 32 to 41 inches. Grayish brown (10YR 5/2 dry) clay loam with similar structure and consistence as above; highly calcareous; contains an estimated 10 percent by volume of soft and hard lumps of $CaCO_3$ up to 10 mm in diameter; few plant roots; gradual boundary.

C1ca 5030 41 to 52 inches. Pale brown (10YR 6/3, 5/3 moist) loam or clay loam containing an estimated 30 percent by volume of soft lumps of $CaCO_3$ up to 1-1/2 inches in diameter; friable moist; extremely hard dry; highly calcareous; few plant roots; diffuse boundary.

C2ca 5031 52 to 63 inches. Pale brown (10YR 6/3 dry) loam similar to above and apparently moderately permeable; few plant roots also.

Remarks: This pedon was sampled as Clareville, and the site was mapped Clareville in the soil survey for Nueces County, Texas, issued June 1965. The Clareville series is a member of the fine, mixed, hyperthermic family of Pachic Argiustolls.

Textures above agree with laboratory data. Field textures where different are given below:

Ap - clay loam
A12 - clay loam
B1 - sandy clay
B2t - fine sandy clay
Bca - fine sandy clay
C1ca - light fine sandy clay (or clay loam
C2ca - fine sandy clay (or clay loam)

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Udic Argiustoll; fine, mixed, thermic

SOIL Series not designated SOIL Nos. S63TX-169-1 LOCATION Montague County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 18224-18228 March 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (In.)	Horizon	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 2A2: 3B1 ≥ 2 Pct.	2 – 19 Pct. of < 76mm	19 – 76 Pct. of < 76mm
		Pct. of < 2 mm														
0-4	Ap	24.8	56.7	18.5	tr	0.3	1.1	5.7	17.7	38.5	18.2	50.1	7.1	-		
4-10	A1	22.6	52.2	25.2	0.1	0.2	1.0	5.3	16.0	35.8	16.4	55.4	6.6	-		
10-17	B21t	17.9	42.7	39.4	tr	0.2	0.8	4.3	12.6	28.0	14.7	43.5	5.3	-		
17-27	B22t	14.6	34.5	50.9	-	0.2	0.7	3.6	10.1	21.0	13.5	33.5	4.5	tr		
27-30	B23t	13.7	31.7	54.6	0.1	0.2	0.7	3.4	9.3	19.6	12.1	31.1	4.4	tr		

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	Carbonate as $CaCO_3$ Pct.	6C2a Ext. Iron as Fe Pct.	Bulk density: 4A1a Field-State g/cc	4A1d 1/3-Bar g/cc	4A1b Air-Dry g/cc	4D1 COLE	Water content: 4B4 Field-State Pct.	4B1c 1/3-Bar Pct.	4B2 15-Bar Pct.	4C1 1/3-to 15-Bar in./in.	pH 8C1a 1:1
0-4	1.87	0.172	11		0.7	1.37	1.33	1.40	0.017	13.0	21.3	6.7	0.19	6.4
4-10	1.26	0.117	11		0.9	1.43	1.38	1.52	0.032	17.7	19.6	9.4	0.14	6.0
10-17	1.32	0.109	12		1.4	1.45	1.38	1.70	0.073	24.1	26.8	14.1	0.18	6.0
17-27	1.09	0.087	13		2.1	1.46	1.38	1.77	0.087	25.3	28.7	18.9	0.14	6.0
27-30	1.11	0.097	11		2.1							20.9		6.4

Depth (In.)	Extractable bases 5B1a — 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum	6H1a Ext. Acidity	Cat. Exch. Cap.: 5A3a Sum Cations	5A1a NH_4OAc	8D3 Ca/Mg	Base saturation: 5C3 Sum Cations Pct.	5C1 NH_4OAc Pct.
	meq/100 g										
0-4	10.3	1.7	tr	0.7	12.7	5.4	18.1	13.5	6.1	70	94
4-10	11.8	1.9	tr	0.4	14.1	6.1	20.2	14.9	6.2	70	95
10-17	17.9	2.4	0.1	0.5	20.9	8.1	29.0	21.7	7.5	72	96
17-27	24.5	2.6	0.1	0.7	27.9	9.6	37.5	27.8	9.4	74	100
27-30	28.3	2.3	0.1	0.7	31.4	9.1	40.5	30.2	12	78	104

Depth (In.)	Ratios to Clay 8D1: NH_4OAc CEC	Ext. Iron	15-Bar Water
0-4	0.73	0.04	0.36
4-10	0.59	0.04	0.37
10-17	0.55	0.04	0.36
17-27	0.55	0.04	0.37
27-30	0.55	0.04	0.38

Soil classification: Udic Argiustoll; fine, mixed, thermic.
Soil: Series not designated.
Soil Nos.: S63TX-169-1; 18224-18228.
Location: Montague County, Texas. About 2 miles south of west from Saint Jo, which is near the east county line of Montague County; in pasture, 0.4 mile south of Texas Highway 59 from a point that is 2 miles west-southwest of its intersection with U.S. Highway 82.
Vegetation and use: Old cropland field, now in pasture.
Topography: Gently undulating landscape having broad smooth divides and side slopes of about 2 percent and indistinct drainageways. One percent gradient at pedon site.
Drainage and permeability: Well drained, runoff is slow to moderate. Permeability is slow.
Parent material: Of questionable origin. It is thought not to be derived of the underlying limestone, but could be a mantle or residuum of interbedded shale or clay.
Sampled by and date: J. DeMent, W. R. Elder, R. B. Grossman, H. Oakes, M. Stout, and W. Walters, April 15, 1963.
Described by: M. Stout.

Ap 18224 0 to 4 inches. Dark brown (7.5YR 4/2) silt loam, very dark brown (7.5YR 2/2) moist; weak fine subangular and granular structure; hard; friable; crushed, dark brown (7.5YR 3/2) dry; few fine and coarse ironstone fragments on and in surface, some smooth and worn; pH 6.5; noncalcareous; abrupt lower boundary.

A1 18225 4 to 10 inches. Dark reddish gray (5YR 4/2) silt loam; dark reddish brown (5YR 3/2) moist; moderate to strong fine subangular blocky structure; when crushed, reddish brown (5YR 4/3); hard; friable; pH 6.5; noncalcareous; few fine ironstone gravel and some coarse fragments; clear mostly smooth lower boundary, ± 3 inches in pit area.

B21t 18226 10 to 17 inches. Reddish brown (5YR 4/4) heavy silty clay loam; dark reddish brown (5YR 3/4) moist; strong fine and medium angular blocky structure; some clay films on some peds; very hard, very firm; pH 6.5; noncalcareous; few fine and medium angular ironstone and quartz pebbles; clear slightly wavy lower boundary.

B22t 18227 17 to 27 inches. Reddish brown (5YR 4/4) light clay; yellowish red (5YR 3/5) moist; strong fine and medium angular blocky structure; very shiny ped surfaces; pressure faces; extremely hard; very firm; pH 6.5; noncalcareous; clear wavy lower boundary.

B23t 18228 27 to 30 inches. Dark reddish brown (5YR 3/3) clay; dark reddish brown (5YR 3/3) moist; strong fine and medium angular blocky structure; very shiny ped surfaces; pressure faces; extremely hard; very firm; pH 6.3; noncalcareous; abrupt irregular boundary over limestone; very sharp contact. The boundary between the B23t and the R is irregular in respect to tonguing of clay into the R - it is wavy in respect to pockets of clay into the rock - or waviness of the rock surface. The clay is mottled, prismatic, and has organic staining on the ped surfaces.

R 30 to 36 inches. Nearly white smooth limestone plates have about 20 percent clay between plates and in cracks; the contact between rock and clay sharp; rock plates become mostly continuous; shiny ped surfaces; pH 7.0; noncalcareous.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Typic Calciustoll; fine-loamy, mixed, thermic

SOIL Venus clay loam SOIL Nos. S63TX-14-1 LOCATION Bell County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 18197-18206 March 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (In.)	Horizon	Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05) b	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 <0.002	Coarse fragments 2A2: 3B1 >2 Wt. Pct.	3B2 >2 Vol. Pct.
		Pct. of < 2 mm														
0-4	Ap	36.0	34.9	29.1	0.7	1.2	3.0	15.1	16.0	19.2	15.7	44.9	20.0	26	tr	
4-12	A1	33.8	34.4	31.8	0.4	1.1	2.8	14.6	14.9	17.2	17.2	41.5	18.9	26	tr	
12-18	B21ca	30.1	35.5	34.4	0.7	0.9	2.5	12.6	13.4	15.4	20.1	36.8	16.7	27	tr	
18-29	B22ca	25.2	39.5	35.3	0.7	1.1	2.3	10.2	10.9	13.8	25.7	31.2	14.3	28	tr	
29-36	B23ca	25.5	41.6	32.9	0.5	1.2	2.4	11.1	10.3	13.8	27.8	31.1	15.2	26	3	2
36-50	B24ca	26.7	43.5	29.8	1.5	1.4	2.5	11.8	9.5	13.4	30.1	30.2	17.2	24	7	4
50-66	C1ca	29.0	42.0	29.0	0.3	0.9	2.9	14.9	10.0	12.0	30.0	30.6	19.0	25	2	1
66-72	C2ca	32.4	40.7	26.9	0.7	1.7	3.6	16.1	10.3	13.7	27.0	33.4	22.1	22	1	
72-84	C3ca	38.1	35.3	26.6	0.5	1.4	4.6	20.6	11.0	12.3	23.0	34.5	27.1	22	3	2
a		36.2	36.4	27.4	tr	0.9	3.1	15.8	16.4	21.9	14.5	48.6	19.8	23		

Depth (In.)	6A1a Organic carbon c	6B1a Nitrogen	C/N	Carbonate as $CaCO_3$: 6E1b <2mm	Carbonate as $CaCO_3$: 3A1a <0.002 mm	6C2a Ext. Iron as Fe	Bulk density: 4A1a Field-State	Bulk density: 4A1d 1/3-Bar	Bulk density: 4A1b Air-Dry	4D1 COLE	Water content: 4B4 Field-State	Water content: 4B1c 1/3-Bar	Water content: 4B2 15-Bar	Water content: 4C1 1/3-to 15-Bar	pH 8C1a 1:1
	Pct.	Pct.		Pct.	Pct.	Pct.	g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	In./in.	
0-4	1.63	0.144	11	26	3	0.2	1.52	1.42	1.62	0.044	13.8	21.8	11.2	0.15	7.8
4-12	1.19	0.105	11	29	6	0.2	1.53	1.45	1.67	0.047	16.2	21.0	11.8	0.13	7.9
12-18	0.90	0.072	13	34	7	0.3		1.5 d					11.2		7.9
18-29	0.59	0.050	12	37	7	0.3	1.62	1.54	1.76	0.044	16.2	19.6	11.5	0.12	8.0
29-36	0.35			39	7	0.2		1.6 d					10.4		8.0
36-50	0.23			40	6	0.2	1.74	1.64e	1.82	0.035	13.2	16.8	10.1	0.11	7.9
50-66	0.11			38	4	0.2		1.6 d					10.1		8.0
66-72	0.05			43	5	0.3	1.70	1.64	1.72	0.017	13.0	16.0	9.0	0.11	8.0
72-84	0.05			34	5	0.3							9.3		8.0
a	2.67	0.181	15	16	4								10.5		7.8

Depth (In.)	Extractable bases 5B1a: 6N4b Ca	6O4b Mg	6P2a Na	6Q2a K	Sum	Ext. Acidity	Cat. Exch. Cap.: Sum Cations	5A1a NH_4OAc	Base saturation: Pct.	Pct.
	meq/100 g									
0-4	20.1	0.7	tr	1.0	21.8			19.9		
4-12	21.2	0.6	tr	0.7	22.5			20.2		
12-18	21.5	0.4	tr	0.6	22.5			19.2		
18-29	20.0	0.4	tr	0.5	20.9			18.0		
29-36	18.1	0.4	tr	0.5	19.0			15.9		
36-50	16.0	0.4	tr	0.5	16.9			14.0		
50-66	15.6	0.2	0.1	0.5	16.4			13.3		
66-72	13.6	0.4	tr	0.4	14.4			11.4		
72-84	14.4	0.4	0.1	0.5	15.4			12.4		
a										

Depth (In.)	Ratios to Clay 8D2: NH_4OAc CEC	Ext. Iron	15-Bar Water
0-4	0.77	0.01	0.43
4-12	0.78	0.01	0.45
12-18	0.71	0.01	0.41
18-29	0.64	0.01	0.41
29-36	0.61	0.01	0.40
36-50	0.58	0.01	0.42
50-66	0.53	0.01	0.40
66-72	0.52	0.01	0.41
72-84	0.56	0.01	0.42
a			0.46

a. Earthworm casts on surface.
b. Carbonate comprises 10 to 20 percent of the sand.
c. 13 kg/m^2 to 60 inches (Method 6A).
d. Estimated.
e. 1.57 g/cc when calculated to include volume but not weight of greater than 2 mm material (Method 3B2).

Soil classification: Typic Calciustoll; fine-loamy, mixed, thermic.
Soil: Venus clay loam.
Soil Nos.: S63TX-14-1; 18197-18206.
Location: Bell County, Texas. About 3-1/2 miles south of new Scott and White Hospital, Temple; 1.5 miles southwest of Taylor's Valley Church, 3/4 mile south and 3/4 mile west; south of road in pasture.
Vegetation and use: Old cropland now in pasture.
Topography: The landscape is comprised of nearly level broad alluvial terraces having erosional surfaces along streams and drainageways. Site is on erosional surface having convex surface and about 3 percent gradient.
Drainage and permeability: Well drained. Runoff is medium. Moderately permeable.
Parent material: Pleistocene loamy alluvium, calcareous.
Sampled by and date: J. DeMent, W. R. Elder, M. Stout, and R. B. Grossman, April 17, 1963.
Described by: M. Stout and W. R. Elder.

Ap 18197 0 to 4 inches. Dark grayish brown (10YR 4/2) clay loam; very dark grayish brown (10YR 3/2) moist; weak fine granular and subangular blocky structure; hard; firm; abundant wormcasts in and on horizon surface; few shell fragments and fine $CaCO_3$ concretions and gravel; calcareous; pH 8.3; abrupt lower boundary.

A1 18198 4 to 12 inches. Dark grayish brown (10YR 4/2) clay loam; very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure with granular peds from abundant wormcasts; hard; firm but very crumbly; about 5 percent $CaCO_3$ concretions and shell fragments; filled worm channels common; calcareous; pH 8.3; gradual smooth lower boundary.

B21ca 18199 12 to 18 inches. Brown (10YR 5/3) clay loam; dark brown (10YR 4/3) moist; moderate to strong medium and fine subangular blocky structure; hard; firm but very crumbly; few to common fine $CaCO_3$ concretions and shells; common wormcasts; few quartz pebbles; calcareous; pH 8.3; gradual lower boundary.

B22ca 18200 18 to 29 inches. Light brown (7.5YR 6/4) clay loam; brown (7.5YR 5/4) moist; strong very fine and fine subangular blocky structure with seemingly continuous films on ped surfaces; hard; firm but very crumbly; common filled worm channels; common $CaCO_3$ concretions and few quartz gravel; few shell fragments; calcareous; pH 8.3; arbitrary boundary.

B23ca 18201 29 to 36 inches. Same as horizon above; except about 5 percent $CaCO_3$, mostly concretions and some blocky structure in lower part; gradual lower boundary.

B24ca 18202 36 to 50 inches. Pale brown (10YR 6/3) clay loam; brown (10YR 4/3) moist; moderate medium subangular and angular blocky structure; hard; firm but very crumbly; estimated 7 percent $CaCO_3$ in soft and hard masses; about 3 percent quartz gravel and some Fe-Mn concretions; calcareous; diffuse lower boundary.

C1ca 18203 50 to 66 inches. Light brown (7.5YR 6/4) clay loam; brown (7.5YR 5/4) moist; weak fine subangular and angular blocky structure; hard; firm but very crumbly; estimated 7 percent $CaCO_3$, mostly soft; few to common Fe-Mn as soft pellet masses; worm channels and casts continue; calcareous; pH 8.3; clear lower boundary.

C2ca 18204 66 to 72 inches. Pink (7.5YR 7/4) loam; light brown (7.5YR 6/4) moist; moderate medium and fine blocky and irregular blocky structure; hard; firm but very crumbly; faintly mottled with grays and browns; few to common spots Fe-Mn and few soft $CaCO_3$ masses; calcareous; pH 8.3; arbitrary boundary.

C3ca 18205 72 to 84 inches plus. Same color; weak blocky structure or fragmented; faintly mottled as above, but not wet (believe to be material mixture); continuous and becomes loam-textured; calcareous.

Earthworm casts on surface 18206. Surface mostly covered with low mounds of discrete wormcasts or granular aggregates lying loosely and unattached upon surface. Comprises a fine mulch upon the surface around each worm channel working.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

B24ca - light clay loam
C1ca - light clay loam
C2ca - clay loam
C3ca - becomes coarse-textured

SOIL CLASSIFICATION: Typic Calciustoll; fine-silty, mixed, thermic

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Lewisville clay loam SOIL Nos. S63TX-14-2 LOCATION Bell County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 18207-18216 March 1968

General Methods: 1A, 1B1b, 2A1, 2B

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)	3A1a Non-Carbonate <0.002	Coarse fragments 2A2: > 2	2 – 19	19 – 76
		Pct. of < 2 mm													Pct.	Pct. of < 19mm	
0-5	Ap	27.0a	43.6	29.4	0.4	0.9	1.1	6.7	17.9	21.6	22.0	44.7	9.1	29	tr	tr	
5-14	A1	20.8a	46.3	32.9	0.3	0.7	0.8	5.1	13.9	19.8	26.5	37.7	6.9	31	tr	tr	
14-20	B21ca	16.2a	51.9	31.9	1.7	1.1	0.8	3.6	9.0	15.8	36.1	27.6	7.2	29	3	3	
20-29	B22ca	7.7a	59.3	33.0	0.3	0.4	0.4	1.8	4.8	12.7	46.6	18.9	2.9	29	tr	tr	
29-36	B23ca	2.9a	64.1	33.0	0.1	0.3	0.2	0.5	1.8	11.1	53.0	13.3	1.1	29	tr	tr	
36-48	B24ca	2.3a	63.9	33.8	0.2	0.3	0.1	0.4	1.3	10.5	53.4	12.1	1.0	30	tr	tr	
48-58	C1ca	2.6a	61.1	36.3	0.4	0.3	0.2	0.5	1.2	9.4	51.7	11.0	1.4	30	2	2	
58-69	C2ca	5.6a	58.9	35.5	0.5	0.4	0.3	1.1	3.3	12.5	46.4	16.6	2.3	31	2	2	
69-85	C3ca	6.8b	57.1	36.1	0.2	0.5	0.6	1.6	3.9	12.6	44.5	17.6	2.9	31	2	2	
85-97	C4ca	9.5b	54.9	35.6	0.7	1.6	1.4	2.4	3.4	10.0	44.9	14.8	6.1	30	4	4	

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	Carbonate as $CaCO_3$: 6E1b <2mm	3A1a <0.002 mm	Bulk density: 4A1a Field-State	4A1d 1/3-Bar	4A1b Air-Dry	4D1 COLE	Water content: 4B4 Field-State	4B1c 1/3-Bar	4B2 15-Bar	4C1 1/3-to 15-Bar	pH: 8C1b Sat. Paste		8C1a 1:1
	C Pct.	Pct.		Pct.	Pct.	g/cc	g/cc	g/cc		Pct	Pct.	Pct	in./in.			
0-5	1.36	0.067	20	18	tr	1.59	1.47	1.68	0.044	12.8	21.6	11.7	0.15			7.8
5-14	0.98	0.056	18	23	2	1.58	1.46	1.72	0.056	14.9	21.8	12.2	0.14			7.8
14-20	0.64	0.048	13	38	3		1.5d					12.0				7.9
20-29	0.52	0.031	17	45	4	1.74	1.60	1.80	0.040	12.4	18.4	11.9	0.10			7.9
29-36	0.34	0.027	13	51	4		1.6d					11.6				8.0
36-48	0.30			52	4	1.81	1.64	1.86	0.044	11.0	18.2	11.5	0.11	7.7		7.9
48-58	0.15			50	6		1.6d					12.9				7.8
58-69	0.15			46	5	1.77	1.60	1.88	0.056	13.4	20.0	13.0	0.11			7.8
69-85	0.09			45	5							13.9				7.8
85-97	0.08			48	6	1.77	1.60	1.85	0.052	13.1	20.3	13.3	0.11			7.9

Depth (In.)	Extractable bases: 6N4b Ca	6O4b Mg	6P2a Na	5B1a: 6Q2a K	Sum	Cat. Exch. Cap. 5A1a NH_4OAc	8E1 Resistivity e	8B1a Elec. Cond.	8D5 Total Sol. Salts in Soil	8B Water at Sat.	Base saturation	
	meq/100 g						ohms-cm.	mmhos/cm.	ppm.	Pct.	Pct.	Pct.
0-5	19.1	0.8	tr	1.1	21.0	18.7						
5-14	20.9	0.8	0.1	0.8	22.6	20.9						
14-20	19.3	0.6	0.1	0.6	20.6	18.5						
20-29	19.4	0.6	0.1	0.6	20.7	18.0						
29-36	19.8	0.4	0.1	0.5	20.8	17.9						
36-48	19.9	0.4	0.1	0.6	21.0	17.8	1,800	0.51	140	43.3		
48-58	20.7	0.4	0.1	0.6	21.8	18.6						
58-69	20.4	0.4	0.1	0.7	21.6	18.2						
69-85	20.3	0.5	0.1	0.7	21.6	18.1						
85-97	18.3	0.6	0.1	0.6	19.6	16.5						

Depth (In.)	Ratios to Clay: NH_4OAc CEC	Ext. Iron	8D2 15-Bar Water
0-5	0.64		0.40
5-14	0.67		0.39
14-20	0.64		0.41
20-29	0.62		0.41
29-36	0.62		0.40
36-48	0.59		0.38
48-58	0.62		0.43
58-69	0.59		0.42
69-85	0.58		0.45
85-97	0.55		0.44

a. Carbonate: > 50 percent (2-0.25 mm); 10-25 percent (0.25-0.05 mm).
b. Carbonate: > 50 percent (2-0.5 mm); 5-25 percent (0.5-0.05 mm).
c. 12 kg/m^2 to 60 inches (Method 6A).
d. Estimated.
e. Resistivity measured at saturated paste is similar to that measured at moisture equivalent for medium and fine-textured soils. For coarse-textured soils, resistivity generally decreases from moisture equivalent to saturated paste. Therefore, minimum values are reported.

Soil classification: Typic Calciustoll; fine-silty, mixed, thermic;
Soil: Lewisville clay loam.
Soil Nos.: S63TX-14-2; 18207-18216.
Location: Bell County, Texas. About 10 miles south of Temple; 2.3 miles west of town of Little River, Texas, on FM Road 436; 300 feet south of road in pasture.
Vegetation and use: Old cropland field now in pasture.
Topography: Landscape of broad, nearly level alluvial terraces having erosional surfaces in parts along streams and drainageways. Site on slope of 5 percent gradient on erosional segment between alluvial plain and level terraces.
Drainage and permeability: Well drained. Runoff is medium. Moderately permeable.
Parent material: Pleistocene loamy alluvium, calcareous.
Sampled by and date: J. DeMent, W. R. Elder, M. Stout, April 17, 1963.
Described by: M. Stout.

Ap 18207 0 to 5 inches. Dark grayish brown (10YR 4/2) clay loam; very dark grayish brown (10YR 3/2) moist; weak granular and subangular blocky structure with abundant wormcasts within horizon and mounded upon the surface; very hard; firm; about 3 to 5 percent snail shell fragments; few very fine $CaCO_3$ concretions; calcareous; abrupt lower boundary.

A1 18208 5 to 14 inches. Grayish brown (10YR 5/2) clay loam; very dark grayish brown (10YR 3/2) moist; moderate fine and very fine subangular blocky structure; hard; firm but very crumbly; abundant wormcasts and filled channels; few shell fragments; about 4 percent very fine $CaCO_3$ concretions; filled channels of brown (7.5YR 5/4); calcareous; pH 8.0; gradual lower boundary.

B21ca 18209 14 to 20 inches. Brown (10YR 5/3) silty clay loam; dark brown (10YR 4/3) moist; moderate to strong very fine and fine subangular blocky structure; indistinct coatings on many peds; hard; firm but very crumbly; common wormcasts and dark filled channels; about 6 to 10 percent gravels or concretions, dark coated, subrounded; few fine quartz gravel; calcareous; pH 8.0; gradual lower boundary.

B22ca 18210 20 to 29 inches. Light yellowish brown (10YR 6/4) silty clay loam; yellowish brown (10YR 5/4) moist; strong medium and fine subangular blocky structure with apparent, though thin, films seemingly continuous; weak prismatic structure apparent on drying; common casts and nests; hard; firm but very crumbly; few $CaCO_3$ concretions and shell fragments; few tongues of very dark grayish brown from above; calcareous; pH 8.0; arbitrary boundary.

B23ca 18211 29 to 36 inches. Same as above except strong medium and fine subangular and angular blocky structure; gradual lower boundary.

B24ca 18212 36 to 48 inches. Light brown (7.5YR 6/4) silty clay loam; brown (7.5YR 5/4) moist; weak prismatic structure breaking to moderate to strong medium and fine blocky structure; peds seemingly have films; hard; firm but very crumbly; worm channels throughout; 10 percent $CaCO_3$ concretions with some lime-filled worm channels; occasional quartz gravel; calcareous; pH 8.0; arbitrary boundary.

C1ca 18213 48 to 58 inches. Same as horizon above. Sampling break. Blocky structure more apparent.

C2ca 18214 58 to 69 inches. Same as B24ca; about 6 percent $CaCO_3$ concretions, medium to coarse; gradual lower boundary.

C3ca 18215 69 to 85 inches. Light yellowish brown (10YR 6/4) silty clay loam; yellowish brown (10YR 5/4) moist; weak to moderate medium blocky structure with some faces coated with Mn; few coarse masses of $CaCO_3$ and decreasing; root channels extend through ped interior and horizon; hard; firm; calcareous; pH 8.0; arbitrary boundary.

C4ca 18216 85 to 97 inches. Very pale brown (10YR 7/3) silty clay loam; pale brown (10YR 6/3) moist, same as above, but becoming coarser textured with depth; structure undetermined; diffuse lower boundary.

C5ca 97 to 157 inches. Very pale brown (10YR 7/4) gritty light sandy clay loam or loam grading to gravelly sandy loam and gravel with depth; structure undetermined.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

B21ca - clay loam
B22ca - clay loam
B23ca - clay loam
B24ca - light clay loam
C1ca - light clay loam
C2ca - light clay loam
C3ca - light clay loam or loam
C4ca - loam

SOIL CLASSIFICATION- TYPIC CALCIUSTOLL
FINE-SILTY, MIXED, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SERIES - - - - - - -SERIES NOT DESIGNATED

SOIL NO - - - - - - S62TX-246-90 COUNTY - - - WILLIAMSON

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K1471-1476

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 SAND 2-.05	SILT .05-.002	CLAY LT .002	SAND VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	PARTICLE SIZE ANALYSIS (A) SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	(ETHYLENE GLYCOL) RETAINED LT 2 MM	LT .002 MM	( ) LT .0002 MM	BULK DEN 4A3A G/CC
		(- - - - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - - -)											(PCT LT.002)		(- - MG/G - - -)			
000-7	AP	3.7	48.9	47.4									24	76				
007-17	A1	4.8	46.0	49.2									28	72				
017-30	B21CA												24	76				
030-37	B22CA												30	70				
037-43	C1CA	15.0	63.4	21.6									29	71				
043-51	C2	14.8	61.6	23.6									34	66				

DEPTH IN	(ORGANIC MATTER) 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON PHOS 6C3 EXT FE PCT	6S1A TOTL PCT	(- -EXTRACTABLE BASES 5B1A- -) 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	(CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO 8D3 CA TO MG	CA CARB EQ 6E1E PCT	(- - - PH - - -) 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
						(- - - - - - - - - MEQ / 100G - - - - - - - - - -)													
000-7	2.30						1.6	0.1	1.5		62.9	91A	103A			4.0	7.9		
007-17	2.00						0.9	0.2	0.9		55.6	88A	105A			14.0	7.8		
017-30	1.30						0.6	0.1	0.7		49.6	90A				31.0	7.9		
030-37	0.80						0.3	0.1	0.5		28.0	88A	98A			62.0	7.9		
037-43	0.40						0.4	0.1	0.3		14.7	76A	93A			74.0	8.1		
043-51	0.20						0.4	0.1	0.2		10.8	66A	89A			77.0	8.2		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S62TX-246-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-7	QZ1	QZ1 MI3 KK3 FD3		MI2 KK2 QZ2 MT3	MT1 MI3 KK3
7-17	QZ1 FD3	QZ1 MI3 KK3 FD3		MI1 KK2 MT2 QZ3	MT1 MI3 KK3
17-30	QZ1	QZ1 MI3 KK3 FD3		KK1 MI2 MT3 QZ3 FD3	MT1 MI3 KK3
30-37	QZ1 FD3	QZ1 MI2 KK2 FD3		MI1 KK2 MT2 QZ3	MT1 MI3 KK3
37-43	QZ1	QZ2 MI2 KK2 FD3		KK1 MI2 MT2 QZ3 FD3	MT1 MI3 KK3
43-51	QZ1	QZ2 MI2 KK2 FD3		KK1 MI2 MT2 QZ3 FD3	MT1 MI3 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Typic Calciustoll; fine-silty, mixed, thermic.
Soil: Series not designated.
Soil Nos.: S62TX-246-90; K1471-1476.
Location: Williamson County, Texas; 3.15 miles west from intersection of U.S. Highway 81 and Farm Road 487 in southeast end of Jarrell along Farm Road 487; thence 0.2 mile south along heavily gravelled county road; thence 0.75 mile west along field road. Sample site is on north side of road. Cover: Cultivated in oats.
Topography: Undulating surface with about 2 percent gradient at sampling site.
Sampled by: Harvey Oakes, June 1, 1962.
Described by: Harvey Oakes.

Ap K1471 0 to 7 inches. Very dark gray brown (10YR 3/2) silty clay; very dark brown (10YR 2/3) moist; moderate fine granular and fine subangular blocky; crumbly, peds very firm; calcareous; abrupt smooth boundary.

A1 K1472 7 to 17 inches. Dark brown (7.5YR 3.5/2) silty clay; slightly darker (7.5YR 3/2) moist; strong fine angular blocky; peds extremely hard, crumbly; few small spots of lighter colored material; calcareous; gradual slightly wavy boundary.

B21ca K1473 17 to 30 inches. Brown (6YR 4/3) silty clay; dark brown (6YR 3/3) moist; structure and consistence same as horizon just above; about 10 percent by volume of soft and hard particles of $CaCO_3$ and lighter colored spots; calcareous; gradual slightly wavy boundary.

B22ca K1474 30 to 37 inches. Reddish brown (5YR 4/5) silty clay loam; dark reddish brown (5YR 3/5) moist; 10 to 20 percent by volume of soft lumps and hard particles of limestone; calcareous; clear wavy boundary.

C1ca K1475 37 to 43 inches. Yellowish brown silt loam with some 30 percent by volume of soft segregated $CaCO_3$; calcareous; clear wavy boundary.

C2 K1476 43 to 51 inches. Very pale brown to white soft chalky marl with about 10 percent by volume of yellowish fine earth, of silt loam; clear wavy boundary.

C&R 51 to 65 inches plus. About equal parts of limestone fragments more or less rounded and soft chalky marl.

Remarks: 1. This pedon was sampled as Denton series. The soil is outside the range of the Denton series in being of Typic instead of Vertic subgroup, in being fine-silty instead of fine textured. The soil also lacks the limestone within 40 inches depth required of the Denton series.

2. Textures above agree with laboratory data. Field textures where different are given below:

Ap - clay
A1 - clay
B21ca - clay
B22ca - light clay
C1ca - light clay

SOIL CLASSIFICATION: Typic Calciustoll; fine-silty, carbonatic, thermic

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Series not designated SOIL Nos. S63TX-50-1 LOCATION Coryell County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 18152-18157 March 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (In.)	Horizon	Size class and particle diameter (mm) — Total: Sand (2–0.05) [a]	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 <0.002	Coarse fragments 2A2: 3B1 >2 (<19) Pct.	2 – 19 Pct. of <2 mm	19 – 76 Pct. of <76 mm
		Pct. of <2 mm															
0-5	Ap	8.0	44.1	47.9	0.8	1.0	0.8	2.4	3.0	12.8	31.3	17.2	5.0	44	tr		
5-15	A11	7.6	43.6	48.8	0.5	1.1	0.9	2.4	2.7	11.5	32.1	15.6	4.9	46	tr		
15-25	A12	8.6	47.8	43.6	0.7	1.2	1.1	2.8	2.8	10.0	37.8	14.4	5.8	42	tr		
25-37	B21ca	14.2	60.9	24.9	1.6	2.0	1.6	4.2	4.8	10.5	50.4	17.7	9.4	23	tr		
37-50	B22ca	12.0	61.0	27.0	0.8	1.3	1.3	3.8	4.8	10.6	50.4	17.6	7.2	21	tr		
50-64	R&B23ca	16.4	52.6	31.0	2.1	2.6	1.8	4.3	5.6	11.5	41.1	19.6	10.8	29	4		

Depth (In.)	6A1a Organic carbon [b] Pct.	6B1a Nitrogen Pct.	C/N	Carbonate as $CaCO_3$: 6E1b <2mm Pct.	Carbonate as $CaCO_3$: 3A1a <0.002 mm Pct.	6C2a Ext. Iron as Fe Pct.	Bulk density: 4A1a Field-State g/cc	Bulk density: 4A1d 1/3-Bar g/cc	Bulk density: 4A1b Air-Dry g/cc	4D1 COLE	Water content: 4B4 Field-State Pct.	Water content: 4B1c 1/3-Bar Pct.	Water content: 4B2 15-Bar Pct.	4C1 1/3-to 15-Bar in./in.	pH: 8C1b Sat. Paste	pH: 8C1a 1:1	pH: 8C1a 1:10
0-5	1.61	0.131	12	24	4	1.1	1.33	1.20	1.57	0.10	21.6	31.5	19.2	0.15	7.6	7.9	8.1
5-15	1.44	0.099	15	32	3	1.2	1.39	1.29	1.75	0.11	26.0	30.9	18.8	0.16	7.6	8.0	8.3
15-25	0.88	0.073	12	47	2	1.3	1.58c	1.50c	1.72c	0.047	18.1c	21.8c	15.4	0.10	7.7	8.1	8.3
25-37	0.42			68	2	0.6	1.62	1.57	1.66	0.017	13.5	17.0	8.3	0.14	7.9	8.1	8.4
37-50	0.22			69	6	0.7	1.70	1.64	1.74	0.020	11.1	16.2	8.4	0.13	7.8	8.2	8.5
50-64	0.12			68	2	0.8		1.6 d					9.6		7.8	8.3	8.5

Depth (In.)	Extractable bases: 6N4b Ca	6O4b Mg	6P2a Na	6Q2a K	5B1a Sum	Cat. Exch. Cap.: 5A1a NH_4OAc	Water extract from saturated paste 8A1: Ca	Mg	6P1a Na	6Q1a K	CO_3	HCO_3	Cl	SO_4	8A1a Electrical conductivity
	meq/100 g						meq/liter								mmho/cm
0-5	41.4	0.9	tr	1.1	43.4	39.9			0.1	0.1					0.31
5-15	38.0	0.5	tr	0.7	39.2	34.4			0.2	tr					0.44
15-25	30.6	0.2	tr	0.5	31.3	28.3			0.2	tr					0.39
25-37	17.0	0.1	tr	0.2	17.3	14.0			0.2	tr					0.30
37-50	17.5	0.1	tr	0.2	17.8	14.6			0.1	tr					0.25
50-64	18.0	-	tr	0.2	18.2	15.2			0.2	tr					0.27

Depth (In.)	8A Water at Saturation Pct.	5D2 Exchangeable Na Pct.	Base Sat. NH_4OAc Pct.	Gypsum Pct.	Ratios to Clay 8D2: NH_4OAc CEC	Ext. Iron	15-Bar Water
0-5	58.5	<1			0.91	0.02	0.44
5-15	60.1	<1			0.75	0.03	0.41
15-25	52.1	<1			0.67	0.03	0.37
25-37	38.5	<1			0.61	0.03	0.36
37-50	36.9	<1			0.70	0.03	0.40
50-64	43.1	<1			0.52	0.03	0.33

a. Carbonate grains comprise more than 50 percent of the sand.
b. 14 kg/m² to 60 inches (Method 6A).
c. One clod.
d. Estimated.

Soil classification: Typic Calciustoll; fine-silty, carbonatic, thermic.
Soil: Series not designated.
Soil Nos.: S63TX-50-1; 18152-18157.
Location: Coryell County, Texas. About 10-1/2 miles northeast of Gatesville; in a field, 150 yards east of a west field fence and 175 yards south of a north fence in east field, which is 0.3 mile southeast of the P. H. Morton farm headquarters (on the P. H. Morton Farm), which is 1.2 miles southeast of Coryell City.
Vegetation and use: Cropland; in soil bank (tame grasses).
Topography: Gently undulating landscape having smooth convex slopes and gently sloping convex divides.
Drainage and permeability: Rapid from the surface, moderate to slow permeability.
Parent material: Residuum from interbedded marly clay and soft limestone and with indications of a colluvial mantle that influences the upper part of the pedon.
Sampled by and date: J. DeMent, W. R. Elder, J. W. Huckabee, G. Kunze, H. Oakes, A. Startz and R. B. Grossman, April 18, 1963.
Described by: M. Stout.

Ap 18152 0 to 5 inches. Very dark grayish brown (9YR 3/2) silty clay; very dark brown (10YR 2/2) moist; moderate very fine granular structure; upper inch is loose mulch of very fine peds of flat angular shape; extremely hard, very firm, crumbly; calcareous; abrupt lower boundary.

A11 18153 5 to 15 inches. Dark brown (7.5YR 3/2) silty clay; very dark brown (7.5YR 2/2) moist; moderate fine angular blocky structure, having some subangular blocks in upper part; shiny ped surfaces; few $CaCO_3$ concretions; common brownish wormcasts; extremely hard, very firm; crumbly; calcareous; slightly wavy lower boundary.

A12 18154 15 to 25 inches. Dark brown (7.5YR 4/2) silty clay; same color when moist; moderate fine and very fine angular blocky structure; shiny ped surfaces; thin clay films; very hard, very firm; very crumbly, common wormcasts; few mottles and spots of olive and gray; about 1 to 2 percent of fine limestone gravel that is dark brown and black coated; calcareous; clear slightly wavy lower boundary.

B21ca 18155 25 to 37 inches. Pale brown (10YR 6/3) silt loam; brown (10YR 5/3) moist; with mottles of olive and light gray; weak fine angular blocky and subangular blocky structure; few patchy clay films; hard, firm; very crumbly; common (3 to 6 percent) white calcium concretions and altered soft limestone; many fine pores; common wormcasts and filled channels; calcareous; discontimuous stone line pebbles; clear wavy lower boundary.

B22ca 18156 37 to 50 inches. Brownish yellow (10YR 6/6) silt loam or silty clay loam; yellowish brown (10YR 5/6) moist; with few brownish gray mottles; weak to moderate fine blocky structure; occasional patchy clay films; hard, firm; very crumbly; about 30 percent of white soft calcium deposits--some having hard cores; few altered fragments of limestone; contains wormcasts; calcareous; clear wavy lower boundary.

R&B23ca 18157 50 to 64 inches. Distinctly mottled light gray, light yellowish brown, and yellowish brown interbedded or thin-bedded silty clay loam and limestone; remnants of the limestone are hard; tongues of upper horizon extend throughout; about 5 to 20 percent $CaCO_3$ mostly soft masses; rock partings apparent; very wavy boundary; grayish mottles are not due to wetness, but are colors of the limestone.

R 64 to 76 inches plus. Interbedded soft shales, limestone and clay.

Remarks: This pedon was sampled as Denton series. The soil is outside the range of the Denton series in being of a fine-silty, carbonatic family and in having a solum more than 40 inches thick. It is in the Typic instead of Vertic subgroup. Textures above agree with laboratory data. Field textures where different are given below:

Ap - clay
A11 - clay
B21ca - silty clay loam

SOIL CLASSIFICATION: Typic Calciustoll; fine-silty, carbonatic, thermic

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Series not designated SOIL Nos. S63TX-50-3 LOCATION Coryell County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 18165-18170 March 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1 — Total Sand (2–0.05) a	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 <0.002	3A3a Non-Carbonate <0.0002	Coarse fragments 2A2: 3B1 > 2 (<19) Pct.	2 – 19	19 – 76
		Pct. of < 2 mm															Pct. of < 76mm	
0-5	Ap	9.6	45.7	44.7	0.7	1.4	1.3	3.2	3.0	11.9	33.8	16.7	6.6	42	16	tr		
5-9	A11	9.8	43.2	47.0	1.3	1.4	1.2	2.8	3.1	11.4	31.8	16.1	6.7	43		tr		
9-13	A12	9.3	46.5	44.2	1.3	1.3	1.0	2.6	3.1	10.3	36.2	14.9	6.2	40	12	tr		
13-16	IIA13	22.6	43.6	33.8	6.5	5.4	2.4	4.4	3.9	8.7	34.9	15.0	18.7	30				
16-29	IIB21	15.2	55.3	29.5	2.1	2.0	1.5	4.3	5.3	10.6	44.7	18.4	9.9	25		2		
29-37	IIB22ca	13.6	59.0	27.4	1.2	1.8	1.4	4.1	5.1	10.9	48.1	18.4	8.5	23	16	tr		

Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N	Carbonate as $CaCO_3$: 6E1b <2mm	Carbonate as $CaCO_3$: 3A1a <0.002 mm	Ext. Iron as Fe b	Bulk density			Water content:		4B2 15-Bar	pH 8C1a 1:1
	Pct.	Pct.		Pct.	Pct	Pct.	g/cc	g/cc	g/cc	Pct.	Pct.	Pct.	
0-5	1.70	0.124	14	32	3	3.8						17.8	
5-9	1.58	0.107	15	32	4							17.8	
9-13	1.42	0.092	15	44	4	2.0						16.7	
13-16	0.94	0.069	14	60	4							12.2	
16-29	0.70	0.054	13	66	5							10.3	
29-37	0.38			71	4	2.8						9.2	

Depth (in.)	Extractable bases: Ca	Mg	Na	K	Sum (meq/100 g)	Liquid Limit Pct.	Plasticity Index Pct.	Linear Shrinkage Pct.	Base saturation: Pct.	Pct.
0-5						52	30	16.4		
5-9										
9-13										
13-16										
16-29						36	20	10.3		
29-37										

Depth (in.)	Ratios to Clay 8D2: NH_4OAc CEC	Ext. Iron	15-Bar Water
0-5		0.09	0.42
5-9			0.41
9-13		0.05	0.42
13-16			0.41
16-29			0.41
29-37		0.12	0.40

a. Carbonate grains comprise more than 50 percent of the sand.
b. Determined on noncarbonate clay; extraction by Method 7A1c; analysis by Method 6C2a.

Soil classification: Typic Calciustoll; fine-silty, carbonatic, thermic.
Soil: Series not designated.
Soil Nos.: S63TX-50-3; 18165-18170.
Location: Coryell County, Texas; 0.5 miles NW of Coryell City (north on gravel road 0.5 mile, and 100 yards in field on west side of road).
Vegetation and use: Cropland now in soil bank.
Topography: Undulating landscape having long smooth slightly convex slopes and gently sloping convex divides. Site is on a low sloping hillside slightly higher than Denton clay sample site S63-Tex-50-2.
Drainage and permeability: Rapid from the surface, moderate to slow permeability.
Parent material: Residuum of interbedded clayey marls and limestone with slope alluvium in the first three horizons.
Sampled by and date: J. DeMent, W. R. Elder, J. W. Huckabee, G. Kunze, H. Oakes, A. Starts and R. B. Grossman. April 18, 1963.
Described by: M. Stout.

Horizon and Lincoln Lab. Number	
Ap 18165	0 to 5 inches. Dark brown (7.5YR 3/2) silty clay; very dark brown (10YR 2/2) when moist; weak to moderate very fine granular structure; mostly wormcasts and granules; extremely hard; very firm; sticky; upper 1.5 inches is a soft mulch of flattened angular particles; loose; about 5 percent gravel and limestone; calcareous; abrupt lower boundary.
A11 18166	5 to 9 inches. Very dark brown (10YR 2/2) silty clay; same color moist; weak and moderate medium and fine subangular blocky and blocky structure; many wormcasts; many yellowish very fine noncalcareous particles; extremely hard, extremely firm; sticky; few yellowish spots; few fine pores; calcareous; clear but indistinct lower boundary.
A12 18167	9 to 13 inches. Very dark grayish brown (10YR 3/2) silty clay, same color moist; strong medium and fine blocky structure; shiny peds; extremely hard, very firm; calcareous; boundary clear and very wavy plus or minus 3 inches.
IIA13 18168	13 to 16 inches. Lithologic discontinuity consisting of a stone line of fine and medium rounded gravel (not fresh but having residual stainings) set in a matrix similar to the horizon above, except clay loam texture.
IIB21 18169	16 to 29 inches. Very pale brown (10YR 7/4) silty clay loam; light yellowish brown (10YR 6/4) moist, faintly mottled with yellowish brown; mostly weak blocky with some moderate very fine blocky and subangular structure; seemingly clay films on peds; about 3 to 5 percent soft $CaCO_3$ concretions, fine and very fine, uniformly distributed; worm channels filled with yellowish material; common wormcasts.
IIB22ca 18170	29 to 37 inches. Light yellowish brown (10YR 6/4) silty clay loam; yellowish brown (10YR 5/6) moist; mottled faintly and finely with yellowish brown; weak blocky structure; firm; hard; estimated 30 percent soft masses of white calcium carbonate; occasional altered limestone or chalk fragment; hard; firm; very crumbly; calcareous; lower boundary abrupt to clear and wavy - having wavy strata of subrounded stones.
C	37 to 52 inches. Mottled marly clays interbedded with discontinuous strata of thin limestone; silty clay; clay has moderate medium blocky structure - or cleavage planes; calcareous, and about 5 to 7 percent $CaCO_3$ in soft masses and some hard; extremely hard, firm; few wormcasts and filled channels; some films; diffuse boundary.
R	52 to 64 inches plus. Interbedded marly clays and limestone.

Mineralogy (Methods 7A2, 7A3). The Ap, A12, and IIB22ca all contain small amounts of well-ordered kaolinite and mica (or illite). The A12 horizon contains abundant well-ordered nontronitic montmorillonite. The Ap and IIB22ca horizons contain small amounts of poorly ordered montmorillonite. Clay mineralogy is montmorillonitic.

SOIL CLASSIFICATION: Typic Calciustoll; loamy, carbonatic, thermic, shallow

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Series not designated SOIL Nos. S63TX-50-4 LOCATION Coryell County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 18171-18174 March 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05) [a]	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 <0.002	3A3a Non-Carbonate <0.0002	Coarse fragments 2A2: 3B1 > 2 (<19)	2 – 19	19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76mm	
0-5	Ap	11.3	48.0	40.7	0.7	1.8	1.5	3.7	3.6	13.3	34.7	19.0	7.7	38	14	tr		
5-9	A1	9.0	46.8	44.2	0.8	1.4	1.1	2.9	2.8	10.7	36.1	15.2	6.2	40		tr		
9-16	B21ca	10.6	48.9	40.5	1.6	1.8	1.2	3.0	3.0	9.5	39.4	14.2	7.6	35	8	tr		
16-20	B22ca	27.4	53.8	18.8	5.3	7.1	3.5	5.8	5.7	10.1	43.7	19.0	21.7	15	12	27		

Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N	Carbonate as $CaCO_3$: 6E1b <2mm	Carbonate as $CaCO_3$: 3A1a <0.002 mm	Ext. Iron as Fe [b]	Bulk density			Water content		4B2 15-Bar			pH	
	Pct.	Pct.		Pct.	Pct.	Pct.	g/cc	g/cc	g/cc	Pct.	Pct.	Pct.				1:1
0-5	1.56	0.128	12	27	3	4.0						15.2				
5-9	1.46	0.111	13	42	4							16.4				
9-16	1.18	0.095	12	52	6							14.2				
16-20	0.66	0.061	11	81	4	3.4						6.7				

Depth (in.)	Extractable bases: Ca	Mg	Na	K	Sum	Liquid Limit	Plasticity Index	Linear Shrinkage	Base saturation	
	meq/100 g					Pct.	Pct.	Pct.	Pct.	Pct.
0-5						45	27	15.2		
5-9						49	31	16.8		
9-16										
16-20										

Depth (in.)	Ratios to Clay 6D2: NH_4OAc CEC	Ext. Iron	15-Bar Water
0-5		0.11	0.40
5-9			0.41
9-16			0.41
16-20		0.23	0.45

a. Carbonate comprises more than 50 percent of the sand.
b. Determined on noncarbonate clay; extraction by Method 7A1c; analysis by Method 6C2a.

Soil classification: Typic Calciustoll; loamy, carbonatic, thermic, shallow,
Soil: Series not designated.
Soil Nos.: S63TX-50-4; 18171-18174.
Location: Coryell County, Texas; 0.5 mile northwest of Coryell City (in a field 310 yards west of a gravel road from a point 0.5 mile north of the west edge of the village of Coryell City).
Vegetation and use: Cropland; now in soil bank (grasses).
Topography: Undulating landscape having long, smooth, slightly convex slopes and gently sloping convex divides. Site is near crest of divide, slope gradient of about 2 percent.
Drainage and permeability: Rapid from the surface, moderate to slow permeability.
Parent material: Residuum of interbedded clayey shales, hard and soft limestone. Limestone strata are 2 to 6 inches in thickness and are commonly nodular; fractured, with rounded corners. The shale is silty with strata containing higher clay content.
Sampled by and date: J. DeMent, W. R. Elder, J. W. Huckabee, G. Kunze, H. Oakes, A. Startz, and R. B. Grossman, April 18, 1963.
Described by: M. Stout.

Ap 18171 0 to 5 inches. Dark brown (7.5YR 3/2) silty clay; very dark brown (7.5YR 2/2) moist; weak moderate granular structure; many wormcasts; many yellowish brown hard "grit"; extremely hard, very firm; calcareous; abrupt smooth boundary.

A1 18172 5 to 9 inches. Dark brown (7.5YR 4/2) silty clay; dark brown (7.5YR 3/2) moist; moderate to strong subangular blocky structure; indistinct clay films on ped faces; common pinkish and yellowish "grit"; same consistence as layer above; calcareous; clear slightly wavy boundary.

B21ca 18173 9 to 16 inches. Pale brown (10YR 6/3) silty clay; brown (10YR 5/3) moist; strong medium to fine subangular blocky structure; thin and indistinct clay films on ped faces; common pinkish and yellowish "grit"; few yellowish mottles and filled worm channels; very hard, firm; calcareous; clear smooth lower boundary.

B22ca 18174 16 to 20 inches. Very pale brown (10YR 7/4) silt loam; light yellowish brown (10YR 6/4) moist; consisting of approximately 40 percent soil fines and 60 percent medium soft limestone fragments with subrounded corners--interiors of fragments are light gray (2.5Y 7/2).

C 20 to 24 inches. Limestone strata of light gray limestone with hardness of less than 3, Mohs scale.

IIC 24 inches plus. Mottled grayish brown, yellowish brown and light gray silty clay loam or soft somewhat altered shale; hard, slightly firm.

Mineralogy (Method 7A2). The Ap, B21ca and B22ca horizons all contain small amounts of well-ordered kaolinite and mica (or illite). The B21ca contains a moderate amount of moderately well-ordered montmorillonite. There are small amounts of montmorillonite in the Ap and in the B22ca horizons. Clay mineralogy is montmorillonitic.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

Ap - heavy silty clay loam
A1 - silty clay loam
B21ca - light silty clay
B22ca - light silty clay

SOIL CLASSIFICATION-ARIDIC CALCIUSTOLL
FINE-LOAMY, MIXED, THERMIC

SERIES - - - - - - - PORTALES

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S53TX-153-60 COUNTY - - - LYNN

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K103-108

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (PCT LT 2MM) SAND	SILT	CLAY	VCOS	CORS	MEOS	FNES	VFNS	PARTICLE SIZE ANALYSIS SAND	SILT	CLAY	(A) CRSE CLAY .002-.0002 MM	FINE CLAY LT .002 MM	ETHYLENE GLYCOL RETAINED (B) 2 MM	LT .002 MM	BULK DEN 4A3A G/CC
		2-.05 MM	.05-.002 MM	LT .002 MM	2-1 MM	1-.5 MM	.5-.25 MM	.25-.10 MM	.10-.05 MM	2-.05 MM	.05-.002 MM	LT .002 MM	(PCT LT .002)		MG/G		
000-7	AP	62.0	18.7	19.3	0.1	0.6	1.0	34.4	25.9	61.2	22.2	16.4	71	29	19.5	146	
007-16	A12	42.7	26.3	31.0	0.3	0.8	0.8	21.5	19.3	47.7	30.7	21.6				150	
016-27	B21	36.4	33.2	30.4	0.5	0.9	0.7	17.4	16.9	40.9	32.3	26.9	41	59	31.4	153	
027-38	B22	32.1	26.2	41.7	0.4	1.9	0.9	14.4	14.5	37.8	34.4	27.9				151	
038-54	C1ca	29.3	26.2	44.5	2.5	3.1	1.4	12.2	10.1	37.8	30.5	32.8				139	
054-72	C2ca or C2	24.8	31.4	43.8	0.8	0.8	0.6	10.9	11.7	36.8	30.3	33.1	34	66	39.7	149	

DEPTH IN	ORGANIC MATTER 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON 6C3 EXT FE PCT	PHOS 6S1A TOTL PCT	EXTRACTABLE BASES 5B1A (MEQ / 100G) 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO CA 8D3 CARB CA TO MG	CA EQ 6E1E PCT	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
000-7	0.62					1.6	0.1	1.2		17.9	62A					8.8	8.0		
007-16	0.73					1.8	0.1	0.8		20.3	64A					18.6	7.9		
016-27	0.42					2.1	0.1	0.7		18.6	69A					25.2	8.0		
027-38	0.32					3.1	0.1	0.7		18.1	67A					32.2	8.1		
038-54	0.20					3.8	0.1	0.5		11.4	62A					57.9	8.1		
054-72	0.10					4.5	0.1	0.6		13.6	63A					47.4	8.3		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S53TX-153-60

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-7	QZ1 FD3	FD1 QZ1 MI3		MI1 KK2 QZ2 FD3	MV1 MI2 KK3
7-16	QZ1	QZ1 FD2 MI3		MI1 KK2 QZ2 FD3	MV1 MI2 KK3
16-27	QZ1	FD1 QZ1 MI3		MI1 KK2 QZ2 FD3	MV1 MI2
27-38	QZ1 FD3	FD1 QZ2 MI3		MI1 KK2 QZ3	MV1 MI2 KK3
38-54	QZ1 FD3	QZ1 FD1 MI3		MI1 KK2 QZ2 FD3	MI1 MI2 KK3
54-72	QZ1 FD3	QZ1 FD2 MI3		MI1 KK2 QZ2	MI1 MI2 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT. 2 = 10 - 40 PCT. 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, MV=DIFFUSE, HYDRATED, EXPANSIBLE AND MICAEOUS (13-18A).

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Aridic Calciustoll; fine-loamy, mixed, thermic.
Soil: Portales fine sandy loam.
Soil Nos.: S53TX-153-60; K103-108.
Location: Lynn County, Texas. Ten miles south of Tahoka and 3 miles east of U.S. Highway 87.
Physiography: Level upland with surface gradient of less than 0.5 percent; cultivated.
Collected and described by: I. C. Mowery and E. H. Templin, July 1, 1953.

Ap K103 0 to 7 inches. Grayish brown (10YR 5/2.5, 3/2.5 moist) fine sandy loam; friable; moderate fine granular; calcareous; gradual lower boundary.

A12 K104 7 to 16 inches. Grayish brown (10YR 5/2.5, 3/2.5 moist) light clay loam; friable; moderately hard; compound strong medium granular and weak prismatic; porous; calcareous; contains a few small hard to $CaCO_3$ concretions; gradual lower boundary.

B21 K105 16 to 27 inches. Pale brown (10YR 6/3, 5/3 moist) light clay loam; friable; moderately hard; compound moderate medium granular and weak prismatic; porous; highly calcareous; films of $CaCO_3$ coat the aggregates; contains a few small hard $CaCO_3$ concretions; gradual lower boundary.

B22 K106 27 to 38 inches. Pale brown (10YR 6/3.5, 5/3.5 moist) clay, moderately hard; compound moderate medium granular and weak prismatic; porous; highly calcareous; films of $CaCO_3$ coat the aggregates; contains a few small hard $CaCO_3$ concretions; abrupt lower boundary.

C1ca K107 38 to 54 inches. Pinkish gray (7.5YR 7/2, 6/2 moist) chalky clay; friable; very highly calcareous; porous and permeable; diffuse lower boundary.

C2ca or C2 K108 54 to 72 inches plus. Pink (7.5YR 7/4, 6/4 moist) clay; friable; highly calcareous but is less whitish and contains less $CaCO_3$ than the horizon above it.

Remarks: This pedon was sampled as Portales, and the site was mapped Portales in the soil survey for Lynn County, Texas, issued March 1959.

Textures above agree with laboratory data. Field data where different are given below:

Ap - loam
B22 - clay loam
C1ca - chalky clay loam
C2 or C2ca - clay loam

SOIL CLASSIFICATION-ARIDIC CALCIUSTOLL
FINE-LOAMY, MIXED, THERMIC

SERIES - - - - - - - PORTALES

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S53TX-153-61 COUNTY - - - LYNN

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K109-113

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (PCT LT 2MM) SAND 2-.05 MM	SILT .05-.002 MM	CLAY LT .002 MM	VCOS 2-1 MM	CORS 1-.5 MM	MEDS .5-.25 MM	FNES .25-.10 MM	VFNS .10-.05 MM	PARTICLE SIZE ANALYSIS (A) (PCT LT.002) SAND 2-.05 MM	SILT .05-.002 MM	CLAY LT .002 MM	CRSE CLAY .002-.0002 MM	FINE CLAY LT .0002 MM	(ETHYLENE GLYCOL) (B) RETAINED LT 2 MM	LT .002 MM	LT .0002 MM	BULK DEN 4A3A G/CC
000-7	AP	62.8			0.1	0.5	1.1	36.1	25.0	54.4	25.0	20.7	67	33	17.0	149		
007-15	A12	36.1	27.8	36.1		0.6	0.7	17.2	17.6	34.3	31.3	34.5	41	59	40.7	148		
015-31	B	43.7	28.1	28.2	2.1	4.7	1.9	17.7	17.3	35.8	30.1	34.2	34	66	39.8	138		
031-45	C1ca	35.7	27.9	36.4	3.0	4.4	2.1	14.9	11.3	44.4	28.0	27.7				144		
045-66	C2ca or C2	27.6			0.6	0.9	0.7	12.6	12.8	41.4	26.8	31.8	39	61	29.9	136		

DEPTH IN	ORGANIC MATTER 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON 6C3 EXT FE PCT	PHOS 6S1A TOTL PCT	EXTRACTABLE BASES 5B1A (MEQ / 100G) 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO CA TO MG	CA CARB EQ 6E1E PCT	PH 1/1 H2O	PH 1/2 KCL	PH 1/2 CACL
000-7	0.85					2.1	0.1	1.1		19.5	71A					9.0	8.0		
007-15	0.68					3.7	0.2	1.2		25.1	69A					15.7	8.0		
015-31	0.36					5.7	0.2	1.2		21.7	65A					24.8	8.0		
031-45	0.17					3.3	0.1	0.4		8.8	66A					65.5	8.3		
045-66	0.09					7.7	0.2	0.6		10.7	60A					50.0	8.5		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S53TX-153-61

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-7	QZ1 FD3	FD1 QZ1 MI3		MI1 KK2 QZ2	MV1 MI2
7-15	QZ1 FD3	QZ1 FD1 MI3		MI1 QZ2 KK2	MV1 MI2
15-31	QZ1 FD3	QZ1 FD1 MI3		MI1 QZ2 KK2	MT1 MI2 KK3
31-45	QZ1 FD3	QZ1 FD1 MI3		MI1 QZ2 KK2	MT1 MI2 KK3
45-66	QZ1 FD3	QZ1 FD2 MI3		MI1 KK2 QZ2	MT1 MI2 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, MV=DIFFUSE, HYDRATED, EXPANSIBLE AND MICACEOUS (13-18A).

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Aridic Calciustoll; fine-loamy, mixed, thermic.

Soil: Portales fine sandy loam.
Soil Nos.: S53TX-153-61; K109-113.
Location: Lynn County, Texas; 8.5 miles south of Tahoka and 4.5 miles east of U.S. Highway 87.
Physiography: Level upland with gradient less than 0.5 percent; cultivated.
Collected and described by: I. C. Mowery and E. H. Templin, July 1, 1953.

Ap K109 0 to 7 inches. Grayish brown (10YR 5/2, 3/2 moist) sandy clay loam; friable; weak fine granular; calcareous; clear lower boundary.

A12 K110 7 to 15 inches. Grayish brown (10YR 4.5/2, 3.5/2 moist) clay loam; friable; moderately hard; compound strong medium granular and weak prismatic; porous; calcareous; gradual lower boundary.

B K111 15 to 31 inches. Light brown (7.5YR 6/4, 5/4 moist) clay loam; friable, moderately hard; compound moderate medium granular and weak prismatic; porous; highly calcareous; films of $CaCO_3$ coat the aggregates; a few small hard concretions of $CaCO_3$ are present; abrupt lower boundary.

C1ca K112 31 to 45 inches. Pinkish white (7.5YR 8/2, 7/2 moist) chalky clay loam (soft caliche); friable; porous and permeable; very highly calcareous and probably contains more than 50 percent $CaCO_3$; diffuse lower boundary.

C2ca or C2 K113 45 to 66 inches plus. Pinkish gray (7.5YR 7/2, 6/2 when moist) clay; friable; highly calcareous and contains numerous soft white $CaCO_3$ concretions but is less whitish and contains less lime than the horizon above it.

Remarks: This pedon was sampled as Portales, and the site was mapped Portales in the soil survey for Lynn County, Texas, issued March 1959.

Textures above agree with laboratory data. Field textures where different are given below:

Ap - loam
A12 - light clay loam
B - light clay loam
C2ca or C2 - clay loam

SOIL CLASSIFICATION Aridic Calciustoll; fine-loamy, mixed, thermic

SOIL Series not designated LOCATION Carson County, Texas

SOIL NOS. S60TX-33-1 LAB. NOS. 12703-12706

SOIL SURVEY LABORATORY Lincoln, Nebraska DATE March 1960

GENERAL METHODS 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	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 (<19mm.)	TEXTURAL CLASS
0-7	A1	0.5a	3.5a	8.7b	29.0b	14.0b	28.0	16.3	46.4	9.7	tr	fsl
7-16	B2	1.3a	2.8a	6.5b	26.2b	12.7b	29.4	21.1	39.3	16.7	8	l
16-60	B21ca	0.2b	1.4b	4.6b	29.7b	14.0b	31.9	18.2	37.9	25.3	tr	l
60-72	B22ca	0.5b	1.1b	3.5b	20.8b	15.8b	36.4	21.9	36.5	28.4	11	l

DEPTH INCHES	pH 8C1a 1:1	pH 1:5	pH 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	ORGANIC MATTER NITROGEN %	ORGANIC MATTER C/N	EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC x 10³ MILLIMHOS PER CM @25°C.	6E1a $CaCO_3$ equivalent %	MOISTURE TENSIONS 1/10 ATMOS. %	MOISTURE TENSIONS 1/3 ATMOS. %	MOISTURE TENSIONS 15 ATMOS. %
0-7	7.7			1.27					13			
7-16	7.9			0.98					27			
16-60	8.1			0.37					30			
60-72	8.4			0.06					26			

DEPTH INCHES	CATION EXCHANGE CAPACITY	EXTRACTABLE CATIONS Ca	Mg	H	Na	K (milliequivalents per 100g. soil)	BASE SAT. % EXCH. Na %	MOISTURE AT SATURATION %

a. Common carbonate concr. ($CaCO_3$?).
b. Few carbonate concr. ($CaCO_3$?).

Soil classification: Aridic Calciustoll; fine-loamy, mixed, thermic.
Soil: Series not designated.
Soil Nos.: S60TX-33-1; 12703-12706.
Location: North 13 miles Panhandle, Carson County, Texas, 3.6 miles west on main ranch road, and 2.2 miles north. The site is 125 yards west of Santa Fe Railroad.
Vegetation: Rangeland in good condition. Vegetation is mostly side-oats grama.
Physiography: Rolling upland.
Relief: Moderately sloping smooth convex knoll or hill with gradient of 3.5 percent. Olton or Richfield soils occur on the gentler slopes below this site.
Collected and described by: L. Geiger, January 12, 1960.

A1 12703 0 to 7 inches. Grayish brown (10YR 5/2, 3/2 moist) fine sandy loam; weak fine subangular blocky and granular; friable moist; highly calcareous; many wormcasts; gradual boundary. Sampled 2 to 6 inches.

B2 12704 7 to 16 inches. Pinkish gray (7.5YR 6/2, 5/2 moist) loam; weak granular; slightly sticky wet, friable moist; highly calcareous; many wormcasts; fine and medium pores common; fine and medium calcium carbonate concretions common; clear boundary. Sampled 9 to 14 inches.

B21ca 12705 16 to 60 inches. Light brown (7.5YR 6/4, 5/4 moist) loam; weak to moderate fine subangular blocky with some granular; very highly calcareous; soft masses calcium carbonate ranging from 5 to 15 mm in diameter common; roots common in upper part; many very fine pores; 6-inch strata of clay loam material containing 50 percent or more calcium carbonate at 54- to 60-inch depth; clear boundary. Sampled 24 to 28 inches.

B22ca 12706 60 to 72 inches. Pink (7.5YR 7/4, 6/4 moist) loam; moderate fine subangular blocky; slightly sticky; hard dry; highly calcareous with common fine and very fine hard calcium carbonate concretions; very porous. Sampled 60 to 65 inches.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

A1 - clay loam
B2 - clay loam
B21ca - clay loam
B22ca - clay loam

SOIL CLASSIFICATION: Aridic Calciustoll; fine-silty, mixed, hyperthermic

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Uvalde clay loam SOIL Nos. S63TX-254-1 LOCATION Zavala County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 18249-18257 March 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm) — Total: Sand (2–0.05) b	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)	3A1a Non-Carbonate <0.002a	Coarse fragments 2A2: 3B1 > 2 (<19)	2 – 19	19 – 76
		Pct. of < 2 mm													Pct.	Pct. of < 76mm	
0–6	Ap	30.8	40.0	29.2	0.2	0.8	1.9	9.4	18.5	16.4	23.6	41.5	12.3	25	-		
6–15	A1	26.4	37.1	36.5	0.3	0.5	1.5	7.6	16.5	15.4	21.7	37.4	9.9	31	-		
15–23	B21ca	25.0	37.2	37.8	0.3	0.7	1.4	7.0	15.6	14.5	22.7	35.1	9.4	30	tr		
23–31	B22ca	24.0	37.2	38.8	0.5	0.7	1.2	6.5	15.1	14.3	22.9	34.1	8.9	26	tr		
31–45	B23ca	21.2	40.8	38.0	0.9	0.7	1.0	5.4	13.2	12.8	28.0	29.9	8.0	24	tr		
45–59	C1ca	16.2	44.8	39.0	0.5	0.6	0.8	3.9	10.4	11.6	33.2	24.8	5.8	22	tr		
59–70	C2ca	14.9	45.7	39.4	0.7	0.4	0.6	3.7	9.5	11.5	34.2	23.6	5.4	22	tr		
70–82	C3ca	13.5	45.7	40.8	0.2	0.4	0.6	3.5	8.8	10.5	35.2	21.9	4.7	24	tr		
82–96	IIC1cam	23.4	46.4	30.2	6.9	5.7	2.6	3.8	4.4	6.2	40.2	12.8	19.0	14	14		
6–15	a	33.3	28.8	37.9	0.1	0.6	2.0	9.9	20.7	14.7	14.1	42.5	12.6				
59–70	a	23.1	34.2	42.7	tr	0.3	1.0	6.2	15.6	17.0	17.2	37.4	7.5				

Depth (in.)	6A1a Organic carbon c	6B1a Nitrogen	C/N	Carbonate as $CaCO_3$: 6E1b <2mm	Carbonate as $CaCO_3$: 3A1a <0.002 mm	6C2a Ext. Iron as Fe	Bulk density: 4A1a Field-State	Bulk density: 4A1d 1/3-Bar	Bulk density: 4A1b Air-Dry	4D1 COLE	Water content: 4B4 Field-State	Water content: 4B1c 1/3-Bar	Water content: 4B2 15-Bar	4C1 1/3-to 15-Bar	pH: 8C1b Sat. Paste	pH: 8C1a 1:1
	Pct.	Pct.		Pct.	Pct.	Pct.	g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.		
0–6	1.33	0.122	11	15	4	0.3	1.30	1.28	1.37	0.024	15.4	22.1	11.6	0.13		7.9
6–15	1.03	0.098	11	22	6	0.2	1.34	1.28	1.41	0.032	17.4	24.0	13.1	0.14		7.6
15–23	0.79	0.077	10	24	8	0.2	1.34	1.28	1.42	0.036	18.4	25.0	13.4	0.15		7.7
23–31	0.49	0.056	9	29	13	0.3	1.40	1.32	1.46	0.036	17.4	25.3	12.5	0.17		7.8
31–45	0.33			38	14	0.2	1.44	1.36	1.48	0.028	15.8	22.2	11.4	0.15	7.5	7.8
45–59	0.17			46	17	0.2	1.59	1.48	1.60	0.024	11.0	20.1	10.4	0.14		7.9
59–70	0.10			48	17	0.3	1.69	1.56	1.70	0.028	10.0	19.5	10.6	0.14		7.8
70–82	0.08			50	17	0.2	1.60	1.46	1.62	0.036	11.8	20.8	11.2	0.14		7.7
82–96	0.08			71	16	0.1							9.4			7.9

Depth (in.)	Extractable bases 6N4b Ca	6O4b Mg	6P2a Na	5B1a 6Q2a K	Sum	Ext. Acidity	Cat. Exch. Cap.: Sum Cations	Cat. Exch. Cap.: 5A1a NH_4OAc	8E1 Resistivity d ohms-cm.	8B1a Elec. Cond. mmhos/cm.	8D5 Total Sol. Salts in Soil ppm.	8B Water at Sat. Pct.	8D3 Ca/Mg	Base saturation: Sum Cations	Base saturation: NH_4OAc
	meq/100 g													Pct.	Pct.
0–6	19.4	1.4	0.1	1.9	22.8			19.9					14		
6–15	18.8	1.5	0.1	1.0	21.4			19.5					13		
15–23	19.3	1.8	0.2	0.7	22.0			18.2					11		
23–31	17.5	2.1	0.3	0.6	20.5			16.8					8.3		
31–45	15.6	2.3	0.3	0.6	18.8			14.9	1700	1.00	290	45.2	6.8		
45–59	13.3	3.1	0.3	0.6	17.3			13.8					4.3		
59–70	12.3	3.8	0.4	0.6	17.1			13.5					3.2		
70–82	13.4	4.5	0.4	0.7	19.0			12.7					3.0		
82–96	8.5	4.1	0.4	0.5	13.5			9.2					2.1		

Depth (in.)	Ratios to Clay 8D2: NH_4OAc CEC	Ext. Iron	15-Bar Water
0–6	0.80	0.01	0.46
6–15	0.63	0.01	0.42
15–23	0.61	0.01	0.45
23–31	0.65	0.01	0.48
31–45	0.62	0.01	0.48
45–59	0.63	0.01	0.47
59–70	0.61	0.01	0.48
70–82	0.53	0.01	0.47
82–96	0.66	0.01	0.67

a. Carbonate removal (Method 3A3). Clay percentage x $(1-\frac{CaCO_3}{100})$ yields the measured noncarbonate clay on a carbonate-containing basis. The calculated values for 18250 and 18255 are 30 and 22, respectively. These values are similar to those reported under the column heading "Noncarbonate clay (3A1a)" indicating little if any cementation of clay by carbonate.

b. Carbonate comprises 5 to 15 percent of the sand above 82 inches, and more than 50 percent of the sand below 82 inches.

c. 12 kg/m^2 to 60 inches (Method 6A).

d. Resistivity of fine- and medium-textured soils measured at saturation is similar to that measured at moisture equivalent. Resistivity at saturation for coarse-textured soils is generally lower than that obtained at moisture equivalent.

Soil classification: Aridic Calciustoll; fine-silty, mixed, hyperthermic.
Soil: Uvalde clay loam.
Soil Nos.: S63TX-254-1; 18249-18257.
Location: Zavala County, Texas; 0.5 mile east of La Pryor intersection of Loop 305 and Highway 76; 0.6 mile on gravel road - 90 yards west in field.
Vegetation and use: Cultivated; broken out of brush 6 years ago - seeded sudan at present - has supplemental irrigation.
Topography: Nearly level, very broad terrace having mostly plane surfaces and gradients of less than 1 percent.
Drainage and permeability: Well drained. Runoff is slow. Permeability is moderate.
Parent material: Loamy Pleistocene alluvium.
Sampled by and date: M. Stout, W. R. Elder and R. B. Grossman, April 22, 1963.
Described by: M. Stout and H. C. Dean.

Ap 18249 0 to 6 inches. Grayish brown (10YR 5/2) clay loam; very dark grayish brown (10YR 3/2) moist; weak granular structure having many wormcast; upper 2 inches is lighter colored; more loamy crust of light brownish gray, mostly sealed; few $CaCO_3$ concretions and terrestial snail shells; hard; friable; horizon dry and cracked through; moderately alkaline; calcareous; abrupt lower boundary.

A1 18250 6 to 15 inches. Grayish brown (10YR 5/2) clay loam; very dark grayish brown (10YR 3/2) moist; weak to moderate very fine granular and subangular blocky structure; many wormcasts; hard; friable; common fine calcium threads and fewer concretions and snail fragments; few to common worm channels and termite tunnels; calcareous; clear wavy lower boundary.

B21ca 18251 15 to 23 inches. Brown (10YR 5/3) clay loam; dark brown (10YR 3.5/3) moist; weak prismatic breaking down to weak to moderate fine subangular blocky structure; hard; friable; many fine lime threads which are not apparent when moist; few very fine $CaCO_3$ concretions and crushed snail shells; common wormcasts and few termite channels or tunnels; calcareous; slightly wavy clear lower boundary.

B22ca 18252 23 to 31 inches. Brown (10YR 5.5/3) clay loam; darker brown (10YR 4/3) moist; weak prismatic; weak to moderate fine subangular blocky structure; hard; friable; very crumbly; common wormcasts and filled nests; few termite tunnels; common fine $CaCO_3$ concretions and crushed and whole shells; many very fine pores; calcareous; clear wavy lower boundary.

B23ca 18253 31 to 45 inches. Pale brown (10YR 6/3) clay loam; brown (10YR 5/3) moist; otherwise same as horizon above; clear lower boundary.

C1ca 18254 45 to 59 inches. Light yellowish brown (10YR 6/4) silty clay loam; yellowish brown (10YR 5/4) moist; weak prismatic breaking to moderate subangular blocky structure; hard; friable; estimated 15 percent $CaCO_3$ concretions and soft masses; common wormcasts and few termite channels; calcareous; diffuse lower boundary.

C2ca 18255 59 to 70 inches. Brown (7.5YR 5.5/4) silty clay loam; darker brown (7.5YR 4.5/4) moist; weak prismatic breaking to weak subangular blocky structure; hard; friable; estimated 5 percent $CaCO_3$ concretions and masses; few wormholes and termite channels; calcareous; diffuse lower boundary.

C3ca 18256 70 to 82 inches. Color same, silty clay, with few concretions of lime; structure and consistence same; calcareous; gradual discontinuous wavy or irregular boundary.

IIC1cam 18257 82 to 96 inches. Very pale brown (10YR 8/4) clay loam, hard horizon of high calcium carbonate, which cannot easily be penetrated with bar or auger; augered.

Remarks: White $CaCO_3$ concretions in much of the pedon are slightly hard and mostly in vertical position and are seemingly filled worm or termite channels.

Textures above agree with laboratory data. Field textures where different are given below:

Ap - light silty clay loam
A1 - silty clay loam
B21ca - silty clay loam
B22ca - silty clay loam
B23ca - silty clay loam
C1ca - light silty clay loam
C2ca - light clay loam
C3ca - loam

SOIL CLASSIFICATION: Aridic Calciustoll; fine-silty, mixed, hyperthermic

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Uvalde loam SOIL Nos. S63TX-254-2 LOCATION Zavala County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 18258-18266 March 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (in)	Horizon	Size class and particle diameter (mm) 3A1 — Total Sand (2–0.05) [a]	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: Int. III (0.05–0.02)	Silt: Int. III (0.02–0.002)	Int. II (0.2–0.02)	(2–0.1)	3A1a Non-Carbonate <0.002	Coarse fragments 2A2: 3B1 ≥ 2	2–19	19–76
		Pct. of < 2 mm													Pct.	Pct. of < 76mm	
0-6	Ap	36.2	37.4	26.4	0.1	0.8	2.7	11.5	21.1	16.3	21.1	45.4	15.1	22	tr		
6-15	A1	32.7	35.7	31.6	0.1	0.9	2.3	10.2	19.2	15.0	20.7	41.2	13.5	25	tr		
15-24	B21ca	27.6	36.1	36.3	0.2	0.7	1.8	8.6	16.3	14.3	21.8	36.6	11.3	26	tr		
24-33	B22ca	24.7	37.3	38.0	0.3	0.7	1.5	7.1	15.1	13.5	23.8	33.5	9.6	26	tr		
33-46	B23ca	22.4	40.1	37.5	1.1	1.1	1.2	6.0	13.0	12.4	27.7	29.6	9.4	21	tr		
46-57	C1ca	18.2	44.0	37.8	0.8	0.9	1.1	4.9	10.5	10.9	33.1	24.8	7.7	20	tr		
57-69	C2ca	16.8	45.2	38.0	1.8	1.1	1.0	4.2	8.7	9.7	35.5	21.3	8.1	22	tr		
69-86	C3ca	19.5	43.9	36.6	1.2	1.3	1.1	4.9	11.0	11.9	32.0	26.3	8.5	29	tr		
86-108	C4ca	11.3	50.9	37.8	0.4	0.3	0.5	2.8	7.3	10.4	40.5	19.7	4.0	28	tr		

Depth (in.)	6A1a Organic carbon [b]	Nitrogen	C/N	Carbonate as $CaCO_3$: 6E1b <2mm	3A1a <0.002 mm	Ext. Iron as Fe	Bulk density: 4A1d 1/3-Bar	4A1b Air-Dry	4D1 COLE	Water content: 4B1c 1/3-Bar	4B2 15-Bar	4C1 1/3-to 15-Bar	pH 8C1a 1:1
	Pct.	Pct.		Pct.	Pct	Pct.	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.	
0-6	1.43			17	4		1.09	1.16	0.020		26.8	11.0	0.17	7.8
6-15	1.02			21	7		1.11	1.17	0.017		24.1	12.0	0.13	7.7
15-24	0.69			27	10		1.22	1.31	0.024		25.3	12.5	0.16	7.8
24-33	0.48			30	12		1.3 c					12.2		7.8
33-46	0.29			41	17		1.30	1.38	0.020		26.4	10.9	0.20	7.6
46-57	0.18			49	18		1.4 c					10.7		7.6
57-69	0.13			53	16		1.44	1.51	0.017		23.1	11.4	0.17	7.7
69-86	0.06			51	8							13.6		7.8
86-108	0.08			51	10							11.8		7.9

Depth (in.)	Extractable bases 5B1a: 6N4b Ca	6O4b Mg	6P2a Na	6Q2a K	Sum	Cat. Exch. Cap.: Sum Cations	5A1a NH_4OAc	8D3 Ca/Mg	Base saturation: Sum Cations	NH_4OAc
	meq/100 g								Pct	Pct.
0-6	15.4	2.0	0.1	1.9	19.4		16.2	7.7		
6-15	16.3	1.8	0.1	1.4	19.6		15.9	9.1		
15-24	15.8	1.5	0.1	0.6	18.0		15.4	11		
24-33	15.3	1.7	0.3	0.5	17.8		14.8	9.0		
33-46	13.6	2.2	0.3	0.5	16.6		12.1	6.2		
46-57	10.8	2.1	0.3	0.4	13.6		9.2	5.1		
57-69	8.2	2.6	0.3	0.4	11.5		8.0	3.2		
69-86	7.5	3.9	0.4	0.5	12.3		8.4	1.9		
86-108	8.6	6.0	0.5	0.7	15.8		11.5	1.4		

Depth (in.)	Ratios to Clay 8D2: NH_4OAc CEC	Ext. Iron	15-Bar Water
0-6	0.74		0.50
6-15	0.64		0.48
15-24	0.59		0.48
24-33	0.57		0.47
33-46	0.58		0.52
46-57	0.46		0.54
57-69	0.36		0.52
69-86	0.29		0.37
86-108	0.41		0.42

a. Carbonate comprises 10 to 20 percent of the sand.
b. 10 kg/m^2 to 60 inches (Method 6A).
c. Estimated.

Soil classification: Aridic Calciustoll; fine-silty, mixed, hyperthermic.
Soil: Uvalde loam.
Soil Nos.: S63TX-254-2; 18258-18266.
Location: Zavala County, Texas; 1.2 miles west of La Pryor, Texas, on U.S. 83, 140 yards south on field road, 33 yards east in idle field.
Vegetation and use: Root plowed in 1959 and seeded Texas bristlegrass.
Topography: Broad nearly level terrace having mostly plane surfaces and less than 1 percent gradient.
Drainage and permeability: Well drained. Runoff is slow. Permeability is moderate.
Parent material: Loamy Pleistocene alluvium.
Sampled by and date: M. Stout, W. R. Elder, R. B. Grossman, J. A. DeMent, April 22, 1963.
Described by: M. Stout and H. C. Dean.

Ap 18258 0 to 6 inches. Light brownish gray (10YR 6/2) loam; very dark grayish brown (10YR 3.5/2) moist; weak fine granular and subangular blocky structure, cloddy when dry; many fine wormcast; hard; friable; upper 2 inches is a lighter-colored crust, which is sealed in the upper 1/32 inch and is porous, somewhat platy below; moderately alkaline; calcareous; abrupt lower boundary.

A1 18259 6 to 15 inches. Grayish brown (10YR 5/2) clay loam; very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure with some fine granular; hard; friable; has common streaks of light brownish gray; few fine to medium $CaCO_3$ concretions and common very fine lime threads; many wormcasts and filled channels; few termite runs; moderately alkaline; calcareous; clear lower boundary.

B21ca 18260 15 to 24 inches. Brown (10YR 5/3) clay loam; dark brown (10YR 4/3) moist; weak prismatic breaking to weak subangular blocky structure; many very fine pores; few fine to medium $CaCO_3$ concretions; many very fine lime films dry, which are not apparent moist; hard; friable; moderately alkaline; calcareous; lower boundary is gradual.

B22ca 18261 24 to 33 inches. Very pale brown (10YR 6.5/3) clay loam; brown (10YR 5/3) moist; crushed color when dry; light brownish gray (10YR 6.5/2); otherwise same as above; clear wavy lower boundary.

B23ca 18262 33 to 46 inches. Very pale brown (10YR 6.5/3) clay loam; brown (10YR 5.5/3) moist; weak subangular blocky structure to massive in place; hard; friable; very crumbly; approximately 20 percent $CaCO_3$ concretions and an unestimated percentage of uniform disseminated lime, upper 2 inches has a prominent band of soft $CaCO_3$; moderately alkaline; calcareous; common wormcasts and termite runs; slightly wavy diffuse lower boundary.

C1ca 18263 46 to 57 inches. Very pale brown (10YR 7/3) silty clay loam; pale brown (10YR 6/3) moist; otherwise same as above horizon; lower boundary slightly wavy, diffuse.

C2ca 18264 57 to 69 inches. Pale brown (10YR 6/3) silty clay loam; brown (10YR 5/3) moist; structureless; hard; friable; approximately 60 percent $CaCO_3$ concretions and an unestimated percentage of uniform disseminated lime; common wormcasts and termite runs; calcareous; lower boundary slightly wavy, diffuse.

C3ca 18265 69 to 86 inches. Light brown (7.5YR 6/4) silty clay loam; brown (7.5YR 5/4) moist; weakly cemented in place; otherwise same as above horizon.

C4ca 18266 86 to 108 inches. Very pale brown (10YR 7/3) silty clay loam; pale brown (10YR 6/3) moist; continuation of above horizon except for color; gradual lower boundary and somewhat wavy in places; irregular in others; augered.

Ccam 108 inches plus. Horizon weakly cemented, composed mostly of hard $CaCO_3$ concretions.

Remarks: White $CaCO_3$ concretions are slightly hard and many are oriented with the vertical and seem to be filled worm or termite channels; medium to coarse in size.

The Ap horizon fails clay loam texture by 0.6 percent clay. Loam not presently allowed in series, but probably should be.

Textures above agree with laboratory data. Field textures where different are given below:

Ap - light clay loam
B21ca - silty clay loam or clay loam
B22ca - silty clay loam or clay loam
B23ca - heavy clay loam
C1ca - heavy silty clay loam
C2ca - heavy silty clay loam
C3ca - heavy silty clay loam
C4ca - heavy silty clay loam

SOIL CLASSIFICATION Aridic Calciustoll; fine-loamy, mixed, mesic

SOIL Series not designated | LOCATION Hansford County, Texas

SOIL NOS. S57TX-98-6 | LAB. NOS. 5777-5781

SOIL SURVEY LABORATORY Lincoln, Nebraska | DATE April 25, 1958

GENERAL METHODS 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	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 (<19mm.)	TEXTURAL CLASS
0-5	Ap	0.1a	1.0b	1.5b	5.6b	13.1b	56.1	22.6	56.6	16.0	-	sil
5-13	A12	-	0.8c	1.4c	4.7c	9.5c	53.0	30.6	48.4	16.8	-	sicl
13-24	B21ca	0.3d	1.8d	2.2c	6.8c	9.2c	44.9	34.8	38.3	19.6	1	cl
24-35	B22ca	0.6d	2.7d	3.6c	11.6c	11.2c	36.7	33.6	30.1	24.1	Tr.	cl
35-60	Cca	1.4d	2.0d	3.2c	12.6c	10.2c	46.3	24.3	23.0	40.6	Tr.	l

	pH 8C1a		ORGANIC MATTER 6A1a	6B1a		8A2	ELECTRICAL CONDUCTIVITY EC x 10^3 MILLIMHOS PER CM. 6A1a	6E1a		MOISTURE TENSIONS		4B2
	1:5	1:10	ORGANIC CARBON %	NITROGEN %	C/N	EST% SALT (BUREAU CUP)		$CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
1:1												
8.0	8.5	8.6	1.28	.132	9.7	<0.20	0.7	3				10.3
8.1	8.5	8.7	1.04	.112	9.3	<0.20	0.6	9				13.4
8.2	8.5	8.8	0.69	.082	8.4	<0.20	0.8	25				11.8
8.2	8.7	8.9	0.23			<0.20	1.2	33				8.9
8.6	9.1	9.3	0.09			<0.20	0.6	53				6.6

5A1a	EXTRACTABLE CATIONS 5B1a					5D2	8A1Sat.Ext.Sol.		8D1 Ratios to Clay			8A
CATION EXCHANGE CAPACITY NH_4Ac	Ca	Mg	H	6P1a Na	6Q1a K	EXCH. Na %	6P2a Na	6Q2a K	NH_4OAc CEC		15-Bar Water	MOISTURE AT SATURATION %
←	milliequivalents per 100g. soil →						← meq/l. →					
21.1				-	1.4	-	0.2	0.5	0.93		0.46	51.2
20.4				-	0.7	-	0.2	0.2	0.67		0.44	65.6
15.5				-	0.5	-	0.3	0.2	0.45		0.34	57.0
11.3				0.1	0.5	1	0.6	0.3	0.34		0.27	46.4
7.0				0.2	0.4	1	1.6	0.3	0.29		0.27	45.3

a. Organic matter
b. Few, smooth black concr. (Mn-Fe?)
c. Few, $CaCO_3$ concr.
d. Many, $CaCO_3$ concr.

Soil classification: Aridic Calciustoll; fine-loamy, mixed, mesic.
Soil: Series not designated.
Soil Nos.: S57TX-98-6; 5777-5781.
Location: One mile north by county road from the junction of Texas Highway No. 15 and the Santa Fe Railroad in the west side of Spearman, 1.25 miles west by county road and 240 feet south into a cultivated field.
Area: Hansford County, Texas.
Vegetation: Fallow at time of sampling.
Physiography: Upland plain.
Relief: Nearly level with gradient of about 0.8 percent. Sampled within an area of 75 to 100 acres.
Collected by: R. E. Daniell, J. S. Allen, W. Brooks, L. Jucquot, M. Turner, P. Mohle, and A. J. Welker.
Described by: R. E. Daniell, June 19, 1957.

Ap 5777 0 to 5 inches. Dark grayish brown (10YR 4.5/2, 3/2 moist) silt loam; very weak granular and subangular blocky; very friable moist; soft dry; calcareous; clear boundary.

A12 5778 5 to 13 inches. Dark grayish brown (10YR 4/2, 3/2 moist) silty clay loam; weak to moderate fine subangular blocky and granular; friable moist; slightly hard dry; estimated 50 percent or more of the mass is wormcasts and nests of wormcasts; many pores about 1.0 mm in diameter; some nests of wormcasts are lighter or darker color than soil mass; calcareous; diffuse boundary.

B21ca 5779 13 to 24 inches. Light brown (9YR 6/4, 4/4 moist) clay loam; weak fine subangular blocky with some granular; friable moist; slightly hard dry; many pores mostly about 1.0 mm in diameter; many wormcasts, number decreasing with depth; wormcasts in lower portion mostly in nests; highly calcareous; diffuse boundary.

B22ca 5780 24 to 35 inches. Light brown (7.5YR 6/4, 5/6 moist) clay loam; weak fine subangular blocky; friable moist; slightly hard dry; common pores less than 0.75 mm in diameter; few wormcasts; highly calcareous; common soft, few hard $CaCO_3$ concretions up to 8 mm in diameter; clear boundary.

Cca 5781 35 to 60 inches. Light brown (7.5YR 6/4, 4.5/4 moist) loam; friable moist; highly calcareous; few small hard $CaCO_3$ concretions; many soft $CaCO_3$ concretions up to 2 inches in diameter; estimated 50 percent by volume of $CaCO_3$.

Remarks: One large krotovina occurred on the opposite side of the pit and was about 12 inches in diameter. The Cca upper boundary is irregular in that much lighter-colored and higher lime spots about 10 inches high and 15 inches wide stick up in the 24- to 35-inch horizon. At a distance of 200 feet from the site, lime concretions were at the surface.

This pedon was sampled as Portales and appears as Portales in the soil survey for Hansford County, Texas, issued June 1960; some of these data are given on pages 37 and 38 of that publication.

Textures above agree with laboratory data. Field textures where different are given below:

Ap - light silty clay loam
B21ca - silty clay loam
B22ca - silty clay loam
Cca - silty clay loam

SOIL CLASSIFICATION Aridic Calciustoll; fine-silty, mixed, mesic

SOIL Series not designated LOCATION Hansford County, Texas

SOIL NOS. S57TX-98-5 LAB. NOS. 5771-5776

SOIL SURVEY LABORATORY Lincoln, Nebraska DATE April 25, 1958

GENERAL METHODS 1A, 1B1a, 2A1, 2B

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	TEXTURAL CLASS
0-5	Ap	0.1a	0.5a	0.5b	3.2b	15.1b	57.6	23.0	59.2	16.1	-	sil
5-9	A12	-	0.3a	0.4b	1.7b	9.5b	55.9	32.2	49.1	17.6	-	sicl
9-17	B21	0.2c	0.4c	0.4b	1.8b	7.7b	51.4	38.1	41.9	18.6	-	sicl
17-28	B22ca	0.3c	0.4c	0.4b	1.9b	6.9b	44.8	45.3	27.3	25.9	-	sic
28-38	B23ca	0.2c	0.6c	0.6b	2.6b	9.6b	45.0	41.4	32.9	23.6	-	sic
38-70	B24ca	0.2c	0.6c	0.5c	3.1c	11.7c	44.1	39.8	37.3	21.0	-	sicl

	pH 8C1a		ORGANIC MATTER			8A2	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM 8A1a	6E1a		MOISTURE TENSIONS		4B2
			6A1a	6B1a		EST% SALT (BUREAU CUP)		$CaCO_3$ equivalent	GYPSUM me./100g. SOIL	1/10 ATMOS.	1/3 ATMOS.	15 ATMOS.
1:1	1:5	1:10	ORGANIC CARBON %	NITROGEN %	C/N			%		%	%	%
8.0	8.5	8.6	1.38	.129	10.7	<0.20	1.1	2				11.0
8.0	8.5	8.6	1.19	.123	9.7	<0.20	0.6	4				14.6
8.0	8.6	8.8	0.86	.099	8.7	<0.20	0.7	16				15.3
8.0	8.5	8.8	0.45	.061	7.4	<0.20	1.5	40				12.8
8.3	8.9	9.1	0.17			<0.20	0.7	34				12.0
8.4	9.0	9.2	0.08			<0.20	0.8	27				12.8

5A1a	EXTRACTABLE CATIONS			5B1a	5D2	8A1 Sat. Ext. Sol.		8D1 Ratios to Clay		8A
				6P1a	6Q1a		6P2a	6Q2a			
CATION EXCHANGE CAPACITY NH_4Ac	Ca	Mg	H	Na	K	EXCH. Na %	Na	K	NH_4OAc CEC	15-Bar Water	MOISTURE AT SATURATION %
← milliequivalents per 100g. soil →							← meq/l. →				
20.6				-	1.7	-	0.2	0.9	0.90	0.48	46.8
23.2				-	0.9	-	0.2	0.2	0.72	0.45	57.7
20.4				-	0.6	-	0.3	0.2	0.54	0.40	61.2
15.1				0.1	0.5	1	0.7	0.2	0.33	0.28	52.4
15.5				0.2	0.6	1	1.5	0.2	0.37	0.29	51.0
16.3				0.5	0.8	2	2.9	0.2	0.41	0.32	57.7

a. Common $CaCO_3$ concr.
b. Common $CaCO_3$ concr. And few smooth black concr. (Mn-Fe?)
c. Many $CaCO_3$ concr.

Soil classification: Aridic Calciustoll; fine-silty, mixed, mesic.
Soil: Series not designated.
Soil Nos.: S57TX-98-5; 5771-5776.
Location: Four miles north by county road from junction of Texas Highway No. 15 and the Santa Fe Railroad in the west side of Spearman, then 420 feet east and 180 feet north into a cultivated field.
Area: Hansford County, Texas.
Vegetation: Fallow at the time of sampling.
Physiography: Upland plain.
Relief: Nearly level with gradient of about 0.8 percent. Sampled within an area of about 100 acres.
Collected by: R. E. Daniell, J. S. Allen, W. Brooks, L. Jucquot, M. Turner, P. Mohle, and A. J. Welker.
Described by: R. E. Daniell, June 19, 1957.

Ap 5771 0 to 5 inches. Dark grayish brown (10YR 4.5/2, 3/2 moist) silt loam; very weak subangular blocky and granular; very friable moist; soft dry; calcareous; lower 2 inches compacted and tendency toward weak platy; clear boundary.

A12 5772 5 to 9 inches. Dark grayish brown (10YR 4/2, 3/2 moist) silty clay loam; weak fine subangular blocky and some granular; friable moist; slightly hard dry; many wormcasts; many pores mostly less than 1 mm in diameter; calcareous; gradual boundary.

B21 5773 9 to 17 inches. Brown (10YR 5/3, 4/3 moist) silty clay loam; same structure and consistency as A12; many pores less than 1 mm in diameter, few 1 to 2 mm in diameter; some nests of wormcasts are dark grayish brown; highly calcareous; gradual boundary.

B22ca 5774 17 to 28 inches. Light yellowish brown (9YR 6/4, 5/4 moist) silty clay; very weak subangular blocky and granular; friable moist; slightly hard dry; many pores less than 1 mm in diameter; common wormcasts, some are dark grayish brown; highly calcareous; few small soft $CaCO_3$ concretions; clear boundary.

B23cab 5775 28 to 38 inches. Reddish brown (6.5YR 5/4, 4/4 moist) silty clay; weak fine blocky and medium and fine prismatic; firm moist; very hard dry; few pores less than 0.75 mm; highly calcareous; many soft concretions and splotches of $CaCO_3$; gradual boundary.

B24cab 5776 38 to 70 inches. Reddish brown (6.5YR 5/4, 4/4 moist) silty clay loam; similar structure, consistency as B23cab; less pores than B23cab; few scattered thin patchy dark-colored coatings on medium and large ped surfaces; probably manganese; highly calcareous; few soft concretions and splotches of $CaCO_3$ increasing in depth to common in lower portion.

Remarks: Krotovinas occurred in the 17- to 28-inch horizon and were about 8 to 10 inches in diameter.

This pedon was sampled as Portales, and the site was mapped Portales in the soil survey for Hansford County, Texas, issued June 1960.

Textures above agree with laboratory data. Field textures where different are given below:

Ap - light silty clay loam
B22ca - silty clay loam
B24ca - silty clay

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Aridic Calciustoll; fine-silty, mixed, thermic

SOIL Series not designated SOIL Nos. S60TX-33-2 LOCATION Carson County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 12707-12710

Depth (In.)	Horizon	Size class and particle diameter (mm)													Coarse fragments		
		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															
2-12	A1		52.0	28.2	<0.1	0.2b	0.2b	2.5b	16.9b		16.1	54.8			-		
18-22	B2		44.2	38.8	0.1a	0.3a	0.3b	2.0b	14.3b		17.4	42.7			tr		
22-34	B2ca		46.4	39.5	<0.1	0.2a	0.3b	1.9b	11.7b		23.3	36.3			-		
60-70	Cca		46.2	35.9	<0.1	0.2a	0.4b	2.3b	15.0b		18.1	44.9			tr		

Depth (In.)	Organic carbon	Nitrogen	C/N		Carbonate as $CaCO_3$		Bulk density				Water content				pH		
															Sat. Paste		(1:1)
	Pct.	Pct			Pct		g/cc	g/cc	g/cc		Pct.	Pct.	Pct.				
	2.18				6										7.7		
	0.99				19										7.8		
	0.33				32										7.9		
	0.06				21										8.0		

Depth (In.)	Extractable bases														Base saturation	
	Ca	Mg	Na	K												
	meq/100 g														Pct.	Pct.

Depth (In.)					

a. Common carbonate concretions ($CaCO_3$?).

b. Few carbonate concretions ($CaCO_3$?).

Soil classification: Aridic Calciustoll; fine-silty, mixed, thermic.
Soil: Series not designated.
Soil Nos.: S60TX-33-2; 12707-12710.
Location: About 300 yards west and 20 yards north of southeast corner of Section 78, Block B 7, 3.8 miles east of Panhandle, Texas. Carson County, Texas.
Vegetation: Native pasture in good condition. The vegetation consists of buffalograss and bluegrama.
Physiography: Upland.
Relief: Smooth convex slope with gradient of 4 percent above playa bench. Playa bottom is about 0.5 mile east of site.
Described by and date: Luther Geiger, January 13, 1960.

A1 12707 2 to 12 inches. Dark grayish brown (10YR 4/2, 3/2 moist) clay loam; moderate fine subangular blocky and granular; slightly sticky wet, friable moist; strongly calcareous; a few fine hard calcium carbonate concretions; wormcasts common; gradual boundary.

B2 12708 18 to 22 inches. Brown (7.5YR 5/4, 4/4 moist) clay loam; weak fine granular; slightly sticky wet, very friable; strongly calcareous; a few fine and medium calcium carbonate concretions; a few patches of thin clay films; gradual boundary.

B2ca 12709 22 to 34 inches. Light brown (7.5YR 6/4, 5/4 moist) heavy clay loam; moderate fine and very fine subangular blocky; slightly sticky wet, friable moist; hard when dry; very strongly calcareous with common masses and coatings soft calcium carbonate; common fine and medium pores; gradual boundary.

Cca 12710 60 to 70 inches. Light reddish brown (5YR 6/4, 5/4 moist) heavy clay loam; moderate fine subangular blocky; slightly sticky wet; hard when dry; strongly calcareous; hard and semihard fine calcium carbonate concretions common; a few very fine roots; many fine pores.

Sampling depths:

A1	1-8 inches
B2	12-18 inches
B2ca	28-34 inches
Cca	60-70 inches

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Lithic Calciustoll; clayey-skeletal, montmorillonitic, thermic

SOIL Tarrant cobbly clay SOIL Nos. S64TX-155-1 LOCATION McLennan County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 20225-20227 March 1968
GENERAL METHODS: 1A, 1B1b, 2A1, 2B

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)	3A1a Non-carbonate <0.002		Coarse fragments 2A2: 3B1 ≥ 2 (<19) Pct.	2 – 19	19 – 76
		Pct. of ≤ 2 mm														Pct.	Pct. of ≤ 76mm	
0-9	A11	3.1a	36.2	60.7	0.2	0.2	0.2	0.5	2.0	18.4	17.8	20.7	1.1	61		8		
9-17	A12															18		
22-32+	R	15.4b	41.1	43.5	2.4	2.5	1.7	4.4	4.4	11.2	29.9	18.2	11.0	39		26		

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	Carbonate as $CaCO_3$: 6E1b <2mm	3A1a <0.002 mm	6C2a Ext. Iron as Fe	Bulk density			Water content:	4B2 15-Bar	pH 8C1a	
	Pct.	Pct.		Pct.	Pct.	Pct.	g/cc	g/cc	g/cc	Pct.	Pct.	1:1	
0-9	4.22	0.357	12	2	-	1.6					24.1	7.6	
9-17	3.06	0.273	11								22.8	7.7	
22-34+	2.06	0.203	10	50	5	1.0					16.9	7.7	

Depth (In.)	Extractable bases 6N4b Ca	6O4b Mg	6P2a Na	6Q2a K	5B1a Sum	Cat. Exch. Cap. 5A1a Sum Cations	5A1a NH_4OAc	Liquid Limit	Plasticity Index	Linear Shrinkage	Ca/Mg	Base saturation: Sum Cations	NH_4OAc
	meq/100 g							Pct.	Pct.	Pct.		Pct.	Pct.
0-9	46.7	1.9	0.1	1.6	50.3		46.7	65	27	18.7			
9-17													
22-34+	29.6	0.9	tr	0.6	31.1		27.4						

Depth (In.)	Ratios to Clay 8D2: NH_4OAc CEC	Ext. Iron	15-Bar Water
0-9	0.77	0.03	0.40
9-17			
22-34+	0.70	0.03	0.43

a. Carbonate comprises approximately 10 percent of the sand.
b. Carbonate comprises more than 50 percent of the sand.

Soil classification: Lithic Calciustoll; clayey-skeletal, montmorillonitic, thermic.
Soil: Tarrant cobbly clay.
Soil Nos.: S64TX-155-1; 20225-20227.
Location: McLennan County, Texas. In native pasture about 150 feet west of a concrete watering trough and a mesquite tree; 0.2 mile east of a railroad crossing that is 1.2 miles south of the center of Crawford, Texas, along Texas Highway 317.
Vegetation and use: Burclover, bitterweed, buffalograss, occasional prickly pear cactus, crotonweed, mesquite tree and live oak mott; heavily grazed native pasture.
Topography: Undulating; slopes in the area range from about 1 to 8 percent, with few slightly steeper breaks to drains; at pedon site, which is in a ridgetop position, the slope is about 3 percent and the surface is slightly convex. This is a soil area of over 1,000 acres of Tarrant stony clay. A few small areas of Denton clay occur along the lower parts of slopes adjacent to side drains.
Drainage and permeability: Well drained. Runoff is rapid. Slowly permeable.
Parent material: Limestone; probably Edwards limestone formation of the Fredericksburg geologic group (Comanche series), Lower Cretaceous Period.
Sampled by and date: G. S. McKee and W. R. Elder, October 1, 1964.
Described by: G. S. McKee and W. R. Elder.

All 20225 0 to 9 inches. Very dark grayish brown (10YR 3/2) cobbly clay (estimated 40 percent clay content in soil fines); very dark brown (10YR 2/2) when moist; containing about 40 percent by volume of limestone fragments that are mostly of cobble size, less than 10 inches across the long axis and dominantly 3 to 6 inches in diameter, an estimated 3 to 5 percent of the 40 percent consists of gravel-size limestone fragments; the cobbles seem smooth on the tops and some are very slightly subrounded and slightly cracked; the fines are of strong very fine subangular blocky and strong medium granular structure; very crumbly; firm when moist; sticky and plastic when wet; contains occasional wormcasts and plentiful grass and weed roots; calcareous; clear irregular boundary in the soil fines between the limestone fragments.

A12 20226 9 to 17 inches. Limestone fragments of cobble and stone-size (mostly about 4 to 14 inches across the long axis and about 3 to 5 inches thick); the limestone fragments form a discontinuous horizontal layer in which the cobbles and stones are mainly oriented with their long axis horizontally, but a few are tilted slightly; vertical cracks between the limestone fragments are up to about 1 inch wide and they are filled with dark brown (10YR 4/2.5) when moist, light clay; strong very fine subangular blocky and granular as in the layer above; crumbly; firm, sticky and plastic when wet; horizontal crevices between the limestone fragments are up to about 1/2 or 3/4 inch thick and also are filled with clay; estimated volume of clay in the layer is about 5 or 10 percent; calcareous; contains plentiful fibrous roots; abrupt very slightly wavy boundary.

R 20227 17 to 32 inches plus. Alternating indurated limestone, and slightly cemented limestone that can be dug with a spade with much effort; the upper 5-inch layer is indurated limestone that has fractures about 6 to 12 inches apart; the cracks are less than 1/4 inch wide and some fit one against another vertically but they have brownish organic and soil stains along the faces of the fractures; some of the crevices contain very thin (less than 1/4 inch thick) layers of clay in the vertical cracks in this upper 5 inches of the horizon, which allows root penetration to the lower part of layer; from a depth of 22 to 32 inches the layer consists of alternating soft or slightly hard limestone that can be dug with a spade and thin fractured hard limestone layers varying in thickness from about 1 to 3 inches thick across the 2-foot wide pit; the hard limestone layers can be broken with a heavy bar; brown (7.5YR 4/4) moist, calcareous clay occurs in small pockets between the thin limestone layers; the clay pockets contain small clusters of fine roots; at a depth of 30 inches there is an indurated limestone layer; penetration to 32 inches was achieved; but the layer cannot be broken through with a heavy bar.

Remarks: The S64Tex-155-1 pedon is the brown calcareous clay, which occurs in pockets or crevices in the hard limestone within the layer. Limestone fragments in the R layer have small pendants on underside.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Lithic Calciustoll; clayey-skeletal, montmorillonitic, thermic

SOIL Tarrant cobbly silty clay SOIL Nos. S64TX-155-2 LOCATION McLennan County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 20228-20229 March 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05) [a]	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 <0.002		Coarse fragments 2A2: 3B1 > 2 (<19) Pct.	2–19	19–76
		Pct. of < 2 mm														Pct.	Pct. of < 76mm	
0-9	A11	9.8	42.2	48.0	2.0	1.5	0.7	1.5	4.1	21.0	21.2	26.0	5.7	48		14		
9-16	A12	13.4	42.3	44.3	4.0	2.7	1.0	2.0	3.7	18.9	23.4	23.8	9.7	44		17		

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	Carbonate as $CaCO_3$: 6E1b <2mm Pct.	Carbonate as $CaCO_3$: 3A1a <0.002 mm 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 1:1	8C1a
0-9	3.08	0.280	11	17	tr	1.5						19.3	7.8	
9-16	2.41	0.211	11	26	tr	1.5						18.6	7.8	

Depth (in.)	Extractable bases 5B1a: 6N4b Ca	6O4b Mg	6P2a Na	6Q2a K	Sum	Cat. Exch. Cap.: Sum Cations	5A1a NH_4OAc	Ca/Mg	Base saturation: Sum Cations Pct.	NH_4OAc Pct.
	meq/100 g									
0-9	39.6	1.5	tr	1.2	42.3		36.7			
9-16	37.0	0.8	0.1	0.9	38.8		32.6			

Depth (in.)	Ratios to Clay 8D2: NH_4OAc CEC	Ext. Iron	15-Bar Water
0-9	0.76	0.03	0.40
9-16	0.74	0.03	0.42

a. Carbonate comprises 10 to 20 percent of the sand.

Soil classification: Lithic Calciustoll; clayey-skeletal, montmorillonitic, thermic.
Soil: Tarrant cobbly silty clay.
Soil Nos.: S64TX-155-2; 20228-20229.
Location: McLennan County, Texas. About 700 feet east of a county road, from a point on the road that is 1.95 miles southeast of a railroad crossing and intersection of the county road and Texas Highway 317, which is 2.9 miles south of the center of Crawford, Texas.
Vegetation and use: Bitterweeds, buffalograss, Texas wintergrass, occasional crotonweed; downslope is an occasional mesquite tree and live oak mott; thin vegetative cover; area may have been disked or plowed many years ago, but there is no evidence of an Ap horizon.
Topography: Undulating; slopes in the area are about 1 to 8 percent, with a few slightly steeper breaks to drains; at pedon site, which is in a ridgetop position, the slope is about 2 percent and the surface is slightly convex. This is a large delineation of several hundred acres.
Drainage and permeability: Well drained. Runoff is rapid. Slowly permeable.
Parent material: Limestone, probably Edwards limestone formation of the Fredericksburg geologic group (Comanche series), Lower Cretaceous Period.
Sampled by and date: G. S. McKee and W. R. Elder, October 3, 1964.
Described by: G. S. McKee and W. R. Elder.

A11 20228 0 to 9 inches. Very dark grayish brown (10YR 3/2) cobbly silty clay, very dark brown (10YR 2/2) when moist; strong very fine subangular blocky and strong medium granular structure; crumbly; firm when moist, sticky and plastic when wet; calcareous; contains about 40 percent by volume of limestone fragments, dominantly about 3 to 6 inches across their long axis; about 20 to 30 percent of the coarse fragments are smaller than 3 inches across, mostly angular and some fine gravel size; some of the larger fragments appear to be etched; contains plentiful roots in the soil fines; gradual boundary between the rock fragments.

A12 20229 9 to 16 inches. Limestone fragments of cobble and stone size with about 10 percent by volume of dark brown (10YR 4/2.5) silty clay, very dark brown (10YR 2/3) moist, and when crushed it is (10YR 3/3) moist; strong very fine subangular blocky and strong medium granular; crumbly; firm when moist, sticky and plastic when wet; the limestone fragments dominantly are about 3 to 5 inches thick, vertically, and are about 4 to 10 inches across the horizontally lying long axis; vertical cracks between the fractured limestones are mostly less than about 1 inch wide; the soil is concentrated mostly in horizontal bands between apparent layer of the limestones; the tops of the limestone fragments are etched and the outsides are colored with brownish organic and soil stains; contains a few fine fibrous roots; abrupt slightly wavy boundary.

R 16 to 31 inches plus. Indurated crystalline fractured limestone layer to a depth of 25 inches, in which the fractures are not wide enough to see and can be distinguished only after the limestone is broken out with a heavy bar and the brownish stains can be seen in the fine fracture planes; at depths between 25 and 31 inches laminated or very thin bedded, alternating soft limestone that can be broken in the hand, and indurated limestone that is 1 or 2 inches thick and has occasional fractures that are almost indistinguishable prior to breaking with a bar occur; also has thin layers of marl and clay; the brown clay (7.5YR 4/4) moist is in thin lenses or small pockets up to about 1 inch thick vertically, and seems to be between layers of the hard limestone layers; clay contains occasional fine roots; clay component comprises about 1 or 2 percent of the volume of the R layer; upper surfaces of the hard limestone are etched and lower surfaces appear to have secondary coatings of indurated $CaCO_3$; at 31-inch depth, another indurated limestone layer was encountered, which could not be penetrated with a heavy bar.

Remarks: Secondary $CaCO_3$ occurs on underside of the limestone fragments in the R layer.

Textures above agree with laboratory data. Field textures where different are given below:

A11 - stony clay

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Lithic Calciustoll; clayey-skeletal, montmorillonitic, thermic

SOIL Tarrant cobbly silty clay SOIL Nos. S64TX-164-1 LOCATION Menard County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 20207-20208 March 1968

General Methods: 1A, 1B1b, 2A1, 2B

Depth (In.)	Horizon	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)	Int. II (0.2–0.02)	(2–0.1)	3A1a Non-Carbonate <0.002		Coarse fragments 2A2: 3B1 (≥3) Pct.	2 – 19	19 – 76
		Pct. of < 2 mm															Pct. of ≤ 76mm	
0-7	A11	4.6	42.4	53.0	tr	0.2	0.2	0.9	3.3	22.2	20.2	26.1	1.3	53		4		
7-13	A12ca	9.4	32.9	57.7	4.8	1.5	0.3	0.7	2.1	14.9	18.0	17.4	7.3	45		32		

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	Carbonate as $CaCO_3$: 6H1b <2mm Pct.	Carbonate as $CaCO_3$: 3A1a <0.002 mm 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 8C1a (1:1)	
0-7	3.63	0.293	12	3	-	0.7						22.2			7.6
7-13	3.74	0.326	11	26	13	0.7						22.2			7.6

Depth (In.)	Extractable bases 6N4b Ca	6O4b Mg	6P2a Na	6Q2a K	5B1a Sum	Cat. Exch. Cap. 5A1a NH_4OAc	8D3 Ca/Mg	Base saturation Pct.	Pct.
	meq/100 g								
0-7	48.6	2.4	0.1	1.2	52.3	48.4	20		
7-13	43.1	1.4	0.1	0.7	45.3	40.3	31		

Depth (In.)	Ratios to Clay 8D2: NH_4OAc CEC	Ext. Iron	15-Bar Water
0-7	0.91	0.01	0.42
7-13	0.90	0.02	0.49

a. Carbonate comprises 20 to 30 percent of the sand above 7 inches. The very coarse and coarse sands below 7 inches are primarily carbonate.

Soil classification: Lithic Calciustoll; clayey-skeletal, montmorillonitic, thermic.
Soil: Tarrant cobbly silty clay.
Soil Nos.: S64TX-164-1; 20207-20208.
Location: Menard County, Texas. In native pasture 500 feet west of U.S. Highway 83 (directly west of the U.S. Highway 83 sign and yield-right-of-way sign), which is 0.4 mile south of intersection of U.S. Highway 83 and Texas Highway 29, and 2.5 miles south of the intersection of U.S. Highway 83 and Ranch Road 2291 in Menard, Texas.
Vegetation and use: Buffalograss, Texas wintergrass (Stipa sp.), three-awn grasses, Panicum sp., Agarito, Mealy cup sage, prickly pear, shinnery oak, live oak motts (one is about 50 feet north of pedon site), few yucca. Poor range condition.
Topography: Undulating; slopes in area range from about 1 to 8 percent, with few slightly steeper breaks to drains. At pedon site the surface is plane and slope is about 3 percent. Site is about 300 feet below the crest of a slope with length of about 1,000 feet, and it is some 20-30 feet above natural drain.
Drainage and permeability: Well drained. Runoff is rapid. Slowly permeable.
Parent material: Limestone, probably Edwards formation of the Fredericksburg geologic group (Lower Cretaceous Period).
Sampled by and date: G. S. McKee and Otto Bynum, October 6, 1964.
Described by: G. S. McKee and Otto Bynum.

A11 20207 0 to 7 inches. Very dark grayish brown (10YR 3/2) cobbly silty clay (about 50 percent clay content in soil fines), very dark brown (10YR 2/2) when moist; contains about 35 percent, by volume, of hard cobble and stone-size limestone fragments and pebble-size fragments; strong medium granular and very fine subangular blocky structure; firm but crumbly, sticky and plastic; calcareous; contains plentiful grass roots and occasional live oak tree roots; some of the limestone fragments are subrounded and others are angular; many have caliche coating. The fragments range from 2 mm in diameter to about 14 inches across the long axis, and they dominantly are about 4 to 10 inches across the long axis; about 25 percent of the surface is covered with stone-size and cobble-size limestone fragments; clear irregular boundary in the fine earth portion between the fragments.

A12ca 20208 7 to 13 inches. Limestone cobbles and stones (mainly 8 to 14 inches across their long axes), lying mainly oriented with each other with their long axes in horizontal plane, having vertical cracks up to 2 inches wide, and with about 10-20 percent by volume of horizon of dark brown (10YR 3/3) moist, light clay of about 50 percent clay content; strong medium granular and very fine subangular blocky structure; calcareous; crumbly, firm, sticky and plastic; contains plentiful roots of grasses and forbs and occasional tree roots; cobbles and stones are caliche coated and have caliche pendants on undersides; and thinner caliche coatings on vertical faces and some very thin caliche coatings on the upper faces; abrupt slightly wavy boundary (about 3-inch difference in elevation across the 5-foot length of pit).

R 13 to 16 inches plus. Indurated limestone that was penetrated slowly to 16-inch depth with heavy bar with extreme effort; this layer is somewhat fractured but not enough so that pieces could be removed from pit of 3 feet by 5 feet.

Remarks: In another spot in the pasture about 200 feet distant west-southwest the indurated consolidated limestone is about 3 inches thick and was broken through with a heavy bar; beneath the hard slightly fractured limestone was soft limestone that could be dug with spade with much effort. Surface slightly crusted but slight surface crust crumbles easily.

Textures above agree with laboratory data. Field textures where different are given below:

All - stony clay

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Lithic Calciustoll; clayey-skeletal, montmorillonitic, thermic

SOIL Tarrant cobbly silty clay SOIL Nos. S64TX-164-2 LOCATION Menard County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 20209-20210 March 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05) [a]	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 <0.002		Coarse fragments 2A2: 3B1 > 2 (<19) Pct.	2–19 Pct. of < 2mm	19–76 Pct. of < 76mm
		Pct. of < 2 mm																
0-8	A11	4.9	42.5	52.6	0.4	0.3	0.3	0.7	3.2	22.5	20.0	26.2	1.7	52		2		
8-13	A12	5.4	37.9	56.7	1.3	1.1	0.4	0.7	1.9	16.0	21.9	18.3	3.5	48		18		

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	Carbonate as $CaCO_3$: 6E1b <2mm Pct.	3A1a <0.002 mm Pct.	6C2a Ext. Iron as Fe Pct.	Bulk density: g/cc	g/cc	g/cc	Water content: Pct.	Pct.	4B2 15-Bar Pct.		pH 8C1a 1:1	
0-8	3.18	0.291	11	6	1	0.6						22.6		7.6	
8-13	3.19	0.304	10	22	9	0.7						22.2		7.7	

Depth (in.)	Extractable bases 5B1a: 6N4b Ca	6O4b Mg	6P2a Na	6Q2a K	Sum	Cat. Exch. Cap.: Sum Cations	5A1a NH_4OAc		8D3 Ca/Mg	Base saturation: Sum Cations Pct.	NH_4OAc Pct.
	meq/100 g										
0-8	44.4	2.3	0.1	1.2	48.0			42.3	19		
8-13	41.4	3.9	0.1	1.1	46.5			39.8	11		

Depth (in.)	Ratios to Clay 8D2: NH_4OAc CEC	Ext. Iron	15-Bar Water
0-8	0.81	0.01	0.43
8-13	0.83	0.01	0.46

a. Carbonate comprises 10 to 20 percent of the sand.

Soil classification: Lithic Calciustoll; clayey-skeletal, montmorillonitic, thermic .
Soil: Tarrant cobbly silty clay .
Soil Nos.: S64TX-164-2; 20209-20210.
Location: Menard County, Texas. In native pasture 150 feet west of edge of U.S. Highway 83, and 1.2 miles south of the intersection of U.S. Highway 83 and Ranch Road 2291 in Menard, Texas.
Vegetation and use: Buffalograss, Texas wintergrass, (Stipa sp.), three-awn grasses; green sprangletop grass, prickly pear, occasional yucca, Mealy cup sage, occasional mesquite; small live oak motts are frequent (100 to 300 feet apart). Poor range condition.
Topography: Undulating; slopes in area range from about 1 to 8 percent, with few slightly steeper breaks to drains. At pedon site the surface is plane or very slightly convex with slope of about 1 percent, this site is about 100 feet below the crest, but is considered a ridgetop position. Slope length is about 700 to 1,000 feet, and the site is estimated to be about 30 or 40 feet above the natural drain.
Drainage and permeability: Well drained. Runoff is rapid. Slowly permeable.
Parent material: Limestone, probably Edwards formation of the Fredericksburg geologic group (Lower Cretaceous Period).
Sampled by and date: G. S. McKee and O. Bynum, October 6, 1964.
Described by: G. S. McKee and O. Bynum.

A11 20209 0 to 8 inches. Very dark grayish brown (10YR 3/2) cobbly silty clay, very dark brown (10YR 2/2) when moist; contains about 35 percent by volume of cobble and stone-size limestone fragments and some 5 percent of gravel-size limestone fragments; strong medium granular and very fine subangular blocky structure in soil fines; firm, crumbly, sticky and plastic; calcareous in soil matrix; contains plentiful grass, forb and live oak tree roots; limestone fragments are tilted in all directions and are caliche coated; clear irregular boundary in soil fines.

A12 20210 8 to 13 inches. Broken cobble and stone-size limestone, more or less oriented but not continuous and a few are slightly tilted from horizontal plane; cracks between limestone are up to 2 inches wide vertically and about 1 inch horizontally, and dark brown (10YR 3/2.5) when moist, light clay fills the cracks; the limestones have caliche coatings, and caliche pendants 1/4 to 3/4 inch long on lower sides; the caliche coatings are completely around the stones but do not bridge the stones or cobbles together; the clay is strong medium granular in upper part, and moderate very fine subangular blocky in lower part near and at the (lithic) contact with the bedrock; firm, crumbly, sticky and plastic; plentiful roots in both horizontal and vertical crevices; abrupt slightly wavy boundary.

R 13 inches plus. Fractured limestone bedrock.

Remarks: In road cut 150 feet east, the R horizon is as follows: Dominantly the layer is indurated but fractured limestone interbedded with thin seams (1/2 to 6 inches thick) of soft limestone containing some light clay in both vertical and horizontal cracks, 1/32 to 1/2 inch wide; thickness of indurated fractured limestone layer varies (within horizontal distance of 200 feet along road cut) from about 2 inches to about 3-1/2 feet, and in places along the cut it is more thickly interbedded with soft limestone; downslope, this interbedded soft and indurated limestone is underlain by a thick bed of massive, porous pulverulent lime at least 3 feet thick, which is underlain by another indurated fractured limestone layer; live oak tree roots to depth of at least 6 feet and noticed in vertical and horizontal cracks and in the pulverulent lime.

Textures above agree with laboratory data. Field textures where different are given below:

All - stony clay

SOIL CLASSIFICATION: Petrocalcic Calciustoll; fine-silty, mixed, thermic

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Series not designated SOIL Nos. S63TX-164-1 LOCATION Menard County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 18267-18273 March 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (In.)	Horizon	Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05) a	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 <0.002	Coarse fragments 2A2: 3B1 19-2 Wt. Pct.	3B2 19-2 Vol. of <19mm.
		Pct. of < 2 mm														
0-5	A11	8.6	44.7	46.7	0.8	0.9	0.8	1.7	4.4	20.8	23.9	26.1	4.2	47	5	2
5-11	A12	9.8	42.4	47.8	1.3	1.4	1.0	1.9	4.2	17.0	25.4	22.2	5.6	43	3	1
11-19	A13	11.9	41.7	46.4	3.0	1.9	1.0	2.1	3.9	16.0	25.7	21.1	8.0	38	5	2
19-27	Bca	17.3	40.9	41.8	5.6	3.7	1.6	2.7	3.7	13.7	27.2	18.8	13.6	29	26	15
27-31	Ccam	36.6	36.1	27.3	9.8	10.5	4.8	6.9	4.6	9.6	26.5	17.7	32.0	19	66	
31-42	C1ca	36.3	32.7	31.0	14.7	10.6	4.1	3.9	3.0	8.5	24.2	13.3	33.3	25	70	
42-54+	C2ca	40.0	30.0	30.0	14.2	12.9	4.8	4.6	3.5	7.1	22.9	12.8	36.5	25	78	

Depth (In.)	6A1a Organic carbon b Pct.	Nitrogen Pct.	C/N	Carbonate as CaCO3: 6E1b <2mm Pct.	3A1a <0.002 mm Pct.	6C2a Ext. Iron as Fe Pct.	Bulk density: 4A1d 1/3-Bar c g/cc	4A1d 1/3-Bar g/cc	4A1b Air-Dry g/cc	4D1 COLE d	Water content: 4B1c 1/3-Bar Pct.	4B2 15-Bar Pct.	4C1 1/3-to 15-Bar d in./in.	pH: 8C1b Sat. Paste	8C1a 1:1
0-5	3.29			8	tr	0.7	1.09	1.11	1.34	0.063	33.4	19.6	0.15		7.5
5-11	1.93			18	5	0.6	1.19	1.20	1.49	0.072	34.2	18.8	0.18		7.8
11-19	1.29			26	8	0.6	1.26	1.29	1.59	0.072	30.2	17.8	0.16		7.8
19-27	1.04			43	13	0.5	1.10	1.30	1.45	0.031	28.6	14.5	0.16		7.9
27-31	0.65			64	8	0.3						9.5			8.0
31-42	0.45			60	6	0.4						11.5		7.1	8.0
42-54+	0.24			61	5	0.4						11.1			8.0

Depth (In.)	Extractable bases: 6N4b Ca	6O4b Mg	6P2a Na	5B1a 6Q2a K	Sum	Ext. Acidity	Cat. Exch. Cap.: Sum Cations	5A1a NH_4OAc	8E1 Resistivity e ohms-cm.	8B1a Elec. Cond. mmhos/cm.	8D5 Total Sol. Salts in Soil ppm.	8B Water at Sat. Pct.	8D3 Ca/Mg	Base saturation: Pct	Pct.
	meq/100 g														
0-5	35.1	1.2	0.1	1.9	38.3			34.9					29		
5-11	30.9	1.7	0.1	1.5	34.2			28.7					18		
11-19	28.4	1.3	0.1	1.3	31.1			26.2					22		
19-27	23.0	1.1	0.1	1.0	25.2			21.2					21		
27-31	14.7	0.6	0.1	0.6	16.0			13.4							
31-42	17.6	1.1	0.1	0.8	19.6			16.9	3,100	0.35	90	40.2	16		
42-54+	16.2	0.8	0.1	0.7	17.8			15.7							

Depth (In.)	Ratios to Clay 8D2: NH_4OAc CEC	Ext. Iron	15-Bar Water
0-5	0.75	0.01	0.42
5-11	0.67	0.01	0.44
11-19	0.69	0.02	0.47
19-27	0.73	0.02	0.50
27-31	0.71	0.02	0.50
31-42	0.68	0.02	0.46
42-54+	0.63	0.02	0.44

a. Carbonate comprises 10 to 20 percent of the sand above 19 inches, and more than 50 percent below 19 inches.

b. 14 kg/m^2 to 27 inches (Method 6A).

c. Calculated to include volume but not weight of greater than 2-mm material (Method 3B2).

d. Less than 19-mm material.

e. Resistivity measured at saturated paste is similar to that measured at moisture equivalent for medium- and fine-textured soil. For coarse-textured soils, resistivity generally decreases from moisture equivalent to saturated paste. Therefore, minimum values are reported.

	Horizon All	Bca
Liquid Limit (Pct.)	56	46
Plasticity Index (Pct.)	31	22
Linear Shrinkage (Pct.)	14.8	12.7

Soil classification: Petrocalcic Calciustoll; fine-silty, mixed, thermic .
Soil: Series not designated.
Soil Nos.: S63TX-164-1; 18267-18273 .
Location: Menard County, Texas. Extreme northwest corner of Menard County, Texas; on the Haley Ranch, 20 miles northwest of Menard; in a pasture 540 feet southwest of gravel road, 7.5 miles west on Highway 29 from its junction with Highway 83, and 20.6 miles north and northwest on gravel road.
Vegetation and use: Native pasture, consisting of curly mesquite; side-oats grama, three-awn grasses and a few mesquite trees and occasional live oak trees.
Topography: Gently undulating landscape; the soil occurs in shallow valleys and sideslope positions below broad ridgetops occupied by other soils usually Lithosols, such as Tarrant.
Drainage and permeability: Well drained. Surface runoff is slow to moderate. Permeability is moderate.
Parent material: Calcareous clays and interbedded limestone.
Sampled by and date: O. Bynum, R. Coffee, H. C. Dean, J. DeMent, R. B. Grossman, and M. Stout, April 25, 1963.
Described by: H. C. Dean.

A11 18267 0 to 5 inches. Very dark grayish brown (10YR 3/2) silty clay; very dark brown (7.5YR 2/2) when moist; moderate fine subangular blocky and some granules; peds have many fine pores; the granules are mostly wormcasts; hard; peds are firm but mass is crumbly; sticky and plastic; plentiful grass roots; moderately alkaline; calcareous and contains a few fine hard limestone fragments up to about 1 cm in diameter; clear lower boundary.

A12 18268 5 to 11 inches. Dark brown (7.5YR 3/2) silty clay; very dark brown (7.5YR 2/2) when moist; moderate (approaching strong) fine subangular blocky with few very fine granules; blocks have many fine pores; same consistence and reaction as in layer above; plentiful grass roots and few fine limestone fragments as in layer above; gradual boundary.

A13 18269 11 to 19 inches. Brown (7.5YR 4/2) silty clay; dark brown (7.5YR 3/2) when moist; moderate fine subangular blocky and a few angular (wedge-shaped) very fine blocks; very hard; firm peds, but mass is crumbly; peds have many fine pores; sticky and plastic; contains a few fine hard limestone fragments and few fine hard $CaCO_3$ concretions; moderately alkaline and calcareous; contains fewer grass roots than in layers above; gradual lower boundary.

Bca 18270 19 to 27 inches. Light brown (7.5YR 6/4) silty clay; brown (7.5YR 4.5/4) when moist; moderate fine subangular blocky; very hard; firm; slightly sticky and plastic; peds have common fine pores; contains few grass roots; contains an estimated 5 percent by volume of hard "knobby" concretions and fine caliche-coated limestone fragments up to about 1 cm in diameter; calcareous and moderately alkaline; abrupt lower boundary.

Ccam 18271 27 to 31 inches. Pinkish and whitish indurated caliche, containing a few solution channels and fractures filled with limy clay loam; earthworm casts; clear boundary.

C1ca 18272 31 to 42 inches. Reddish yellow (6YR 6/6) clay loam; strong brown (6YR 5/6) when moist; with about 60 percent of caliche-coated limestone fragments up to about 5 cm across the long axis but many are very fine fragments; also contains common number of fine hard $CaCO_3$ concretions; structure undetermined; hard; firm; contains occasional grass roots; soil mass is calcareous and moderately alkaline; gradual lower boundary.

C2ca 18273 42 to 54 inches plus. Reddish yellow (5YR 6/6) clay loam; yellowish red (5YR 5/6) when moist with an estimated 50 percent or more of limestone fragments ranging from 5 mm to 5 cm in diameter and a few $CaCO_3$ concretions; soil mass is calcareous and moderately alkaline.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

A11 - light clay
A12 - light clay
A13 - light clay
Bca - silty clay loam
C1ca - silty clay loam
C2ca - heavy silty clay loam

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Petrocalcic Calciustoll; fine-silty, mixed, thermic

SOIL Series not designated SOIL Nos. S63TX-164-2 LOCATION Menard County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 18274-18279 March 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05) [a]	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 <0.002	Coarse fragments 2A2: 3B1 19-2 Wt. Pct. of <19mm	3B2 19-2 Vol. of <19mm
		Pct. of < 2 mm														
0-6	A11	6.6	51.6	41.8	1.1	1.0	0.6	1.1	2.8	19.1	32.5	22.5	3.8	41	3	1
6-16	A12	6.9	43.2	49.9	0.6	1.1	0.7	1.3	3.2	16.1	27.1	20.0	3.7	40	1	tr
16-24	A13	8.0	42.5	49.5	1.4	1.2	0.7	1.5	3.2	16.0	26.5	20.0	4.8	38	3	2
24-32	Bca	13.8	44.6	41.6	2.0	2.3	1.8	3.7	4.0	12.3	32.3	18.4	9.8	26	37	23
32-35	Ccam.	31.2	41.7	27.1	9.7	7.8	3.5	5.8	4.4	10.0	31.7	17.6	26.8	12	68	
35-46+	R	31.4	42.5	26.1	14.4	6.2	2.6	4.4	3.8	11.0	31.5	17.2	27.6	16	63	

Depth (in.)	6A1a Organic carbon [b] Pct.	6B1a Nitrogen Pct.	C/N	Carbonate as $CaCO_3$: 6E1b <2mm Pct.	3A1a <0.002 mm Pct.	Bulk density: 4A1d 1/3-Bar [c] g/cc	4A1d 1/3-Bar g/cc	4A1b Air-Dry g/cc	4D1 COLE [d]	Water content Pct.	4B1c 1/3-Bar Pct.	4B2 15-Bar Pct.	4C1 1/3-to 15-Bar [d] in./in.	pH 8C1a 1:1
0-6	3.00	0.267	11	14	1	1.10	1.10	1.37	0.078		38.6	20.5	0.20	7.6
6-16	1.61	0.136	12	25	10	1.38	1.38	1.62	0.056		31.6	19.0	0.17	7.7
16-24	1.29	0.112	12	31	12	1.31	1.34	1.68	0.078		28.8	17.6	0.15	7.9
24-32	0.86	0.086	10	59	16	1.02	1.32	1.50	0.034		28.2	13.4	0.15	7.9
32-35	0.40			76	15							8.2		8.1
35-46	0.20			68	10							8.5		8.1

Depth (in.)	Extractable bases: 6N4b Ca	6O4b Mg	6P2a Na	5B1a 6Q2a K	Sum	Cat. Exch. Cap.: Sum Cations	5A1a NH_4OAc	Liquid Limit Pct.	Plasticity Index Pct.	Linear Shrinkage Pct.	6D3 Ca/Mg	Base saturation Pct.	Pct.
	meq/100 g												
0-6	33.1	1.5	0.1	2.3	37.0		33.9				22		
6-16	29.8	1.5	0.1	1.5	32.9		28.0	53	24	14.1	20		
16-24	27.7	1.5	0.1	1.3	30.6		25.8				19		
24-32	18.1	0.9	0.1	0.8	19.9		16.1	43	18	8.7			
32-35	10.9	0.4	0.1	0.4	11.8		8.1						
35-46	12.8	0.8	0.1	0.5	14.2		10.7						

Depth (in.)	Ratios to Clay 8D2: NH_4OAc CEC		15-Bar Water		
0-6	0.83		0.50		
6-16	0.70		0.48		
16-24	0.68		0.46		
24-32	0.62		0.52		
32-35	0.68		0.68		
35-46	0.67		0.53		

a. Carbonate comprises 10 to 20 percent of the sand above 24 inches, and more than 50 percent below 24 inches.
b. 16 kg/m^2 to 32 inches (Method 6A).
c. Calculated to include volume but not weight of 2- to 19-mm material (Method 3B2).
d. Less than 19-mm material.

Soil classification: Petrocalcic Calciustoll; fine-silty, mixed, thermic.
Soil: Series not designated.
Soil Nos.: S63TX-164-2; 18274-18279.
Location: Menard County, Texas. In western part of Menard County about 18.2 miles west of Menard, Texas; in pasture 720 feet south of Highway 29, 18.6 miles west (by road) of junction of Highways 29 and 83 in Menard.
Vegetation and use: Open native pasture, consisting of curly mesquite, side-oats grama, and three-awn grasses.
Topography: Gently undulating landscape; sample site was in sideslope of a shallow valley below a broad ridgetop occupied by other soils, mostly Lithosols of the Tarrant series.
Drainage and permeability: Well drained. Surface runoff is slow to moderate. Permeability is moderate.
Parent material: Calcareous clays and interbedded limestone.
Sampled by and date: O. Bynum, R. Coffee, H. C. Dean, J. DeMent, R. B. Grossman and M. Stout, April 25, 1963.
Described by: H. C. Dean.

A11 18274 0 to 6 inches. Very dark grayish brown (10YR 3/2) silty clay; very dark brown (10YR 2/2) when moist; moderate fine subangular blocky and granular; granules are mostly wormcasts; hard, peds firm, but soil mass is crumbly when moist or dry; sticky; plentiful grass roots; has a few fine hard limestone fragments; calcareous and moderately alkaline; peds have a few fine pores within; clear boundary.

A12 18275 6 to 16 inches. Dark grayish brown (10YR 3.5/2) silty clay; dark brown (7.5YR 3/2) when moist; moderate fine subangular blocky and occasional very fine angular (wedge-shaped) blocks; peds have a few fine pores within; hard; firm, but soil mass is crumbly when moist; contains plentiful grass roots; contains few fine hard limestone fragments up to about 1 cm in diameter; calcareous and moderately alkaline; gradual lower boundary.

A13 18276 16 to 24 inches. Brown (7.5YR 4/2) silty clay; dark brown (7.5YR 3/2) when moist; compound moderate fine subangular blocky and angular (wedge-shaped) blocky; peds have few fine pores within; very hard; firm, but mass is crumbly when moist; contains fewer grass roots than layer above; contains a few fine hard limestone fragments as in layer above (up to about 1 cm in diameter); calcareous and moderately alkaline; gradual boundary.

Bca 18277 24 to 32 inches. Brown (7.5YR 5/4) silty clay; slightly darker brown (7.5YR 4/4) when moist; moderate fine and very fine subangular blocky; peds have few fine pores within; hard; firm, but soil mass is crumbly when moist, slightly sticky; plastic; contains fewer roots than in layer above; contains an estimated 2 percent by volume of hard fine limestone fragments up to about 1 cm in diameter; some of the limestone fragments have thin caliche coatings; contains a few hard fine $CaCO_3$ concretions; abrupt lower boundary.

Ccam 18278 32 to 35 inches. Hard limestone flags and some limestone rubble; the rubble is cemented together, apparently with carbonates; the limestone has a thin (1/4-inch) coating of caliche on the underside; gradual boundary.

R 18279 35 to 46 inches plus. Bed of limestone rubble that is cemented with pinkish to whitish caliche.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Vertic Calciustoll; fine, montmorillonitic, thermic

SOIL Series not designated SOIL Nos. S63TX-50-2 LOCATION Corvell County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 18158-18164 March 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (In.)	Horizon	Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05) a	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 <0.002	3A3a Non-Carbonate <0.002	Coarse fragments 2A2: 3B1 > 2 (<19) Pct.	2 – 19 Pct. of < 76 mm	19 – 76 Pct. of < 76 mm
		Pct. of < 2 mm																
0-6	Ap	6.4	41.5	52.1	0.4	1.0	0.7	1.9	2.4	12.1	29.4	15.6	4.0	48	38	tr		
6-17	A11	7.6	45.9	46.5	0.6	1.1	0.8	2.3	2.8	13.0	32.9	17.1	4.8	45		tr		
17-25	B21	6.6	42.9	50.5	1.2	1.2	0.6	1.7	1.9	10.9	32.0	13.8	4.7	48	27	tr		
25-30	IIB22ca	19.7	43.0	37.3	6.9	4.8	2.0	3.2	2.8	8.9	34.1	13.4	16.9	33		24		
30-40	IIB23ca	13.3	58.3	28.4	2.2	2.4	1.5	3.7	3.5	9.7	48.6	15.2	9.8	23		6		
40-57	IIB24ca	9.4	63.6	27.0	1.1	1.2	1.0	2.7	3.4	10.5	53.1	15.5	6.0	23		4		
57-69	C	8.3	59.1	32.6	1.3	1.6	0.8	1.9	2.7	8.5	50.6	12.4	5.6	27	19	8		

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	Carbonate as $CaCO_3$: 6E1b <2mm	3A1a <0.002 mm	Ext. Iron as Fe b	Bulk density: 4A1a Field-State	4A1d 1/3-Bar	4A1b Air-Dry	4D1 COLE	Water content: 4B4 Field-State	4B1c 1/3-Bar	4B2 15-Bar	4C1 1/3-to-15-Bar	Fine Clay to Clay d/	pH: 8C1b Sat. Paste	8C1a 1:1	8C1a 1:10
	Pct.	Pct.		Pct.	Pct.	Pct.	g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.	Pct.			
0-6	1.06	0.111	15	22	4	4.8	1.24	1.20	1.51	0.082	25.9	30.3	21.2	0.11	73	7.6	7.8	8.1
6-17	1.71	0.124	14	26	2		1.35	1.26	1.80	0.13	28.1	31.9	19.3	0.16		7.5	7.8	8.2
17-25	1.50	0.089	17	28	3	2.3	1.38	1.28	1.80	0.12	27.4	30.3	19.4	0.14	72	7.6	7.8	8.2
25-30	0.95	0.059	16	53	4								13.1		76	7.7	8.2	8.3
30-40	0.68	0.056	12	64	5		1.56	1.50	1.60	0.020	17.0	18.7	10.4	0.12	69	7.8	8.0	8.3
40-57	0.33	0.026	13	65	4		1.57	1.53	1.64	0.024	16.7	18.1	8.9	0.14	70	7.8	8.1	8.5
57-69	0.15			66	6	2.6							9.4			7.9	8.2	8.5

Depth (In.)	Extractable bases 5B1a: 6N4b Ca	6O4b Mg	6P2a Na	6Q2a K	Sum	Cat. Exch. Cap. 5A1a NH_4OAc	Water extract from saturated paste 8A1: Ca	Mg	6P1a Na	6Q1a K	CO_3	HCO_3	8B1a Elec. Cond. mmhos/cm	8E1 Resistivity c ohms-cm	8D5 Total Sol. Salts in Soil ppm.
	meq/100 g						meq/liter								
0-6	41.4	1.0	tr	1.0	43.4	38.6			0.1	0.1			0.38		
6-17	37.6	1.2	tr	1.2	40.0	35.1			0.1	0.1			0.45		
17-25	38.4	0.3	tr	0.8	39.5	35.3			0.2	tr			0.49		
25-30	26.2	0.3	tr	0.4	26.9	24.0			0.2	tr			0.44		
30-40	19.2	0.3	tr	0.3	19.8	17.0			0.2	tr			0.34		
40-57	17.5	-	tr	0.2	17.7	15.2			0.2	tr			0.25	2,600	60
57-69	17.5	0.1	tr	0.1	17.7	15.0			0.1	tr			0.22		

Depth (In.)	8A Water at Saturation	5D2 Exchangeable Na	Gypsum	Ratios to Clay 8D2: NH_4OAc CEC	Ext. Iron	15-Bar Water
	Pct.	Pct.	Pct.			
0-6	59.4	<1		0.80	0.10	0.44
6-17	62.7	<1		0.78		0.43
17-25	59.7	<1		0.74	0.05	0.40
25-30	48.8	<1		0.73		0.40
30-40	40.7	<1		0.74		0.45
40-57	38.4	<1		0.66		0.39
57-69	43.3	<1		0.56	0.10	0.35

a. Carbonate grains comprise more than 50 percent of the sand.
b. Determined on noncarbonate clay; extraction by Method 7A1c; analysis by Method 6C2a.
c. Resistivity measured at saturated paste is similar to that measured at moisture equivalent for medium- and fine-textured soils. For coarse-textured soils, resistivity generally decreases from moisture equivalent to saturated paste. Therefore, minimum values are reported.
d. Soil treated for removal of $CaCO_3$.

	Horizon: Ap	B21	C
Liquid Limit (Pct.)	53	57	38
Plasticity Index (Pct.)	31	36	21
Linear Shrinkage (Pct.)	17.7	18.5	11.5

Soil classification: Vertic Calciustoll; fine, montmorillonitic, thermic.
Soil: Series not designated.
Soil Nos.: S63TX-50-2; 18158-18164.
Location: Coryell County, Texas; 0.5 mile northwest of Coryell City (0.5 mile north on gravel road and 150 feet west of road in field).
Vegetation and use: Cropland; now in soil bank (grasses).
Topography: Undulating landscape having smooth slightly convex slopes and gently sloping convex divides. Site is on gently sloping hillside in a receiving portion with slope of about 1-1/2 percent.
Drainage and permeability: Rapid from the surface, moderate to slow permeability.
Parent material: Residuum from interbedded marly clays and soft limestone with upper three horizons from slope colluvium originating from soils of higher elevation that are developing in same residuum.
Sampled by and date: J. DeMent, W. R. Elder, J. W. Huckabee, G. Kunze, H. Oakes, A. Startz and R. B. Grossman, April 18, 1963.
Described by: W. R. Elder.

Ap 18158 0 to 6 inches. Dark grayish brown (10YR 4/2) silty clay; very dark grayish brown (10YR 3/2) moist; moderate very fine granular structure; hard, firm; calcareous, with scattered fine hard $CaCO_3$ nodules, 1 to 2 mm; numerous roots and wormcasts; abrupt smooth lower boundary.

A11 18159 6 to 17 inches. Very dark grayish brown (10YR 3/2) silty clay; very dark brown (10YR 2/2) moist; moderate very fine subangular and angular blocky structure with some intermingled granules; very hard, firm; calcareous and contains small hard $CaCO_3$ nodules, 1 to 2 mm; wormcasts and a few filled channels with material from horizon beneath; gradual lower boundary.

B21 18160 17 to 25 inches. Reddish brown (5YR 5/4) silty clay; slightly darker reddish brown (5YR 4/4) moist; strong fine to very fine angular blocky structure, crumbling readily and having shiny pressure faces; very hard, very firm; calcareous, and few $CaCO_3$ nodules; numerous filled channels with light-colored material from below; abrupt lower boundary.

IIB22ca 18161 25 to 30 inches. Evident stone line of rounded to subrounded hard limestone fragments 1/4 to 3 inches in diameter, imbedded in silty clay loam; strong fine angular blocky structure; crumbling readily and having shiny pressure faces; very hard, very firm, calcareous, and few $CaCO_3$ nodules; gradual lower boundary.

IIB23ca 18162 30 to 40 inches. Light yellowish brown (10YR 6/4) silty clay loam; yellowish brown (10YR 5/4) moist; faint coarse mottles of brown; strong very fine subangular and angular blocky structure; very crumbly; hard, firm; calcareous and contains scattered strongly cemented $CaCO_3$ concretions and occasional masses of soft $CaCO_3$ in lower part; gradual lower boundary.

IIB24ca 18163 40 to 57 inches. White (10YR 8/2) silt loam, silty clay loam and silty clay (textures vary in pockets) light gray (10YR 7/2) moist; strong very fine subangular blocky structure; very crumbly; hard, firm; calcareous and contains about 25 percent of soft $CaCO_3$ masses, occurring in lumps 2 to 3 inches in diameter; also contains scattered large hard limestone fragments and reddish remains of decomposed mineral fragments; gradual boundary.

C 18164 57 to 69 inches. Gray clayey shale and limestone fragments mottled with yellowish brown; fragments are 1/2 to 4 inches thick and are intermingled with soil like that in layer above; yellowish and reddish colors coat part of the raw shaly material; calcareous throughout; soil material not over 25 percent of the volume of the mass; plant roots are evident.

R 69 inches plus. Beds of hard limestone, flaggy with wide crevices.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

IIB22ca - heavy clay loam

This pedon was sampled as Denton silty clay. The soil is outside the range of the Denton series in having a solum thicker than 40 inches.

Mineralogy data (Methods 7A1a through 7A1d and 7A2a) S63Tex-50-2

Depth Inches	Sand 2-0.05 mm	Silt 0.05-0.002 mm	Coarse Clay 0.002-0.0002 mm	Fine Clay < 0.0002 mm
0-6	QZ1	QZ2 MI2 KK2 FD3	KK1 MI2 MT2 QZ2	MT1 KK3
6-17	QZ1	QZ2 MI2 KK2 FD3	KK1 MI2 MT2 QZ3	MT1 KK3
17-25		QZ2 MI2 KK2 FD3	MI1 KK2 MT2 QZ2	MT1 KK3
25-30		MI2 QZ2 KK2	KK1 MI2 MT2 QZ2	MT1 KK3
30-40		MI2 KK2 QZ2	KK1 MI2 MT3 QZ2	MT1 KK3
40-57		MI2 KK2 QZ2	KK1 MI2 MT2 QZ2	MT1 KK3 MI3

Relative abundance: 1 = > 40 percent, 2 = 10-40 percent, 3 = < 10 percent.
Mineral code: FD = feldspar, MI = mica or illite, KK = kaolinite, MT = montmorillonite, QZ = quartz.

SOIL CLASSIFICATION: Vertic Calciustoll; fine, mixed, thermic

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Knippa silty clay SOIL Nos. 863TX-232-1 LOCATION Uvalde County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 18175-18185 March 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (In.)	Horizon	Size class and particle diameter (mm) — Total: Sand (2–0.05) [b]	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 3A1a Non-Carbonate <0.002		Coarse fragments 2A2: 3B1 19-2 Wt.	3B2 19-2 Vol.
		Pct. of < 2 mm														←Pct.	of <19mm. →
0-5	Ap	10.4	41.6	48.0	0.3	0.7	0.9	2.7	5.8	12.5	29.1	20.1	4.6	45		tr	
5-12	A11	10.4	36.2	53.4	0.5	0.8	0.9	2.6	5.6	11.6	24.6	18.9	4.8	45		tr	
12-22	A12	10.2	36.6	53.2	0.3	0.7	0.8	2.5	5.9	11.2	25.4	18.8	4.3	45		tr	
22-35	B21	9.7	37.2	53.1	0.3	0.7	0.8	2.4	5.5	11.3	25.9	18.4	4.2	43		tr	
35-39	B22ca	11.9	42.2	45.9	1.6	1.4	1.1	2.7	5.1	10.3	31.9	17.1	6.8	36		13	7
39-52	B23ca	14.8	48.6	36.6	2.2	2.2	1.8	3.7	4.9	10.0	38.6	17.1	9.9	27		15	8
52-66	B24ca	15.0	49.2	35.8	1.2	1.6	1.8	4.0	6.4	11.8	37.4	20.6	8.6	26		10	6
66-76	B25ca	15.7	47.0	37.3	0.6	1.4	2.0	4.4	7.3	13.6	33.4	23.6	8.4	27		6	3
76-89	C1	16.0	43.1	40.9	0.7	1.4	2.1	4.5	7.3	14.2	28.9	24.2	8.7	35		1	
89-124	C2															tr	
124-156	C3															tr	
0-5	a	8.9	31.2	59.9	-	0.2	0.3	2.0	6.4	13.6	17.6	21.5	2.5				
35-39	a	7.2	31.0	61.8	-	0.1	0.3	1.4	5.4	13.5	17.5	19.9	1.8				
66-76	a	6.9	34.2	58.9	tr	0.3	0.4	1.3	4.8	14.8	19.4	20.2	2.0				
124-156	a	9.8	37.0	53.2	0.1	0.9	1.5	2.4	4.9	17.2	19.8	23.4	4.9				

Depth (In.)	6A1a Organic carbon [c] Pct.	6B1a Nitrogen Pct.	C/N	Carbonate as $CaCO_3$: 6E1b <2mm Pct.	3A1a <0.002 mm Pct.	6C2a Ext. Iron as Fe Pct.	Bulk density: 4A1a Field-State g/cc	4A1d 1/3-Bar [d] g/cc	4A1d 1/3-Bar g/cc	4A1b Air-Dry g/cc	4D1 COLE	Water Content: 4B4 Field-State Pct.	4B1c 1/3-Bar Pct.	4B2 15-Bar Pct.	4C1 1/3-to-15-Bar in./in.	pH: 8C1b Sat. Paste	8C1a 1:1
0-5	1.63	0.131	12	21	3	0.6	1.15		1.13	1.33	0.056	23.1	35.0	19.5	0.18		7.8
5-12	1.19	0.106	11	24	8	0.7	1.37		1.25	1.66	0.10	25.4	32.6	20.9	0.15		7.8
12-22	1.05	0.087	12	25	8	0.7	1.42		1.27	1.69	0.10	22.9	32.5	19.8	0.16		7.7
22-35	0.77	0.071	11	28	10	0.7	1.52		1.30	1.72	0.10	18.7	31.4	19.3	0.16		7.9
35-39	0.57			44	10	0.5		1.2e	1.3 e					16.0			7.9
39-52	0.31			60	10	0.3	1.51	1.26	1.37	1.54	0.037	11.9	21.4	12.0	0.12	7.6	8.0
52-66	0.19			59	10	0.4	1.56	1.33	1.42	1.60	0.038	12.3	21.0	11.7	0.12		7.9
66-76	0.19			54	10	0.3	1.57	1.36	1.40	1.65	0.054	14.2	22.9	12.9	0.14		7.9
76-89	0.15			42	6	0.5	1.44		1.26	1.56	0.073	17.9	28.6	15.6	0.16		7.8
89-124				63										10.0			
124-156				67										9.0			

Depth (In.)	Extractable bases 5B1a: 6N4b Ca	6O4b Mg	6P2a Na	6Q2a K	Sum	Ext. Acidity	Cat. Exch. Cap.: Sum Cations	5A1a NH_4OAc	8E1 Resistivity [f] ohms-cm.	8B1a Elec. Cond. mmhos/cm.	8D5 Total Sol. Salts in Soil ppm.	8B Water at Sat. Pct.	Ca/Mg	Base saturation: Sum Cations Pct.	NH_4OAc Pct.
	meq/100 g														
0-5	31.3	0.8	tr	2.6	34.7			30.3							
5-12	31.3	0.9	0.1	1.5	33.8			29.1							
12-22	31.2	0.8	0.1	1.1	33.2			27.5							
22-35	29.9	1.0	0.1	1.0	32.0			27.1							
35-39	23.8	0.7	0.1	0.8	25.4			21.9							
39-52	17.9	0.7	0.1	0.6	19.3			17.2	2500	0.40	120	45.8			
52-66	17.2	1.1	0.2	0.6	19.1			16.5							
66-76	18.4	0.8	0.2	0.6	20.0			17.5							
76-89	21.5	1.1	0.3	0.8	23.7			21.3							
89-124															
124-156															

Depth (In.)	Ratios to Clay 8D2: NH_4OAc CEC	Ext. Iron	15-Bar Water
0-5	0.67	0.01	0.43
5-12	0.65	0.02	0.46
12-22	0.61	0.02	0.44
22-35	0.63	0.02	0.45
35-39	0.61	0.01	0.44
39-52	0.64	0.01	0.44
52-66	0.63	0.02	0.45
66-76	0.65	0.01	0.48
76-89	0.61	0.01	0.45
89-124			
124-156			

a. Carbonate removed (Method 3A3). Clay percentage x $(1-\frac{CaCO_3}{100})$ yields the measured noncarbonate clay on a carbonate-containing basis. The calculated values for 18175, 18179 and 18182 are 47, 35 and 27, respectively. These values are similar ~~to those~~ reported under the column heading, "Noncarbonate clay (3A1a)" indicating little if any cementation of clay by carbonate.

b. Carbonate comprises 10 to 20 percent of the sand above 39 inches, and more than 50 percent below 39 inches.

c. 14 kg/m^2 to 60 inches (Method 6A).

d. Calculated to include volume but not weight of greater than 2-mm material (Method 3B2).

e. Estimated.

f. Resistivity of fine- and medium-textured soils measured at saturation is similar to that measured at moisture equivalent. Resistivity at saturation for coarse-textured soils is generally lower than that obtained at moisture equivalent.

Soil classification: Vertic Calciustoll; fine, mixed, thermic.
Soil: Knippa silty clay.
Soil Nos.: S63TX-232-1; 18175-18185.
Location: Uvalde County, Texas. Three miles north-northeast of Knippa, Texas; about 1.1 miles east of Knippa, north 2.7 miles, 90 yards east in crop field.
Vegetation and use: Cultivated, grain sorghum.
Topography: A very broad nearly level stream terrace.
Drainage and permeability: Well drained. Runoff is slow to moderate. Permeability is slow.
Parent material: Clay Pleistocene alluvium underlain by more loamy sediments.
Sampled by and date: H. Dean, J. DeMent, A. Newman, J. Stevens, M. Stout, and R. B. Grossman, April 23, 1963.
Described by: M. Stout.

Ap 18175 0 to 5 inches. Brown (7.5YR 4/2) silty clay; dark brown (7.5YR 2.5/2) moist; weak subangular blocky structure with a thin 2-inch mulch on surface; hard; very firm, but crumbly; many wormcasts and termite channels; few fine $CaCO_3$ concretions and numerous very fine reddish noncalcareous particles throughout; moderately alkaline; calcareous; smooth abrupt lower boundary.

A11 18176 5 to 12 inches. Brown (7.5YR 4/2) clay; dark brown (7.5YR 3/2) moist; moderate to strong subangular blocky and irregular blocky structure; ped surfaces are shiny; extremely hard; very firm but crumbly; about 3 percent $CaCO_3$ concretions and shell fragments; noncalcareous reddish particles persist; many casts and termite channels; moderately alkaline; calcareous; clear somewhat wavy lower boundary.

A12 18177 12 to 22 inches. Reddish brown (6YR 4/3) clay; dark reddish brown (6YR 3/3) moist; strong medium blocky, dry; strong very fine irregular blocky, moist, and seemingly weak prismatic; peds are very shiny; extremely hard; very firm but crumbly; about 5 percent $CaCO_3$ concretions; few crushed shells; common worm and termite channels and casts; some thin partially closed cracks filled with darker soil; moderately alkaline; calcareous; slightly wavy gradual lower boundary.

B21 18178 22 to 35 inches. Reddish brown (6YR 4/4) clay; dark reddish brown (6YR 3/4) moist; strong medium blocky, dry; very fine irregular blocky structure, moist; prisms apparent upon drying during sampling; peds shiny; extremely hard; very firm but crumbly; $CaCO_3$ concretions continue; few to common wormcasts and termite channels; few to common filled cracks of less reddish color; moderately alkaline; calcareous; both clear and abrupt very wavy lower boundary.

B22ca 18179 35 to 39 inches. Reddish brown (6YR 5/4) silty clay; darker reddish brown (6YR 4/4) moist; weak prismatic breaking to moderate medium blocky structure; peds shiny in patches; extremely hard; very firm but very crumbly; estimated 8 to 10 percent $CaCO_3$ concretions; few to common darkened filled worm and termite channels; moderately alkaline; calcareous; clear wavy lower boundary.

B23ca 18180 39 to 52 inches. Reddish brown (5YR 5/4) silty clay loam; yellowish red (5YR 5/6) moist; moderate medium blocky and subangular blocky structure, dry; very hard; very firm but very crumbly; filled wormcasts and filled cracks persist; moderately alkaline; calcareous; estimated 25 percent $CaCO_3$ concretions and soft masses; gradual wavy lower boundary.

B24ca 18181 52 to 66 inches. Reddish yellow (5YR 6/6) silty clay loam; yellowish red (5YR 5/6) moist; estimated 15 percent $CaCO_3$ content; structure same as above; clear wavy lower boundary.

B25ca 18182 66 to 76 inches. Pink (7.5YR 7/4) silty clay loam; reddish yellow (7.5YR 6/6) moist; weak prismatic structure breaking to weak to moderate medium blocky; very hard; very firm but very crumbly; estimated 8 to 12 percent $CaCO_3$ as concretions and masses; wormcasts, few; moderately alkaline; calcareous; clear wavy lower boundary.

C1 18183 76 to 89 inches. Yellowish red (5YR 5/6) silty clay loam; darker yellowish red (5YR 5/6) moist; this horizon begins a series of stratified horizons of sandy loam and browner clay loam; estimated 5 percent $CaCO_3$ in segregated form; boundary doubtful; auger sample.

C2 18184 89 to 124 inches. Pink (7.5YR 7/4) mostly clay loam but stratified with more loamy texture; contains less than 1 percent calcium carbonate segregated; wormcasts and filled tunnels observed at 100 inches; boundary doubtful; auger sample.

C3 18185 124 to 156 inches. Same as above but becoming somewhat coarser in texture; about sandy loam; stratified; horizon extended upward into B25ca horizon at one end of pit; auger sample.

Clay mineralogy (Method 7A2) B21 horizon: The clay contains small amounts of smectite[1/], mica, calcite and kaolinite. The smectite is poorly ordered and includes a considerable interlayer component. Clay mineralogy is mixed by X-ray diffraction but bordering on montmorillonitic.

1/ Smectite is the name for the group of 2:1 layer silicate minerals that expand upon solvation with glycerol. Montmorillonite is one member of the group.

SOIL CLASSIFICATION: Vertic Calciustoll; fine, mixed, thermic

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Knippa clay SOIL Nos. S63TX-232-2 LOCATION Uvalde County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 18186-18196 March 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05) [a]	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 <0.002	Coarse fragments 2A2: 3B1 19-2 Wt.	3B2 19-2 Vol.
		Pct. of < 2 mm													Pct. of <19mm	
0-6	Ap	13.2	36.3	50.5	0.3	0.4	0.7	3.4	8.4	14.7	21.6	25.6	4.8	48	tr	
6-12	A11	12.4	37.3	50.3	0.5	0.8	0.6	2.9	7.6	17.3	20.0	27.0	4.8	43	tr	
12-24	A12	12.3	37.3	50.4	0.2	0.6	0.6	3.0	7.9	12.9	24.4	23.0	4.4	42	tr	
24-34	B21ca	11.5	37.8	50.7	0.6	0.6	0.5	2.7	7.1	12.8	25.0	21.9	4.4	42	tr	
34-37	B22ca	11.8	42.2	46.0	1.2	0.9	0.6	2.8	6.3	11.5	30.7	19.8	5.5	35	4	2
37-45	B23ca	14.0	48.1	37.9	3.4	2.1	1.0	2.5	5.0	9.5	38.6	16.2	9.0	25	11	6
45-57	B24ca	11.7	51.7	36.6	1.7	1.7	0.8	2.5	5.0	10.7	41.0	17.4	6.7	27	9	5
57-78	B25ca	8.8	53.8	37.4	0.7	0.5	0.4	2.1	5.1	11.6	42.2	18.2	3.7	27	6	3
78-96	C1														9	
96-120	C2														6	
120-139	C3															

Depth (in.)	6A1a Organic carbon [b] Pct.	Nitrogen Pct.	C/N	Carbonate as $CaCO_3$: 6E1b <2mm Pct.	3A1a <0.002 mm Pct.	Bulk density: 4A1d 1/3-Bar [c] g/cc	4A1d 1/3-Bar g/cc	4A1b Air-Dry g/cc	4D1 COLE [e]	Water content: Pct.	4B1c 1/3-Bar Pct.	4B2 15-Bar Pct.	4C1 1/3-to 15-Bar [e] in./in.	pH 8C1a 1:1
0-6	1.81			14	3		1.14	1.42	0.078		32.0	18.8	0.15	7.9
6-12	1.29			18	7		1.23	1.60	0.092		32.3	19.5	0.16	7.8
12-24	1.01			20	8		1.3 d					19.0		7.8
24-34	0.78			24	9		1.32	1.70	0.087		30.4	18.3	0.16	7.9
34-37	0.57			37	11	1.3 d	1.3 d					16.4		7.9
37-45	0.31			54	13	1.28	1.36	1.50	0.030		25.0	12.8	0.16	8.0
45-57	0.22			54	10	1.3 d	1.4 d					12.6		7.9
57-78	0.15			49	10	1.44	1.48	1.68	0.043		21.4	13.3	0.12	7.9
78-96				57										
96-120				60										
120-139				62										

Depth (in.)	Extractable bases: 6N4b Ca	6O4b Mg	6P2a Na	6Q2a K	5B1a Sum	Cat. Exch. Cap.: 5A1a NH_4OAc	Ca/Mg	Base saturation: Sum Cations Pct.	NH_4OAc Pct.
	meq/100 g								
0-6	30.3	0.9	tr	2.9	34.1	30.0			
6-12	29.5	0.7				29.6			
12-24	29.8	1.0	0.1	1.2	32.1	28.0			
24-34	28.9	1.0	0.1	1.1	31.1	26.7			
34-37	24.9	0.7	0.1	0.9	26.6	23.1			
37-45	18.9	0.7	0.1	0.7	20.4	17.7			
45-57	18.6	1.0	0.1	0.7	20.4	17.5			
57-78	18.2	1.0	0.1	0.7	20.0	17.5			
78-96									
96-120									
120-139									

Depth (in.)	Ratios to Clay 8D2: NH_4OAc CEC	Ext. Iron	15-Bar Water
0-6	0.63		0.39
6-12	0.69		0.45
12-24	0.67		0.45
24-34	0.64		0.44
34-37	0.66		0.47
37-45	0.71		0.51
45-57	0.65		0.47
57-78	0.65		0.49
78-96			
96-120			
120-139			

a. Carbonate comprises 10 to 20 percent of the sand.
b. 15 kg/m^2 to 60 inches (Method 6A).
c. Calculated to include volume but not weight of 2- to 19-mm material (Method 3B2).
d. Estimated.
e. Less than 19-mm material.

Soil classification: Vertic Calciustoll; fine, mixed, thermic.
Soil: Knippa clay.
Soil Nos.: S63TX-232-2; 18186-18196.
Location: Uvalde County, Texas. 3.9 miles east of Knippa, Texas, along U.S. Highway 90; 0.1 mile north of U.S. Highway 90 across railroad tracks.
Vegetation and use: Formerly cultivated land - now in soil bank.
Topography: Nearly level, very broad stream terraces.
Drainage and permeability: Well drained. Runoff is slow to moderate. Permeability is slow.
Parent material: Clayey Pleistocene alluvium underlain by more loamy alluvium.
Sampled by and date: H. C. Dean, J. DeMent, A. Newman, J. Stevens, M. Stout and R. B. Grossman, April 23, 1963.
Described by: M. Stout.

Ap 18186 0 to 6 inches. Brown (9YR 4/2) clay, dark brown (9YR 2.5/2) moist; weak subangular blocky and blocky structure, mostly cloddy dry; upper 2 inches is a loose mulch of very fine discrete flattened granules covered by a thin easily broken crust; hard; very firm but crumbly; about 2 percent fine $CaCO_3$ concretions; many reddish particles or grit; many wormcasts and termite channels; moderately alkaline; calcareous; smooth abrupt lower boundary.

A11 18187 6 to 12 inches. Brown (7.5YR 4/2) clay, dark brown (7.5YR 3/2) moist; moderate to strong very fine subangular blocky and irregular blocky structure; peds shiny; extremely hard; very firm but crumbly; crushed color (7.5YR 4/3); few very fine $CaCO_3$ concretions, few shell fragments; common wormcasts and termite channels; few fine white mycelia-like mold; moderately alkaline; calcareous; slightly wavy clear lower boundary.

A12 18188 12 to 24 inches. Reddish brown (6YR 4/3) clay, dark reddish brown (6YR 2/3) moist; strong medium and coarse blocky structure, dry; breaking to strong very fine irregular blocky structure, moist; very shiny ped surfaces; extremely hard; very firm but crumbly; about 4 percent fine $CaCO_3$ concretions; few wormcasts and filled termite channels; common filled cracks of grayish soil fines; very fine or thin mold persists; few fine quartz pebbles; moderately alkaline; calcareous; seemingly weak prismatic structure; slightly wavy gradual lower boundary.

B21ca 18189 24 to 34 inches. Reddish brown (6YR 4/4) clay, dark reddish brown (6YR 3/4) moist; strong medium blocky, dry; very fine strong irregular blocky, moist; macro structure of weak prismatic, dry; shiny peds; extremely hard; very firm but crumbly; about 4 percent $CaCO_3$ concretions; common dark grayish filled cracks and worm channels; casts and termite channels persist; few quartz pebbles, scattered; suggestions of slickensides but could not confirm; moderately alkaline; calcareous; clear wavy lower boundary.

B22ca 18190 34 to 37 inches. Brown (7.5YR 4/4) silty clay, dark reddish brown (6YR 3/4) moist; weak prismatic breaking to moderate medium blocky structure; extremely hard; very firm but very crumbly; shiny patches on ped surfaces; many very fine whitish threads; estimated 10 to 12 percent $CaCO_3$ concretions; common dark filled worm channels; moderately alkaline; calcareous; clear wavy boundary.

B23ca 18191 37 to 45 inches. Brown (7.5YR 5/4) silty clay loam, strong brown (7.5YR 5/6) moist; moderate to strong medium and fine blocky and subangular blocky structure, dry; very hard; very firm; estimated 30 percent $CaCO_3$ concretions and soft masses; common wormcasts of nearly black and reddish colors; moderately alkaline; calcareous; gradual wavy to irregular lower boundary with tongues 6 inches in width extending 12 inches into next horizon.

B24ca 18192 45 to 57 inches. Reddish brown (5YR 5/4) silty clay loam, yellowish red (5YR 5/6) moist; estimated 10 to 15 percent $CaCO_3$; same as horizon above for other characteristics; clear wavy lower boundary.

B25ca 18193 57 to 78 inches. Reddish brown (5YR 5/4) silty clay loam, darker reddish brown (5YR 4/4) moist; weak blocky and prismatic structure; about 10 percent $CaCO_3$ concretions and soft masses; very few wormcasts; contains streaks of brown (7.5YR 5/4); clear wavy lower boundary.

C1 18194 78 to 96 inches. Light brown (7.5YR 6/4) light clay loam, brown (7.5YR 5/4) moist; auger sample here and below.

C2 18195 96 to 120 inches. Same as preceding horizon except the $CaCO_3$ content as concretions and masses increased to about 25 percent.

C3 18196 120 to 139 inches. Same - estimated 15 percent $CaCO_3$ and decreasing with depth with color becoming less pale and a stronger brown; clay loam textured.

Clay mineralogy (Method 7A2) B21ca horizon: The clay contains small amounts of smectite[1/], mica, calcite and kaolinite. The smectite is poorly ordered and includes a considerable interlayer component. Clay mineralogy is mixed by X-ray diffraction but bordering on montmorillonitic.

1/ Smectite is the name for the group of 2:1 layer silicate minerals that expand upon solvation with glycerol. Montmorillonite is one member of the group.

SOIL CLASSIFICATION Typic Haplustoll; fine-silty, mixed, mesic

SOIL Series not designated LOCATION Hansford County, Texas

SOIL NOS. S57TX-98-8 LAB. NOS. 5788-5794

SOIL SURVEY LABORATORY Lincoln, Nebraska DATE April 25, 1958

GENERAL METHODS 1A, 1B1a, 2A1, 2B

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 <19mm.	TEXTURAL CLASS
0-6	Ap	0.1a	0.2a	0.3	2.5	11.9	59.6	25.4	54.6	18.9	-	sil
6-14	B21	-	0.1	0.2	2.1	10.4	55.2	32.0	49.9	17.4	-	sicl
14-18	B22	0.3b	0.2b	0.2c	2.2c	9.4c	50.6	37.1	41.6	20.2	Tr.	sicl
18-28	B23ca	0.1b	0.1b	0.2c	2.0c	8.5c	45.5	43.6	26.4	29.3	2	sic
28-36	B24ca	0.2b	0.1b	0.2c	2.7c	8.9c	47.6	40.3	28.7	30.0	-	sic
36-56	B25ca	0.4b	0.3b	0.4c	5.5c	14.3c	41.7	37.4	38.4	22.2	-	cl
56-66	B26ca	3.1b	1.5b	0.8c	2.9c	11.9c	46.0	33.8	41.2	18.8	-	sicl

	pH 8C1a		ORGANIC MATTER			8A2	ELECTRICAL CONDUCTIVITY	6E1a		MOISTURE TENSIONS		
			6A1a ORGANIC CARBON	6B1a NITROGEN		EST% SALT (BUREAU CUP)	EC×10³ MILLIMHOS PER CM 8A1a	$CaCO_3$ equivalent	GYPSUM me./100g. SOIL	1/10 ATMOS.	1/3 ATMOS.	4B2 15 ATMOS.
1:1	1:5	1:10	%	%	C/N			%		%	%	%
7.3	7.8	7.9	1.42	.127	11	<0.20	0.7	-				10.4
7.4	7.9	7.8	1.04	.102	10	<0.20	0.7	-				14.0
8.0	8.5	8.7	0.83	.096	9	<0.20	0.8	17				13.2
8.2	8.6	8.9	0.45	.053	8	<0.20	1.4	50				10.7
8.2	8.7	8.9	0.23			<0.20	1.1	32				10.6
8.4	9.0	9.2	0.11			<0.20	0.5	42				10.5
8.3	8.8	9.0	0.05			<0.20	0.5	15				13.3

5A1a	EXTRACTABLE CATIONS 5B1a					5D2	8A1 SATURATION EXTRACT SOLUBLE					8A
CATION EXCHANGE CAPACITY NH_4Ac	6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K	EXCH. Na %	6P1a Na	6Q1a K				MOISTURE AT SATURATION %
← milliequivalents per 100g. soil →							← milliequivalents per liter →					
21.3	18.2	2.2	2.8	-	1.7	-	0.2	0.8				49.3
24.3	21.9	2.6	2.8	-	0.8	-	0.3	0.2				60.6
20.5				-	0.7	-	0.3	0.2				52.8
11.7				-	0.4	-	0.5	0.3				45.9
13.4				0.1	0.6	1	0.7	0.3				49.5
13.0				0.1	0.6	1	0.7	0.2				47.1
20.4				0.3	1.0	1	1.0	0.2				60.5

a. Organic matter
b. Many $CaCO_3$ concr.
c. Few $CaCO_3$ concr. Also, few, smooth black concr. (Mn-Fe?)

Soil classification: Typic Haplustoll; fine-silty, mixed, mesic.
Soil: Series not designated.
Soil Nos.: S57TX-98-8; 5788-5794.
Location: From the junction of Texas Highway No. 15 and No. 207 in the west side of Spearman, 3.1 miles southwest on Texas Highway No. 207, then 200 feet east into a cultivated field. (In Sec. 120, Block 4T, Texas and New Orleans Railroad.)
Area: Hansford County, Texas.
Vegetation: Cultivated.
Physiography: Upland plain.
Relief: Nearly level slightly concaved slopes of less than 1 percent gradient in association with Portales and Pullman soils. Sampled within areas of less than 100 acres.
Collected by: R. E. Daniell, J. S. Allen, W. Brooks, L. Jucquot, M. Turner, P. Mohle, A. J. Welker.
Described by: R. E. Daniell, June 20, 1957.

Ap 5788 0 to 6 inches. Dark grayish brown (10YR 4/2, 3/2 moist) silt loam; weak fine subangular blocky and granular; friable moist; slightly hard dry; 4- to 6-inch layer slightly compacted; noncalcareous; clear boundary.

B21 5789 6 to 14 inches. Dark brown (9YR 4/3, 3/3 moist) silty clay loam; moderate very fine and fine subangular blocky; friable moist; slightly hard dry; common pores mostly less than 1 mm in diameter; common wormcasts; noncalcareous; gradual boundary.

B22 5790 14 to 18 inches. Brown (9YR 5/3, 4/3 moist) silty clay loam; similar structure and porosity to B21 horizon; firm moist; slightly hard dry; common to many wormcasts; highly calcareous; clear boundary.

B23ca 5791 18 to 28 inches. Light yellowish brown (9YR 6/4, 5/4 moist) light silty clay; weak fine subangular blocky; friable moist; slightly hard dry; common pores less than 1 mm in diameter; highly calcareous; common soft $CaCO_3$ concretions or nodules; many nodules and balls of soil have filled old biological cavities and channels; gradual boundary.

B24ca 5792 28 to 36 inches. Light brown (8YR 6/4, 5/4 moist) silty clay; weak medium subangular blocky; friable to firm moist; hard dry; common pores less than 1 mm in diameter; many soft $CaCO_3$ concretions; highly calcareous; nodules and balls of soil and $CaCO_3$ have filled up old insect and biological channels and cavities; gradual boundary.

B25ca 5793 36 to 56 inches. Light reddish brown (6YR 6/4, 4.5/4 moist) clay loam; very weak fine and medium subangular blocky; friable moist; hard dry; common pores 0.5 to 1.5 mm in diameter; common soft $CaCO_3$ concretions up to 8 mm in diameter; gradual boundary.

B26ca 5794 56 to 66 inches. Light reddish brown (6YR 5.5/4, 4/4 moist) silty clay loam; weak fine and medium subangular blocky and angular blocky; firm moist; very hard dry; common $CaCO_3$ concretions up to 8 mm in diameter and splotches of $CaCO_3$ on ped surfaces; small thin patchy and scattered dark-colored coatings (probably manganese) on vertical faces of larger peds.

Remarks: Krotovinas in the B24ca horizon were several feet long, 8 to 10 inches in diameter, and filled with darker colored silty clay loam.

This pedon was sampled as Zita, and the site is mapped Zita in the soil survey for Hansford County, Texas, issued June 1960. The Zita series is in the fine-loamy, mixed, thermic family of Typic Haplustolls.

Textures above agree with laboratory data. Field textures where different are given below:

Ap - silty clay loam
B21 - light silty clay
B22 - light silty clay
B23ca - silty clay
B26ca - clay

SOIL CLASSIFICATION Aridic Haplustoll; fine, mixed, mesic

SOIL Series not designated LOCATION Hansford County, Texas

SOIL NOS. S57TX-98-4 LAB. NOS. 5763-5770

SOIL SURVEY LABORATORY Lincoln, Nebraska DATE April 25, 1958

GENERAL METHODS 1A, 1B1a, 2A1, 2B

		PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)							3A1		
DEPTH INCHES	HORIZON	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	Ap	0.1a	0.3a	0.5a	2.9a	12.4a	59.2	24.6	56.4	17.3	-	sil
6-15	A12	0.1a	0.1a	0.3a	2.5a	9.5a	52.3	35.2	46.8	16.8	-	sicl
15-21	B21ca	0.1c	0.2c	0.6b	6.3b	14.0b	40.7	38.1	40.3	19.0	-	cl
21-30	B22ca	0.3c	0.4c	0.5b	5.4b	18.8b	38.6	36.0	44.3	17.5	-	cl
30-40	B23ca	0.4d	0.6d	0.8b	4.1b	11.5b	44.0	38.6	39.8	18.8	-	sicl
40-52	B24	0.2d	0.4d	0.4b	2.1b	9.2b	49.2	38.5	39.9	20.1	-	sicl
52-65	B25	0.2d	0.1d	0.2b	1.7b	10.1b	48.1	39.6	41.2	18.4	-	sicl
65-79	Cca	0.5d	0.6d	0.6c	3.4c	9.3c	43.7	41.9	27.7	27.9	-	sic

	pH 8C1a		ORGANIC MATTER			8A2	ELECTRICAL CONDUCTIVITY	6E1a		MOISTURE TENSIONS		
			6A1a ORGANIC CARBON	6B1a NITROGEN	C/N	EST% SALT (BUREAU CUP)	EC x 10^3 MILLIMHOS PER CM. 6A1a	$CaCO_3$ equivalent	GYPSUM me./100g. SOIL	1/10 ATMOS.	1/3 ATMOS.	4B2 15 ATMOS.
1:1	1:5	1:10	%	%				%		%	%	%
7.6	8.0	8.1	1.08	.104	10	<0.20	0.5	-				9.8
7.7	8.2	8.4	0.82	.090	9	<0.20	0.7	-				15.1
8.1	8.6	8.8	0.44	.041	11	<0.20	0.8	15				13.7
8.3	8.7	8.9	0.33	.056	6	<0.20	0.8	14				12.2
8.4	8.8	9.0	0.29			<0.20	0.7	9				14.0
8.4	8.9	9.0	0.22			<0.20	0.7	3				15.6
8.1	8.7	8.9	0.19			<0.20	1.2	2				15.7
7.9	8.5	8.8	0.13			<0.20	3.2	45				11.3

5A1a	EXTRACTABLE CATIONS 5B1a					5D2	8A1 SATURATION EXTRACT SOLUBLE					8A
CATION EXCHANGE CAPACITY NH_4Ac	6N2b Ca	6Q2b Mg	6H1a H	6P2a Na	6Q2a K	EXCH. Na %	6P1a Na	6Q1a K				MOISTURE AT SATURATION %
← milliequivalents per 100g. soil →							← milliequivalents per liter →					
19.5	17.3	1.5	2.0	-	1.4	-	0.2	0.5				47.0
26.0	25.4	5.6	2.8	-	0.8	-	0.3	0.2				63.0
20.3				0.1	0.6	-	0.4	0.2				58.3
19.4				0.2	0.7	1	1.1	0.2				53.3
22.2				0.6	1.0	2	2.5	0.2				57.9
21.6				1.2	1.1	5	4.1	0.2				59.3
23.4				1.6	1.0	5	6.5	0.2				61.5
12.6				1.1	0.4	4	12.0	0.3				50.9

a. Few smooth black concr. (Mn-Fe?)
b. Common $CaCO_3$ concr. Also few, smooth black concr. (Mn-Fe?)
c. Common $CaCO_3$ concr.
d. Many $CaCO_3$ concr.

Soil classification: Aridic Haplustoll; fine, mixed, mesic.
Soil: Series not designated.
Soil Nos.: S57TX-98-4; 5763-5770 .
Location: From the junction of Texas Highway No. 15 and the Santa Fe Railroad on the west side of Spearman, 1 mile north and 0.75 mile east on county road, then 150 feet north into a cultivated field. (In Sec. 58, Block 4T, Texas and New Orleans Railroad.)
Area: Hansford County, Texas.
Vegetation: Cultivated.
Physiography: Upland plain.
Relief: Slightly concaved area with slope gradients less than 0.5 percent between areas of Portales and Pullman soils.
Collected by: R. E. Daniell, J. S. Allen, W. Brooks, L. Jucquot, M. Turner, P. Mohle, and A. J. Welker.
Described by: R. E. Daniell, June 18, 1957.

Ap 5763 0 to 6 inches. Brown (10YR 4.5/3, 3/3 moist) silt loam; weak subangular blocky and granular; friable moist; slightly hard dry; noncalcareous; abrupt boundary.

A12 5764 6 to 15 inches. Dark brown (7.5YR 4/3, 3/3 moist) silty clay loam; moderate fine subangular blocky with some fine angular blocky; few thin patchy clay skins; few wormcasts; common pores up to 1 mm in diameter; friable to firm moist; hard dry; noncalcareous; clear boundary.

B21ca 5765 15 to 21 inches. Brown (7.5YR 4.5/4, 4/4 moist) clay loam; moderate fine subangular blocky and weak medium prismatic; friable moist; hard dry; common pores up to 1 mm in diameter; common wormcasts; highly calcareous; few soft $CaCO_3$ concretions between 15 and 18 inches, common between 18 and 21 inches; diffuse boundary.

B22ca 5766 21 to 30 inches. Brown (7.5YR 5/4, 4/4 moist) clay loam; weak to moderate fine subangular blocky and weak medium prismatic; friable moist; common pores less than 1 mm in diameter; few wormcasts; highly calcareous; common soft $CaCO_3$ concretions 3 to 6 mm in diameter; clear boundary.

B23ca 5767 30 to 40 inches. Brown (7.5YR 4.5/4, 3.5/4 moist) silty clay loam; moderate fine subangular blocky and weak medium and fine prismatic; friable moist; hard dry; common pores less than 1 mm in diameter; highly calcareous; few soft $CaCO_3$ concretions about 6 mm in diameter; gradual boundary.

B24 5768 40 to 52 inches. Reddish brown (5YR 5/4, 4/4 moist) silty clay loam; weak fine subangular blocky and weak fine and medium prismatic; friable moist; hard dry; mostly slightly calcareous but noncalcareous in places; many films and threads of $CaCO_3$ on ped surfaces particularly on vertical faces of the weak prisms; few to common pores up to 1 mm mm in diameter; gradual boundary.

B25 5769 52 to 65 inches. Similar color, texture and structure to the B24 horizon; slightly weaker structure; friable moist; hard dry; some of soil mass noncalcareous - some slightly calcareous; many films and threads of $CaCO_3$ but not as many as in the B24 horizon.

Cca 5770 65 to 79 inches. Pink (7.5YR 8/4, 7/4 moist) silty clay; highly calcareous; estimated 40 percent $CaCO_3$ by volume; many soft $CaCO_3$ concretions; lime decreases with depth.

Remarks: Some thin, scattered, small patches of darker color, probably manganese coatings, occur on ped surfaces between 40 and 65 inches. Also in these layers there are common old insect or biological channels that have been filled with soil material. These channels are about 0.5 inch in diameter and are spherical or tubular (1 to 3 inches long). Krotovinas are found in the 65- to 79-inch layer.

This pedon was sampled as Zita and appears as Zita in the soil survey for Hansford County, Texas, issued June 1960. Some of the data appear on pages 37 and 38 of the publication. The Zita series is in the fine-loamy, mixed, thermic family of Typic Haplustolls.

Textures above agree with laboratory data. Field textures where different are given below:

Ap - silty clay loam
A12 - light clay
B21ca - light clay
B22ca - heavy clay loam
B23ca - light clay
B24 - light clay
B25 - light clay
Cca - clay loam

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Entic Haplustoll; fine-silty, carbonatic, thermic

SOIL Austin silty clay SOIL Nos. S62TX-155-1 LOCATION McLennan County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 17717-17721 May 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (In.)	Horizon	Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05) a	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 <0.002	Coarse fragments 2A2: 3B1 > 2	2 – 19	19 – 76
		Pct. of < 2 mm													Pct.	Pct. of < 76 mm		
0-6	Ap	9.1	43.4	47.5	0.3	0.6	0.6	2.9	4.7	14.8	28.6	21.5	4.4		40	tr		
6-15	A12	6.8	42.5	50.7	0.3	0.5	0.4	2.1	3.5	12.0	30.5	17.0	3.3		41	tr		
15-25	B21	5.8	45.3	48.9	0.3	0.3	0.4	1.9	2.9	9.5	35.8	13.8	2.9		35	tr		
25-34	B22	6.2	50.9	42.9	0.1	0.2	0.3	2.7	2.9	6.8	44.1	11.7	3.3		23	tr		
34-45	B23&C	6.9	52.2	40.9	0.1	0.2	0.3	2.8	3.5	6.6	45.6	12.2	3.4		21	tr		

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	Carbonate as $CaCO_3$: 6E1b <2 mm	Carbonate as $CaCO_3$: 3A1a <0.002 mm	Bulk density: 4A1a Field State	Bulk density: 4A1d 1/3-Bar	Bulk density: 4A1b Air-Dry	4D1 COLE	Water content: 4B4 Field State	Water content: 4B1c 1/3-Bar	Water content: 4B2 15-Bar	Water content: 4C1 1/3- to 15-Bar	Fine Clay to Clay b	pH: 8C1b Sat. Paste	pH: 8C1a 1:1	pH: 8C1a 1:10
	Pct.	Pct		Pct.	Pct.	Pct.	g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.	Pct.			
0-6	1.86	0.164	11	1.0	32	8							16.4		92	7.4	7.5	7.5
6-15	1.49	0.116	13	1.0	38	10	1.64	1.34	1.80	0.106	14.6	30.2	20.0	0.14	83	7.4	7.7	7.7
15-25	1.10	0.088	12	0.9	50	14							17.8		87	7.5	7.7	7.8
25-34	0.57	0.058	10	0.6	71	20	1.52	1.47	1.57	0.020	16.6	22.4	12.6	0.14	81	7.7	7.8	7.8
34-45	0.37			0.6	74	20	1.47	1.42	1.49	0.17	15.2	22.7	12.0	0.15	69	7.7	8.0	8.0

Depth (In.)	Extractable bases 5B1a: 6N4b Ca.	6O4b Mg	6P2a Na	6Q2a K	Sum	Cat. Exch. Cap. 5A1a NH_4OAc	Water extract from saturated paste 8A1: Ca	Mg	6P1a Na	6Q1a K	CO_3	HCO_3	Cl	SO_4	8A1a Electrical conductivity
	meq/100 g						meq/liter								mmho/cm
0-6	37.8	1.7	0.1	1.3	40.9	37.9			0.2	0.2					0.59
6-15	37.5	1.1	tr	0.4	39.0	35.3			0.2	0.1					0.77
15-25	33.4	0.4	tr	0.8	34.6	30.9			0.3	0.1					0.63
25-34	21.9	0.2	tr	0.5	22.6	19.4			0.2	0.1					0.39
34-45	17.9		tr	0.4		15.4			0.2	0.1					0.32

Depth (In.)	8A Water at Saturation	5D2 Exchangeable Na	Gypsum	Ratios to Clay 8D2: NH_4OAc CEC	Ext. Iron	15-Bar Water
	Pct.	Pct.	Pct.			
0-6	61.2	< 1		0.95	0.03	0.41
6-15	62.0	< 1		0.86	0.02	0.49
15-25	56.8	< 1		0.88	0.03	0.51
25-34	47.7	< 1		0.84	0.03	0.55
34-45	49.5	< 1		0.73	0.03	0.57

a. Carbonate comprises 25 to 50 percent of the sand above 15 inches and more than 50 percent of the sand below 15 inches.

b. Soil treated for removal of $CaCO_3$.

Soil classification: Entic Haplustoll; fine-silty, carbonatic, thermic.
Soil: Austin silty clay.
Soil Nos.: S62TX-155-1; 17717-17721.
Location: East on first overpass north of Lorena on U.S. 81 (IH 35), about 11 miles south of Waco; 3/4 mile northeast, 100 yards east in cultivated field.
Area: McLennan County, Texas.
Cover: Cultivated, small grain.
Parent material: Clayey residuum of chalk rock.
Topography: Undulating landscape having long plane to slightly convex surfaces; site midway on slope, gradient of about 3.5 percent.
Moisture at sampling: Dry, about 30 percent field capacity.
Sampled by: J. A. DeMent and R. L. Juve, September 17, 1962.
Described by: M. Stout, H. Oakes, and W. R. Elder.

Ap 17717 0 to 6 inches. Dark grayish brown (10YR 3.5/2) light silty clay, very dark grayish brown (9YR 3/2) moist; weak to moderate fine and medium subangular and granular structure with many clods; very hard; firm but very crumbly; common 1- to 2-mm $CaCO_3$ concretions; moderately alkaline, calcareous; abrupt smooth boundary.

A12 17718 6 to 15 inches. Brown (7.5YR 4.5/2) light silty clay, dark brown (7.5YR 3/2) moist; strong fine subangular blocky structure with minor granular component; ped surfaces are shiny throughout; few medium mottles of pinkish gray; very hard; very firm but very crumbly; many fine open pores; common fine and very fine $CaCO_3$ concretions; moderately alkaline, calcareous; gradual but somewhat wavy boundary.

B21 17719 15 to 25 inches. Brown (9YR 5/2) light silty clay, dark brown (9YR 4/2) moist; moderate to strong medium and fine subangular blocky structure; shiny ped surfaces; very hard; very firm but very crumbly; common fine pinkish white $CaCO_3$ concretions and soft masses; moderately alkaline, calcareous; gradual wavy boundary.

B22 17720 25 to 34 inches. Very pale brown (10YR 7/3) silty clay, brown (10YR 5/3) moist; with about 40 percent white (10YR 8/2); light gray (10YR 7/2) moist that seemingly is of $CaCO_3$ coloration; moderate very fine subangular blocky structure; hard; firm but very crumbly; moderately alkaline; calcareous; clear wavy boundary.

B23&C 17721 34 to 45 inches. White (2.5Y 8/2) silty clay; pale yellow (2.5Y 7/4) moist; weak subangular blocky structure with common chalk fragments and partings; platy in lower 3 inches; hard; friable; clear lower boundary.

R 45 to 49 inches. White (10YR 8/1) hard chalk having Mohs' hardness of 2.5-3.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

B22 - heavy silty clay loam
B23&C - light silty clay loam

Mineralogy data (Methods 7A1a through 7A1d and 7A2a)

Depth Inches	Sand 2-0.05 mm	Silt 0.05-0.002 mm	Coarse clay 0.002-0.0002 mm	Fine clay < 0.0002 mm
0-6	QZ1 FD3	QZ1 MI3 FD3	MI1 KK2 MT2 QZ3 FD3	MT1
6-15	QZ1 FD3	QZ1 MI3 FD3	MI1 KK2 MT2 QZ3 FD3	MT1
15-25	QZ1 FD3	QZ1 MI3 VR3 FD3	MI1 KK2 MT2 QZ3 FD3	MT1
25-34	QZ1	QZ1 MI3 VR3 FD3	MI1 MT1 KK3 QZ3 FD3	MT1
34-45	QZ1	QZ1 MI3 VR3 FD3	MT1 MI2 QZ3	MT1

Relative abundance: 1 = > 40 percent, 2 = 10-40 percent, 3 = < 10 percent.
Mineral code: FD = feldspar, MI = mica or illite, KK = kaolinite, MT= montmorillonite, QZ = quartz, VR = vermiculite.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Entic Haplustoll; fine-silty, carbonatic, thermic

SOIL Austin silty clay SOIL Nos. S62TX-155-2 LOCATION McLennan County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 17722-17726 May 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (In.)	Horizon	Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05) [a]	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 <0.002	Coarse fragments 2A2: 3B1 > 2	Coarse fragments 2A2: 2 – 19	Coarse fragments 2A2: 19 – 76
		Pct. of < 2 mm														Pct.	Pct. of < 76 mm	
0-6	Ap	7.7	46.1	46.2	0.3	0.6	0.6	2.4	3.8	13.9	32.2	19.4	3.9		37	tr		
6-19	A1	7.2	43.8	49.0	0.4	0.5	0.5	2.4	3.4	11.0	32.8	16.1	3.8		41	tr		
19-23	B21	7.3	46.9	45.8	0.6	0.6	0.6	2.5	3.0	8.9	38.0	13.6	4.3		33	tr		
23-30	B22	7.9	52.4	39.7	0.7	0.6	0.7	2.8	3.1	8.3	44.1	13.3	4.8		26	tr		
30-38	C	10.2	61.2	28.6	0.8	0.7	0.9	3.6	4.2	8.1	53.1	14.7	6.0		13	tr		

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N		Carbonate as $CaCO_3$: 6E1b < 2 mm	Carbonate as $CaCO_3$: 3A1a <0.002 mm	Bulk density				Water content		4B2 15-Bar		pH: 8C1b Sat. Paste	pH: 8C1a 1:1	pH: 8C1a 1:10
	Pct.	Pct.			Pct.	Pct.	g/cc	g/cc	g/cc		Pct.	Pct.	Pct.				
0-6	1.64	0.143	11		35	9							18.6		7.4	7.7	8.0
6-19	1.54	0.117	13		41	8							20.0		7.4	7.7	7.7
19-23	1.18	0.088	13		51	13							17.1		7.6	7.8	7.8
23-30	0.89	0.072	12		59	14							13.7		7.6	7.8	7.8
30-38	0.53				79	16							8.0		7.8	7.9	8.0

Depth (In.)	Extractable bases 5B1a: 6N4b Ca	6O4b Mg	6P2a Na	6Q2a K	Sum	Cat. Exch. Cap. 5A1a NH_4OAc	Water extract from saturated paste 8A1: Ca	Mg	6F1a Na	6Q1a K	CO_3	HCO_3	Cl	SO_4	8A1a Electrical conductivity
	meq/100 g						meq/liter								mmho/cm
0-6	39.4	0.8	tr	1.1	41.3	38.2			0.2	0.2					0.53
6-19	38.1	0.3	tr	0.8	39.2	35.8			0.2	0.1					0.72
19-23	32.4	0.2	tr	0.7	33.3	29.3			0.2	0.1					0.63
23-30	25.6	0.1	tr	0.5	26.2	22.3			0.2	0.1					0.51
30-38	13.5	0.1	tr	0.3	13.9	10.5			0.2	0.1					0.37

Depth (In.)	8A Water at Saturation	5D2 Exchangeable Na		Gypsum	Ratios to Clay 8D2: NH_4OAc CEC		15-Bar Water
	Pct.	Pct.		Pct.			
0-6	59.0	< 1			1.03		0.50
6-19	62.5	< 1			0.87		0.49
19-23	54.8	< 1			0.89		0.52
23-30	48.8	< 1			0.86		0.53
30-38	41.8	< 1			0.81		0.62

a. Carbonate comprises more than 50 percent of the sand.

Soil classification: Entic Haplustoll; fine-silty, carbonatic, thermic.
Soil: Austin silty clay.
Soil Nos.: S62TX-155-2; 17722-17726 .
Location: East 1.3 miles of Lorena, Texas (0.87 mile northeast of first overpass north of Lorena on U.S. 81, 0.65 mile on middle county road at junction, 0.55 mile south, east in cultivated field).
Cover: Disced Johnsongrass, ready for small grain.
Area: McLennan County, Texas.
Parent material: Clayey residuum from chalk rock.
Topography: Undulating landscape having convex surfaces and gradients of about 3 to 4.5 percent; site at midslope on 3.5 percent gradient.
Moisture at sampling: Dry, about 35 percent field capacity.
Sampled by: J. A. DeMent and R. L. Juve, September 17, 1962.
Described by: M. Stout, W. R. Elder, and H. Oakes.

Ap 17722 0 to 6 inches. Dark grayish brown (10YR 4/1.5) light silty clay, very dark grayish brown (10YR 3/2) moist; weak subangular blocky structure and cloddy; very hard; firm but very crumbly; few very fine $CaCO_3$ concretions; moderately alkaline, calcareous; abrupt smooth lower boundary.

A1 17723 6 to 19 inches. Brown (7.5YR 4/2) light silty clay, dark brown (7.5YR 3/2) moist; strong fine and very fine subangular structure and minor fine blocky and granular components; ped surfaces are shiny; extremely hard; very firm, but very crumbly; common wormcasts of light gray; few fine $CaCO_3$ concretions; moderately alkaline; calcareous; clear wavy lower boundary.

B21 17724 19 to 23 inches. Brown (7.5YR 4.5/3) light silty clay, dark brown (7.5YR 3.5/2) moist; strong fine and medium subangular blocky structure; peds are shiny; extremely hard; very firm, but crumbly; few fine $CaCO_3$ concretions; some 5 percent of altered partings of light gray chalk; moderately alkaline, calcareous; clear wavy lower boundary.

B22 17725 23 to 30 inches. Grayish brown (10YR 5/2) heavy silty clay loam, brown (10YR 4/3) moist; moderate very fine subangular blocky structure; very hard; firm, but very crumbly; about 20 percent light gray soft altered chalk fragments and partings; few to common masses of $CaCO_3$; clear slightly wavy lower boundary.

C 17726 30 to 38 inches. Very pale brown (10YR 7/3) silty clay loam, pale brown (10YR 6/3) moist; commonly mottled with brownish yellow and brown; structureless; very hard; firm; very crumbly; some wormcasts and holes found; estimated 35 percent soft chalk fragments and partings; moderately alkaline, calcareous; clear wavy lower boundary.

R 38 to 43 inches. Bedrock of soft pale brown laminated chalk which becomes harder with depth; Mohs' hardness of 2.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Entic Haplustoll; clayey, mixed, thermic, shallow

SOIL Stephen clay SOIL Nos. S62TX-43-1 LOCATION Collin County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 17782-17784 May 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

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)		3A1a Non-carbonate <0.002	Coarse fragments 2A2: 3B1 > 2	2 – 19	19 – 76
		Pct. of < 2 mm													Pct.	(< 19) Pct.	Pct. of < 76mm	
0-8	Ap	15.4	39.9	44.7	0.4	0.8	1.1	5.6	7.5	21.1	18.8	32.5	7.9		42	-		
8-13	A11	13.5	38.3	48.2	1.0	1.3	1.1	4.4	5.7	17.4	20.9	26.1	7.8		44	-		
13-17	A12	32.8	32.9	34.3	9.5	7.0	3.4	7.1	5.8	12.8	20.1	22.8	27.0		34	11		

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	Carbonate as $CaCO_3$: 6E1b < 2mm	3A1a < 0.002 mm	Bulk density: 4A1a Field-State	4A1d 1/3-Bar	4A1b Air-Dry	4D1 COLE	Water content: 4B4 Field-State	4B1c 1/3-Bar	4B2 15-Bar	4C1 1/3-to 15-Bar		pH: 8C1a (1:1)	
	Pct.	Pct.		Pct.	Pct.	Pct.	g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.			
0-8	1.79	0.158	11	1.2	28	3							18.7				7.7
8-13	2.20	0.172	13	1.3	26	4	1.36	1.32	1.69	0.087	26.1	26.9	20.8	0.08			7.7
13-17	1.44	0.133	11	1.2	52	tr							14.9				7.7

Depth (In.)	Extractable bases 5B1a: 6N4b Ca	6O4b Mg	6P2a Na	6Q2a K	Sum	Cat. Exch. Cap. 5A1a NH_4OAc	Base saturation:	
	meq/100 g						Pct.	Pct.
0-8	38.1	0.8	tr	0.9	39.8	35.4		
8-13	40.7	0.6	tr	0.8	42.1	38.6		
13-17	27.0	0.1	tr	0.4	27.5	24.4		

Depth (In.)	Ratios to Clay 8D2: NH_4OAc CEC	Ext. Iron	15-Bar Water
0-8	0.84	0.03	0.45
8-13	0.88	0.03	0.47
13-17	0.72	0.04	0.44

a. Carbonate comprises more than 50 percent of the coarser than very fine sand and 25 to 50 percent of the very fine sand.

Soil classification: Entic Haplustoll; clayey, mixed, thermic, shallow.
Soil: Stephen clay.
Soil Nos.: S62TX-43-1; 17782-17784.
Location: South of telephone exchange 1.6 miles in Frisco on county road, 105 feet east in cultivated field.
Area: Collin County, Texas.
Cover: None, cultivated field.
Parent material: Residuum from chalk.
Topography: Nearly level to gently undulating, slightly convex surfaces having about 1.5 percent gradient; landscape is undulating with gradients up to 3 percent.
Moisture when sampled: About 50 percent field capacity; very favorable digging.
Sampled by: J. A. DeMent and R. L. Juve, September 11, 1962.
Described by: M. Stout and H. Oakes.

Ap 17782 0 to 8 inches. Very dark grayish brown (10YR 3/2) light clay, very dark brown (10YR 2/2) moist; weak granular structure; hard; firm but crumbly; sticky; contains about 3 percent angular chalk gravels; moderately alkaline, calcareous; abrupt lower boundary.

A11 17783 8 to 13 inches. Very dark grayish brown (10YR 3/2) clay, very dark brown (10YR 2/2) moist; moderate fine granular and subangular blocky structure; ped faces are dull shiny (crush to 1/2 value higher); very hard; very firm but crumbly; 5 percent fine and medium angular chalk fragments; moderately alkaline, calcareous; clear wavy boundary having an amplitude of plus or minus 3 inches.

A12 17784 13 to 17 inches. Dark grayish brown (10YR 4/2) gravelly clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; very hard; firm but mass is crumbly; approximately 30 percent coarse particles of subrounded pebbles of chalk; moderately alkaline, calcareous; lower boundary is abrupt and irregular.

C 17 to 21 inches. Brown (10YR 4/3) silty clay loam, dark brown (10YR 3/3) moist; comprising 1 part soil fines to 5 parts of soft chalk of pale yellow (2.5Y 7/4 dry) and light gray (2.5Y 7/2 dry); soil fines occur in the cracks, between partings, and as masses in the rock portion; roots occur along these cracks and partings; chalk chipped out readily with spade or bar.

R 21 to 26 inches. Light gray chalk or soft limestone, chipped with difficulty with bar; chalk estimated to have hardness of 3+, (Mohs' scale).

Remarks: Textures given above agree with laboratory data. Field textures where different are given below:

Ap - light silty clay
A11 - silty clay
A12 - silty clay loam or clay loam

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Entic Haplustoll; clayey, mixed, thermic, shallow

SOIL Stephen silty clay SOIL Nos. S62TX-43-2 LOCATION Collin County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 17785-17787 May 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (In.)	Horizon	Size class and particle diameter (mm) 3A1: Total Sand (2–0.05) a	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 <0.002	Coarse fragments 2A2: 3B1 ≥ 2 (<19) Pct.	2 – 19 Pct. of < 76mm	19 – 76 Pct. of < 76mm
		Pct. of < 2 mm																
0–7	Ap	5.5	41.8	52.7	0.3	0.5	0.4	1.2	3.1	19.5	22.3	23.4	2.4		53	9		
7–15	A11	5.0	44.1	50.9	0.1	0.3	0.2	1.2	3.2	19.3	24.8	23.4	1.8		49	-		
15–19	A12	8.4	40.4	51.2	0.5	0.6	0.6	2.6	4.1	15.6	24.8	21.5	4.3		45	-		

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N		Carbonate as CaCO3: 6E1b <2 mm Pct.	3A1a <0.002 mm Pct.	Bulk density g/cc	g/cc	g/cc		Water content Pct.	Pct.	4B2 15-Bar Pct.			pH 8C1a (1:1)	
0–7	2.04	0.144	14		7	tr							23.4				7.8
7–15	2.20	0.140	16		6	2							26.1				7.8
15–19	2.02	0.139	14		22	6							23.0				7.8

Depth (In.)	Extractable bases 5B1a: 6N4b Ca	6O4b Mg	6P2a Na	6Q2a K	Sum		Cat. Exch. Cap. 5A1a NH_4OAc			Base saturation Pct.	Pct.
	meq/100 g										
0–7	47.5	0.8	tr	1.1	49.4		44.0				
7–15	47.1	0.7	0.1	1.0	48.9		43.3				
15–19	41.0	0.3	0.1	0.8	42.2		37.1				

Depth (In.)	Ratios to Clay 8D2: NH_4OAc CEC		15-Bar Water	
0–7	0.83		0.44	
7–15	0.88		0.53	
15–19	0.82		0.51	

a. Carbonate comprises more than 50 percent of the very coarse, coarse, and medium sand and 5 to 25 percent of the fine and very fine sand.

Soil classification: Entic Haplustoll; clayey, mixed, thermic, shallow.
Soil: Stephen silty clay.
Soil Nos.: S62TX-43-2; 17785-17787.
Location: South of telephone exchange 3.25 miles in Frisco; 0.2 mile west on curving county road, approximately 25 yards north and 50 yards east.
Area: Collin County, Texas.
Cover: None, cultivated land.
Parent material: Residuum from chalk or chalky limestone.
Topography: Nearly level to gently sloping divide having slightly convex surface with a gradient of 1.5 percent; landscape is undulating with gradients up to 3 percent.
Moisture when sampled: About 50 percent of field capacity; digging good.
Sampled by: J. A. DeMent and R. L. Juve, September 11, 1962.
Described by: M. Stout and H. Oakes.

Ap 17785 0 to 7 inches. Very dark grayish brown (10YR 3/2) light silty clay; very dark brown (10YR 2/2) moist; weak granular structure; hard; firm but crumbly; about 8 percent angular chalk gravels 2 to 10 mm in diameter; moderately alkaline; calcareous; abrupt lower boundary.

A11 17786 7 to 15 inches. Very dark grayish brown (10YR 3/2) silty clay; very dark brown (10YR 2/2) moist; moderate to strong fine subangular blocky and some granular structure; ped surfaces are dull shiny; very hard, very firm but mass is crumbly; crushes to 10YR 3/2 moist; about 10 percent fine angular chalk gravels; moderately alkaline, calcareous; clear wavy lower boundary having an amplitude of plus or minus 4 inches in pit.

A12 17787 15 to 19 inches. Very dark grayish brown (9YR 3/2) light silty clay, very dark brown (9YR 2/2) moist; moderate fine subangular blocky structure; very hard; firm but crumbly; subrounded gravels of hard chalk occur in lenses and range from 5 to 25 percent within pit area, seemingly discontinuous; moderately alkaline, calcareous; lower boundary is abrupt and irregular.

C 19 to 24 inches. Same color, structure, and texture of the soil fines above, comprising 1 part to 5 parts of chalk or limestone of pale yellow; soil fines occur in cracks, between chalk strata, and in masses within the rock; thickness of soil fines between plates decreases with depth and becomes pale brown; roots follow cracks and partings.

R 24 to 31 inches. Chalk or soft limestone bedrock which is dug or chipped with some difficulty using bar; soil fines continue but are very thin and are mostly films between chalk plates; water seeped from between saturated chalk plates. Chalk estimated to have a hardness of 2.5 (Mohs' scale).

SOIL CLASSIFICATION-PACHIC HAPLUSTOLL
THERMIC

SERIES - - - - - - -SERIES NOT DESIGNATED

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S63TX-43-90 COUNTY - - - COLLIN

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K1413-1418

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (- - - - - - SAND - - - - - -)									PARTICLE SIZE ANALYSIS (A)		ETHYLENE GLYCOL RETAINED			BULK DEN
		SAND 2-.05	SILT .05-.002	CLAY LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	LT 2 MM	LT .002 MM	LT .0002 MM	4A3A
IN		(- - - - - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - - - - -)											(PCT LT.002)		(- - MG/G - - -)			G/CC
000-7	AP	1.5	22.5	76.0									19	81				
007-16	A11	1.2	20.1	78.5									43	57				
016-25	A12	2.5	33.2	64.3									34	66				
025-33	B2	1.3	16.4	82.3	0.0	0.1	0.0	0.5	0.7				27	73				
033-39	C	0.4	8.9	90.7									29	71				
039+	R	0.1	24.4	75.4									39	61				

DEPTH	ORGANIC MATTER 1 6A1A ORGN CARB	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	(- -EXTRACTABLE BASES 5B1A- -) 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO CA MG TO	CA CARB EQ 6E1E	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	(- - - - - - - - MEQ / 100G - - - - - - - -)								PCT		PCT			
000-7	3.00					1.2	0.1	1.0		60.3	111A	127A				20.0	8.0		
007-16	2.70					0.7	0.1	0.9		56.5	109A	118A				28.0	8.0		
016-25	1.90					0.3	0.1	0.8		47.9	110A	123A				40.0	8.1		
025-33	1.20					0.3	0.1	0.6		30.3	107A	118A				61.0	7.9		
033-39	0.40					0.3	0.1	0.3		16.3	99A	116A				78.0	8.0		
039+	0.20					0.3	0.1	0.3		13.8	83A	99A				80.0	8.1		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S63TX-43-90

DEPTH	SAND	SILT	CLAY	COARSE CLAY	FINE CLAY
INCHES	2 - 0.05MM	0.05 - 0.002MM	LESS THAN 0.002MM	0.002 - 0.0002MM	LT 0.0002MM
0-7	QZ1	QZ1 MI2 KK3		MI1 KK2 MT3 QZ3	MT1
7-16	QZ1	QZ1 MI2 KK3 FD3		MI1 KK2 MT3 QZ3	MT1
16-25	QZ1	QZ1 MI2 KK3		MI1 KK2 MT2 QZ3	MT1
25-33	QZ1	QZ1 MI2 KK3 FD3		MI2 KK2 MT2 QZ3	MT1
33-39		MI2 VR2 QZ2 KK3 FD3		MI2 MT2 KK2 QZ3	MT1
39+		MI1 QZ2 VR3 KK3 FD3		MI2 MT2 KK3 QZ3	MT1

*RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, VR=VERMICULITE.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Pachic Haplustoll; thermic.
Soil: Series not designated.
Soil Nos.: S63TX-43-90; K1413-1418.
Location: Collin County, Texas; 2.7 miles south of Frisco on Highway 289 at south end of Lebanon; 42 yards west of highway in cultivated field opposite the Baptist Church. Cover: Cultivated; oats.
Topography: Gently undulating, gradient of 1.5 percent.
Sampled by: Harvey Oakes, June 4, 1963.
Described by: Harvey Oakes.

Ap K1413 0 to 7 inches. Very dark grayish brown (10YR 3/2) clay; very dark brown (10YR 2/2 when moist); moderate to strong fine subangular blocky and granular; crumbly, peds extremely hard dry; calcareous; gradual boundary.

A11 K1414 7 to 16 inches. Very dark grayish brown (10YR 3/2) clay; very dark brown (10YR 2/2 when moist); strong fine subangular blocky and granular; very crumbly when slightly moist, sticky and plastic; calcareous, gradual slightly wavy boundary.

A12 K1415 16 to 25 inches. Dark grayish brown (10YR 4/2) clay; very dark grayish brown (10YR 3/2 when moist); structure as above; consistence slightly less crumbly than above; few small spots of yellowish brown material due to insect activity; calcareous; clear smooth boundary.

B2 K1416 25 to 33 inches. Grayish brown (10YR 5/2) clay with spots and lumps of yellowish brown and soft chalky particles that comprise some 20 to 30 percent of the mass; apparently moderate fine subangular blocky and granular; crumbly and friable when slightly moist; calcareous; clear smooth boundary.

C K1417 33 to 39 inches. Very pale brown, soft friable chalky marl containing a small amount of pale brown fine earth in upper part while thin bedded with few hard lenses of chalk in lower part.

R K1418 39 inches plus. Thin bedded soft and hard chalk.

Remarks: 1. Family texture and mineralogy family could not be designated, because the amounts of clay-size and silt-size carbonates were not determined.

2. Please note the extremely high clay content, much of which apparently was carbonate clay based on $CaCO_3$ equivalent.

3. This pedon was sampled as Austin series, but there is not enough data to classify to the full family and series level. Also, the mollic epipedon is too thick for the Austin series.

4. Textures above agree with laboratory data. Field textures where different are given below:

Ap - silty clay
A11 - silty clay
A12 - silty clay
B2 - silty clay

SOIL CLASSIFICATION-VERTIC HAPLUSTOLL
FINE, MONTMORILLONITIC, THERMIC
SERIES - - - - - - -KRUM (A)

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S57TX-18-90 COUNTY - - - BOSQUE

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K1520-1525

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (SAND) SAND	SILT	CLAY	VCOS	CORS	MEDS	FNES	VFNS	PARTICLE SIZE ANALYSIS (B) SAND	SILT	CLAY	CRSE CLAY	FINE CLAY	(ETHYLENE GLYCOL) RETAINED 2 MM	LT .002 MM	( ) LT .0002 MM	BULK DEN 4A3A
		2-.05	.05-.002	LT .002	2-1	1-.5	.5-.25	.25-.10	.10-.05	2-.05	.05-.002	LT .002	.002-.0002	LT .0002				
IN		(- - - - - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - - - - -)											(PCT LT.002)		(- - MG/G - - -)			G/CC
000-6	AP	6.3	45.4	48.3									39	61				
006-16	A11	5.7	41.3	53.0	1.0	0.6	0.5	1.4	2.1									
016-28	A12	5.8	44.3	49.9														
028-36	B	7.1	47.4	45.5									27	73				
036-54	C1	3.0	60.2	36.8									37	63				
054-72	C2CA	2.7	60.9	34.4									38	62				

DEPTH	ORGANIC MATTER 6A1A ORGN	6B1A NITG	C/N	IRON 6C3 EXT FE	6S1A TOTL	PHOS 6N2E CA	EXTRACTABLE BASES 5B1A- 6Q2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO CA TO MG	CA CARB EQ 6E1E	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
	CARB																		
IN	PCT	PCT		PCT	PCT	(- - - - - - - - MEQ / 100G - - - - - - - -)								PCT		PCT			
000-6	2.40					1.6	1.0	1.0	49.8	82B	106B				16.0	7.5			
006-16	1.80					1.4	1.3	0.9	47.6						23.0	7.6			
016-28	1.20					1.1	1.0	0.7	39.3						35.0	7.7			
028-36	0.80					1.1	0.2	0.5	33.7	83B	110B				42.0	7.7			
036-54	0.30					0.7	0.1	0.3	18.3	74B	80B				67.0	7.8			
054-72	0.20					0.9	0.3	0.2	15.3	59B	95B				80.0	7.8			

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S57TX-18-90

DEPTH	SAND	SILT	CLAY	COARSE CLAY	FINE CLAY
INCHES	2 - 0.05MM	0.05 - 0.002MM	LESS THAN 0.002MM	0.002 - 0.0002MM	LT 0.0002MM
0-6	QZ1 FD3	QZ1 MI3 KK3 FD3		MI2 MI2 KK2 QZ3 FD3	MT1 KK3
6-16	QZ1 FD3	QZ1 MI3 KK3 FD3			
16-28	QZ1 FD3	QZ1 MI3 KK3 VM3 FD3			
28-36	QZ1 FD3	QZ1 MI3 KK3 FD3		MV2 MI2 KK2 QZ3 FD3	MT1 KK3
36-54	QZ1 FD3	QZ1 MI2 KK2 FD3		KK1 MT2 MI2 QZ3 FD3	MT1 KK2
54-72	QZ1 FD3			KK1 MV2 MI2 QZ3 FD3	MT1 KK2

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT. 2 = 10 - 40 PCT. 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, MV=DIFFUSE, HYDRATED, EXPANSIBLE AND MICACEOUS (13-18A), VM=VERMICULITE-ILLITE OR ILLITE-VERMICULITE INTERSTRATIFIED.

(A). DATA FROM MS THESIS BY LARRY A NELSON - CHEMICAL, MINERALOGICAL AND PHYSICAL PROPERTIES OF THE SAN SABA CLAY, TEXAS A AND M UNIVERSITY, AUGUST 1958.
(B) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Vertic Haplustoll; fine, montmorillonitic, thermic.
Soil: Krum silty clay.
Soil Nos.: S57TX-18-90; K1520-1525.
Location: Bosque County, Texas; 1.2 miles northwest of the intersection of State Highway 174 and Farm Road 927 near Morgan, Texas on south side of Farm Road 927; 0.4 mile south from gate leading into field and approximately 30 feet from north-south fence on west side of field. Cover: Cultivated, plowed oat stubble.
Topography: Nearly level upland, 1 to 2 percent gradient.
Sampled by: C. L. Godfrey; L. A. Nelson, August 7, 1957.
Described by: C. L. Godfrey; L. A. Nelson.

Ap K1520 0 to 6 inches. Dark gray (5Y 4/1, moist) to very dark gray (5Y 3/1, moist) silty clay, moderate fine granular structure; friable, hard, very plastic, sticky; calcareous; roots numerous; gradual smooth boundary.

A11 K1521 6 to 16 inches. Very dark gray (5Y 3/1, moist) silty clay; moderate medium subangular blocky structure parting to strong fine granular; friable hard, plastic and sticky; calcareous; occasional roots; brown (7.5YR 5/4, moist) krotovina present; gradual smooth boundary.

A12 K1522 16 to 28 inches. Very dark gray (10YR 3/1, moist) silty clay with few krotovinas of very dark grayish brown (10YR 3/2, moist); moderate medium subangular and angular blocky structure; friable to firm, hard, plastic and sticky; calcareous; contains small subrounded particles of indurated $CaCO_3$; occasional chert fragments and few $CaCO_3$ splotches; occasional roots; gradual wavy boundary.

B K1523 28 to 36 inches. Dark gray brown (10YR 4/2, moist) silty clay; moderate medium angular blocky structure; firm, hard, plastic and sticky; calcareous; contains numerous small chert and limestone particles; diffuse wavy boundary.

C1 K1524 36 to 54 inches. Yellowish brown (10YR 5/4, moist) through yellow (10YR 7/6 moist) silty clay loam with very dary gray (10YR 3/1, moist) streaks (partially filled cracks); massive; firm, hard, plastic and slightly sticky; contains occasional limestone and chert fragments; ferromanganese concretions numerous; dark gray brown (10YR 4/2, moist) krotovina present; diffuse wavy boundary.

C2ca K1525 54 to 72 inches. Similar to above horizon.

Remarks: 1. Pedon was sampled as San Saba series. The soil is outside the range of the San Saba series in lacking rock within 40 inch depth. Low chromas of the soil matrix extend to a 36 inch depth, and there are not mottles with chromas of 2 within 54 inches, and is outside the range of the Houston Black series.
2. Textures above agree with laboratory data. Field textures of all horizons were given as clay.

SOIL CLASSIFICATION-TYPIC PALEUSTOLL
FINE, MIXED, THERMIC

SERIES - - - - - - -TILLMAN

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S57TX-99-90 COUNTY - - - HARDEMAN

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K553-558

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (PCT LT 2MM) SAND									PARTICLE SIZE ANALYSIS (A) (PCT LT.002) SAND			CRSE CLAY .002-.0002	FINE CLAY LT .0002	ETHYLENE GLYCOL RETAINED (B) LT 2 MM		GLYCOL (B) LT .0002 MM	BULK DEN 4A3A G/CC
		SAND 2-.05	SILT .05-.002	CLAY LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	SAND .2-.05	SILT .05-.002	CLAY LT .002			LT 2 MM	.002 MM		
000-4	AP	13.5	58.9	27.7	0.1	0.2	0.3	3.1	9.9				26	74	30.9	176	237	
004-23	B21T	10.3	51.5	38.2	0.3	0.4	0.2	2.4	7.1				23	77	42.0	176	248	
023-39	B22T	11.1	51.0	38.0	0.7	0.7	0.3	2.3	7.1				24	76	45.3	182	243	
039-63	B23TCA	12.4	58.7	29.0	1.0	1.3	0.5	3.1	6.4				28	72	29.2		258	
063-97	B24TCA	13.6	57.0	29.3	0.8	1.0	0.4	3.0	8.5				28	72	37.6	181	259	
097-112	B25TCA	14.2	56.1	29.7	0.8	1.0	0.6	3.2	8.8				25	75	37.6	184	256	

DEPTH IN	ORGANIC MATTER 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON 6C3 EXT FE PCT	PHOS 6S1A TOTL PCT	EXCHANGEABLE BASES 5B1B 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB MEQ/100G	CAT EXC CAP 5A2A LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO CA 8D3 CARB EQ TO MG	8C1A 1/1 H2O	8C1C 1/2 KCL	PH 8C1E 1/2 CACL
000-4	1.16					3.3	0.2	1.1		22.0	69A	88A			2.0	7.6		
004-23	0.87					6.6	0.3	0.8		27.1	70A	91A			4.1	7.7		
023-39	0.58					9.4	0.4	0.7		27.0	69A	91A			6.8	7.8		
039-63	0.17					8.9	0.4	0.7		17.0	62A	95A			32.0	8.3		
063-97	0.17					8.9	2.6	0.8		19.5	66A	98A			15.9	8.3		
097-112	0.06					7.7	2.9	0.7		16.2	68A	95A			30.2	8.3		

DEPTH IN	SATURATED PASTE 8E1 RESI OHM-CM	8C1B PH	8A H2O PCT	NA 502 ESP PCT	NA 5E SAR	SALT GYP 8O5 TOTL SOLU PPM	6F1A PCT	SATURATION EXTRACT 8A1 8A1A EC MMHOS/CM	6N1B CA MEQ/LITER	6O1B MG	6P1A NA	6Q1A K	6I1A CO3	6J1A HCO3	6K1B CL	6L1A SO4	6M1A NO3	ATTERBERG 4F1 LQID LMIT PCT	4F2 PLST INDX
000-4			50			360		0.90	7.4	2.7	1.1	TR	0.5	1.6	1.3	7.2			
004-23			51	1	1	330		0.90	4.9	3.3	2.0	TR	0.9	2.2	1.3	7.3			
023-39			46	1	4	200		0.60	1.2	1.2	4.4	TR	0.5	2.5	2.0	2.9			
039-63			56		9	390		1.10	1.0	1.1	8.8	0.1	0.9	2.7	2.8	5.0			
063-97			58	9	11	610		1.60	1.3	1.7	13.4	0.1	0.4	2.2	3.7	12.3			
097-112																			

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S57TX-99-90

DEPTH	SAND	SILT	CLAY	COARSE CLAY	FINE CLAY
INCHES	2 - 0.05MM	0.05 - 0.002MM	LESS THAN 0.002MM	0.002 - 0.0002MM	LT 0.0002MM
0-4	QZ1 FD2	QZ1 MI2 FD3 KK3		MI2 KK2 QZ2	MT1 MI2 KK3
4-23	QZ1 FD2	QZ1 MI2 FD3 KK3		MI2 KK2 QZ2 CL3 FD3	MT1 MI2 KK3
23-39	QZ1 FD3	QZ1 MI2 FD2 KK3		MI2 KK2 QZ2 CL3 FD3	MT1 MI2 KK3
39-63	QZ1 FD3	QZ1 FD2 MI3		MI2 KK2 QZ2 MT3	MT1 MI2 KK3
63-97	QZ1 FD2	QZ1 FD2 MI3 KK3		MI2 KK2 QZ2 MT3 FD3	MT1 MI2 KK3
97-112	QZ1 FD2 MI3	QZ1 FD2 MI2 KK3		MI2 KK2 QZ2 MT3	MT1 MI2 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT. 2 = 10 - 40 PCT. 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, CL=CHLORITE.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Typic Paleustoll; fine, mixed, thermic.
Soil: Tillman silty clay loam.
Soil Nos.: S57TX-99-90; K553-558.
Location: Hardeman County, Texas; 2.1 miles east from intersection of Texas Highways 283 and 287 in Quanah, about 100 feet north of edge of right-of-way and 20 feet west of entrance to Outlaw residence. Cover: Heavily grazed buffalograss pasture.
Topography: Gradient of about 1 percent.
Sampled by: I. C. Mowery, July 1957.
Described by: I. C. Mowery.

Ap K553 0 to 4 inches. Brown (7.5YR 4.5/4; 3/4, moist) silty clay loam; weak fine granular subangular blocky; moderately friable, hard, sticky; noncalcareous; numerous roots; clear smooth boundary.

B21t K554 4 to 23 inches. Dark reddish brown (5YR 3/3; 2/3, moist) silty clay loam; moderate to strong medium and coarse blocky, but being finer in the upper part and coarser in the lower part; very firm, extremely hard, very sticky and plastic; calcareous; a few patchy clayskins present; a few soft $CaCO_3$ concretions in the lower part; roots moderately numerous through and between peds; gradual smooth boundary.

B22t K555 23 to 39 inches. Reddish brown (5YR 3.5/3; 2.5/3, moist) silty clay loam; strong medium and coarse blocky; very firm, extremely hard, very sticky and plastic; strongly calcareous; with numerous soft lumps and hard concretions of $CaCO_3$ occupying about 4 percent of the mass; few roots in and between peds; gradual irregular boundary.

B23tca K556 39 to 63 inches. Yellowish red (5YR 5/6; 4/6, moist) silty clay loam; moderate coarse angular blocky structure; moderately firm, very hard, slightly sticky, crumbly when moist; calcareous; large soft lumps of $CaCO_3$ occupy 25 to 30 percent of the mass; occasional ferromanganese concretions; few fine roots; many fine pores; clear wavy boundary.

B24tca K557 63 to 97 inches. Yellowish red (5YR 5/6; 4/6, moist) silty clay loam; structure and consistence same as horizon just above; calcareous; occasional soft lumps of $CaCO_3$; clear wavy boundary.

B25tca K558 97 to 112 inches. Same as horizon just above.

C 112 to 115 inches plus. Greenish gray shale.

Remarks: 1. The uper 7 inches of the soil, when mixed, has chromas of less than 3.5. Bottom horizon was not sampled.

2. Textures above agree with laboratory data. Field textures where different are given below:

B21t - clay
B22t - clay
B23tca - silty clay
B24tca - silty clay
B25tca - silty clay

SOIL CLASSIFICATION-TYPIC PALEUSTOLL
FINE, MIXED, THERMIC

SERIES - - - - - - -TILLMAN

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S57TX-132-91 COUNTY - - - KENT

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K529-534

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (SAND) SAND 2-.05 MM (PCT)	SILT .05-.002 MM (PCT)	CLAY LT .002 MM (PCT)	VCOS 2-1 MM (PCT)	CORS 1-.5 MM (PCT)	MEDS .5-.25 MM (PCT)	FNES .25-.10 MM (PCT)	VFNS .10-.05 MM (PCT)	PARTICLE SIZE ANALYSIS (A) SAND 2-.05 MM (PCT)	SILT .05-.002 MM (PCT)	CLAY LT .002 MM (PCT)	CRSE CLAY .002-.0002 MM (PCT LT.002)	FINE CLAY LT .0002 MM (PCT LT.002)	ETHYLENE GLYCOL RETAINED (B) LT 2 MM (MG/G)	LT .002 MM (MG/G)	LT .0002 MM (MG/G)	BULK DEN 4A3A G/CC
000-5	AP	40.4	27.7	31.9	0.1	1.6	2.1	25.6	11.0				30	70	30.5	162	233	
005-16	B21T	27.4	31.9	40.7	0.1	0.9	1.1	16.9	8.4				30	70	40.4	167	245	
016-38	B22T	26.6	35.0	38.4	0.7	1.3	1.1	15.7	7.9				28	72	40.8	186	255	
038-59	B23T	24.3	37.1	38.6	0.7	1.5	1.1	13.8	7.2				32	68	42.3	186	264	
059-80	B24TCA	24.7	40.2	35.1	0.0	0.8	1.7	14.7	7.7				38	62	28.8	164	234	
080-98	2B25CA	30.1	40.1	29.9	1.6	2.1	1.4	15.8	9.2				35	65	29.8	164	227	

DEPTH IN	ORGANIC MATTER 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON 6C3 EXT FE PCT	PHOS 6S1A TOTL PCT	EXCHANGEABLE BASES 5B1B 6N2E CA (MEQ/100G)	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 6A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO CA TO MG	8D3 CARB EQ 6E1E PCT	CA 8C1A 1/1 H2O	PH 8C1C 1/2 KCL	8C1E 1/2 CACL
000-5	0.58					4.0	0.2	1.3		20.6	64A	87A				2.4	7.8		
005-16	0.58					7.5	0.6	1.0		24.6	66A	88A				2.9	7.9		
016-38	0.35					11.0	2.1	0.9		24.1	66A	95A				4.8	8.1		
038-59	0.23					13.2	4.0	0.9		24.8	66A	93A				6.6	7.7		
059-80	0.12					8.7	2.7	0.7		17.0	61A	81A				26.5	7.8		
080-98	0.06					8.1	2.3	0.7		15.0	61A	84A				17.4	7.9		

DEPTH IN	(SATURATED PASTE) 8E1 8C1B REST OHM-CM	PH	NA 8A H2O PCT	5D2 ESP PCT	NA 5E SAR	SALT 8D5 TOTL SOLU PPM	GYP 6F1A PCT	SATURATION EXTRACT 8A1 8A1A EC MMHOS/CM	6N1B CA	6O1B MG	6P1A NA	6Q1A K	6I1A CO3	6J1A HCO3	6K1B CL	6L1A SO4	6M1A NO3	ATTERBERG 4F1 LQID LMIT PCT	4F2 PLST INDX PCT
000-5																			
005-16																			
016-38			53	7	5	420		1.20	2.6	2.0	7.7	0.1	1.2	3.8	2.5	9.2			
038-59			53	8	8	3200		9.00	27.9	26.1	39.5	0.5	0.3	1.4	33.5	59.2			
059-80			45	8	8	1700		6.60	14.1	13.6	30.7	0.3	0.3	1.1	43.2	18.5			
080-98			46	9	8	1200		4.00	8.6	8.9	22.6	0.3	0.2	1.2	32.7	8.4			

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S57TX-132-91

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-5	QZ1 FD3	QZ1 FD3 MI3 KK3		MI2 KK2 QZ2 CL3	MT1 MI2 KK3 CL3
5-16	QZ1 FD3	QZ1 FD2 MI3 KK3		MI2 KK2 QZ2	MT1 MI2 KK3
16-38	QZ1 FD3	QZ1 MI2 FD3 KK3		MI2 KK2 QZ2	MT1 MI2 KK3
38-59	QZ1 FD3	QZ1 MI2 FD3 KK3		MI2 KK2 QZ2	MT1 MI2 KK3
59-80	QZ1 FD3	QZ1 MI2 KK2 FD3		MI2 KK2 QZ2	MT1 MI2 KK2
80-98	QZ1 FD3 MI3	QZ1 MI2 KK2 FD3 CL3		MI2 KK2 QZ2	MT1 MI2 KK3

RELATIVE ABUNDANCE: 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, CL=CHLORITE, HW=DISORDER, HYDRATED, EXPANSIBLE AND MICACEOUS (13-10A).

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Typic Paleustoll; fine, mixed, thermic.
Soil: Tillman clay loam.
Soil Nos.: S57TX-132-91; K529-534.
Location: Kent County, Texas; 16.5 miles north of U.S. Highway 84 on county road to Polar; 1 mile north of old Polar school (or to first county road east, north of road intersection at the old Polar school house); thence east 0.6 mile along county road. Cover: Cultivated field.
Topography: Gradient of about 1 percent.
Sampled by: I. C. Mowery, July 1957.
Described by: I. C. Mowery.

Ap K529 0 to 5 inches. Reddish brown (5YR 4/4; 3/4, moist) clay loam; weak fine granular; moderately friable, hard, sticky; noncalcareous; abrupt smooth boundary.

B21t K530 5 to 16 inches. Dark reddish brown (5YR 3/3; 3/3, moist) clay; moderate to strong medium and coarse blocky; very firm, extremely hard, very sticky; few patchy clayskins; few fine roots; few fine chert gravel; noncalcareous; abrupt smooth boundary.

B22t K531 16 to 38 inches. Reddish brown (5YR 4/4; 3/4, moist) clay loam; consistence and structure same as above; calcareous; numerous small, strongly cemented $CaCO_3$ concretions occupy about 2 percent of the mass; few fine roots; few ferromanganese concretions; gradual smooth boundary.

B23t K532 38 to 59 inches. Reddish brown (5YR 4/4; 3/4, moist) clay loam but more sandy than above; calcareous, but less $CaCO_3$ concretions than above; few fine roots; few ferromanganese concretions; clear wavy boundary.

B24tca K533 59 to 80 inches. Reddish brown (5YR 5/4; 4/4, moist) clay loam containing about 15 percent of soft lumps of $CaCO_3$; calcareous; massive; diffuse smooth boundary.

IIB25ca K534 80 to 98 inches. Reddish brown (5YR 5/4; 4/4, moist) clay loam that appears to be reworked Red Beds clay; calcareous and contains a few soft lumps of $CaCO_3$.

Remarks: 1. The total clay content decreases more than 5 percent within 60 inches of the surface, but this is due to the great increase in $CaCO_3$ at 38 inch depth. Other lab data from the same soil area indicates no significant decrease in silicate clay within a 60 inch depth. The upper 7 inches of the soil when mixed has chromas of less than 3.5

2. Textures above agree with laboratory data. Field textures where different are given below:

B22t - clay
B23t - clay
B24tca - clay
IIB25ca - clay

SOIL CLASSIFICATION-ARIDIC PALEUSTOLL
FINE-LOAMY, MIXED, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SERIES - - - - - - -ACUFF

SOIL NO - - - - - - S53TX-153-63 COUNTY - - - LYNN

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K62-68

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1								PARTICLE SIZE ANALYSIS (A)					ETHYLENE GLYCOL RETAINED		(B)	BULK DEN
		SAND	SILT	CLAY	SAND VCOS	SAND CORS	SAND MEDS	SAND FNES	SAND VFNS	SAND	SILT	CLAY	CRSE CLAY	FINE CLAY	RETAINED LT 2	RETAINED LT .002	LT .0002	4A3A
		2- .05	.05- .002	LT .002	2- 1	1- .5	.5- .25	.25- .10	.10- .05	2- .05	.05- .002	LT .002	.002- .0002	LT .0002	MM	MM	MM	
IN		PCT LT 2MM								PCT LT.002					MG/G			G/CC
000-7	AP	52.7	23.8	23.5	0.1	1.6	1.4	29.5	20.1	53.8	24.6	21.6	48	52	26.5	143		
007-16	B21T	47.7	17.8	34.5	0.2	2.0	1.4	25.0	19.1	44.1	25.6	30.4	28	72	37.7	155		
016-26	B22T	43.4	22.8	33.8	0.5	2.1	1.2	20.2	19.4	33.6	32.5	34.0				152		
026-40	B23T	40.1	26.5	33.4	0.6	2.0	1.0	18.3	18.2	39.3	30.0	30.8	19	81	36.0	146		
040-60	B24TCA	42.0	28.1	29.9	4.0	3.2	6.5	15.1	13.2	39.3	27.3	33.4				162		
060-70	B25TCA	33.7	35.3	31.0	1.7	2.9	1.2	15.9	12.0	47.4	25.3	27.3				168		
070-84	BCA	33.7	35.2	31.1	0.3	1.8	0.9	16.1	14.6						32.9	170		

DEPTH	ORGANIC MATTER 6A1A ORGN	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	EXTRACTABLE BASES 6A1A 6N2B CA	6Q2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A LT 2	LT .002	LT .0002	BASE SAT 5C2	RATIO CA 6B3	CA CARB EQ 6E1E	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
	CARB										MM	MM	MM			TO			
IN	PCT	PCT		PCT	PCT	MEQ / 100G								PCT		MG	PCT		
000-7	1.16					16.5	2.3	0.3	1.4	20.5	18.8	62A		100	7.2		7.6		
007-16	1.10					17.0	3.7	0.3	0.8	21.8	23.8	64A		92	4.6		7.1		
016-26	0.70						5.4	0.2	0.9		26.3	71A				2.9	7.7		
026-40	0.46						6.8	0.2	1.0		23.9	69A				5.0	7.9		
040-60	0.29						7.7	0.4	0.9		19.8	70A				24.8	8.1		
060-70	0.17						4.6	0.8	0.5		15.5	74A				50.4	8.4		
070-84	0.12						4.8	1.0	0.6		14.8	77A				37.5	8.4		

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Aridic Paleustoll; fine-loamy, mixed, thermic.
Soil: Acuff sandy clay loam.
Soil Nos.: S53TX-153-63; K62-68.
Location: Lynn County, Texas. Twelve miles northeast of Tahoka; 4 miles southeast of Wilson along Farm Road 211.
Physiography: Nearly level upland; surface gradient about 0.5 percent; cultivated.
Collected and described by: I. C. Mowery and E. H. Templin, July 1, 1953.

Ap 0 to 7 inches. Brown (10YR 4.5/2.5, 3/3 moist) sandy clay loam; friable, slightly hard; moderate fine granular; noncalcareous; abrupt smooth boundary.

B21t 7 to 16 inches. Brown (7.5YR 4/3, 3/3 moist) sandy clay loam; friable; moderately hard; compound moderate medium granular and medium prismatic; noncalcareous; gradual smooth boundary.

B22t 16 to 26 inches. Reddish brown (6YR 4/4, 3/4 moist) clay loam; moderately firm, moderately hard; compound moderate medium granular and medium prismatic; weakly calcareous; gradual wavy boundary.

B23t 26 to 40 inches. Yellowish red (5YR 5/6, 4/6 moist) clay loam; friable, moderately hard; weak medium granular; calcareous; contains films and threads and a few small hard concretions of $CaCO_3$; clear wavy boundary.

B24tca 40 to 60 inches. Reddish yellow (5YR 6/6, 5/6 moist) highly calcareous clay loam intermixed with some 20 percent white masses of impure $CaCO_3$; friable, moderately hard; weak medium granular; porous and permeable; gradual wavy boundary.

B25tca 60 to 70 inches. Impure soft caliche consisting of whitish friable masses of impure $CaCO_3$ intermingled with pink (7.5YR 8/4, 7/4 when moist); highly calcareous clay loam; friable; permeable; gradual wavy boundary.

Bca 70 to 84 inches plus. Reddish yellow (5YR 6/6, 5/6 moist) clay loam; friable; strongly calcareous and contains some 20 percent of soft white $CaCO_3$ concretions; porous and permeable.

Remarks: This pedon was sampled as Amarillo, and the site was mapped Amarillo in the soil survey for Lynn County, Texas, issued March 1959. The Amarillo series is a member of the fine-loamy, mixed, thermic family of Typic Haplustalfs. The Acuff series differs from the Amarillo series in having a mollic epipedon.

Textures above agree with laboratory data. Field textures where different are given below:

Ap - loam
B21t - sandy clay loam
B22t - heavy sandy clay loam
B23t - heavy sandy clay loam
B24tca - highly calcareous sandy clay loam
B25tca - highly calcareous sandy clay loam
Bca - sandy clay loam

SOIL CLASSIFICATION-ARIDIC PALEUSTOLL
FINE-LOAMY, MIXED, THERMIC

SERIES - - - - - - -ACUFF

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S53TX-153-65 COUNTY - - - LYNN

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K69-74

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1								PARTICLE SIZE ANALYSIS (A)				ETHYLENE GLYCOL RETAINED (B)		BULK DEN
		SAND	SILT	CLAY	VCOS	COS	MEDS	FINES	VFNS	SAND	SILT	CLAY	CRSE CLAY	FINE CLAY	LT 2 MM	LT .002 MM	LT .0002 MM	4A3A
		2-.05	.05-.002	LT .002	2-1	1-.5	.5-.25	.25-.10	.10-.05	.05-.002	.002-.0002	LT .0002	.002-.0002	LT .0002				
IN		PCT LT 2MM								PCT LT 2MM			PCT LT .002		MG/G			G/CC
000-7	AP	54.9	22.8	22.3	0.1	1.6	1.1	28.3	23.8	53.3	26.6	20.1	55	45	22.6	150		
007-14	B21T	46.6	25.4	28.0	0.1	1.7	1.1	22.6	21.1	46.1	28.4	25.5	48	52	31.1	148		
014-26	B22T	42.2	26.7	31.1	0.2	2.1	1.4	20.9	17.6	38.5	28.9	32.6				154		
026-38	B23T	45.4	26.7	27.9	0.2	1.9	1.1	22.3	19.9	44.3	29.0	26.8	29	71	29.5	146		
038-54	B24TCA	25.7	31.9	42.4	1.5	2.2	1.5	11.0	9.5	46.0	25.2	28.8				145		
054-72	B25TCA	28.5	36.6	34.9	1.0	2.4	1.3	13.6	10.2	37.6	26.9	35.5	37	63	42.4	164		

DEPTH	ORGANIC MATTER 6A1A ORGN CARB	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	EXTRACTABLE BASES 5B1A 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO 8D3 CA TO MG	CA CARB EQ 6E1E	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	MEQ / 100G								PCT		PCT			
000-7	0.99					4.1	0.7	1.1		19.7	68A					1.6	8.0		
007-14	1.16					2.5	0.7	0.9		22.8	71A					2.7	8.0		
014-26	0.87					2.4	0.6	0.8		26.4	68A					4.3	8.0		
026-38	0.46					3.3	0.3	0.2		22.4	70A					6.5	8.0		
038-54	0.23					3.2	0.2	0.4		10.7	67A					58.9	8.1		
054-72	0.17					6.8	0.5	0.6		18.7	64A					49.9	8.2		

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Aridic Paleustoll; fine-loamy, mixed, thermic.
Soil: Acuff sandy clay loam.
Soil Nos.: S53TX-153-65; K69-74.
Location: Lynn County, Texas; 11.5 miles north-northeast of Tahoka; 1.5 miles southeast of Wilson along Farm Road 211.
Physiography: Nearly level upland, about 0.5 percent gradient; cultivated and irrigated.
Collected and described by: I. C. Mowery and E. H. Templin, July 1, 1953.

Ap 0 to 7 inches. Brown (10YR 4/2.5, 3/3 when moist) sandy clay loam; friable, slightly hard; weak fine granular; noncalcareous; clear lower boundary.

B21t 7 to 14 inches. Brown (7.5YR 4/3, 3/3 moist) sandy clay loam; friable, moderately hard; compound moderate medium granular and medium prismatic; noncalcareous; gradual lower boundary.

B22t 14 to 26 inches. Reddish brown (5YR 5/4, 4/4 moist) clay loam; moderately firm; moderately hard; compound moderate medium granular and medium prismatic; moderately calcareous; weak films of $CaCO_3$ coat the aggregates; gradual lower boundary.

B23t 26 to 38 inches. Yellowish red (5YR 5/6, 4/6 moist) sandy clay loam; friable, moderately hard; moderate medium granular; calcareous; films of $CaCO_3$ coat the soil aggregates; a few small hard concretions are present; abrupt lower boundary.

B24tca 38 to 54 inches. Pink (7.5YR 8/4, 7/4 moist) chalky clay (soft caliche); friable; permeable; very highly calcareous; diffuse lower boundary.

B25tca 54 to 72 inches plus. Pink (7.5YR 7/4, 6/4 moist) friable clay loam; containing scattered soft $CaCO_3$ concretions; friable; permeable; highly calcareous but contains less $CaCO_3$ than the horizon above it.

Remarks: This pedon was sampled as Amarillo, and the site was mapped Amarillo in the soil survey for Lynn County, Texas, issued March 1959. The Amarillo series is a member of the fine-loamy, mixed, thermic family of Typic Haplustalfs. The Acuff series differs from the Amarillo series in having a mollic epipedon.

Textures above agree with laboratory data. Field textures where different are given below:

Ap - loam
B22t - sandy clay loam
B24tca - chalky clay loam

SOIL CLASSIFICATION Aridic Paleustoll; fine-silty, mixed, mesic

SOIL Series not designated LOCATION Hansford County, Texas

SOIL NOS. S57TX-98-3 LAB. NOS: 5758-5762

SOIL SURVEY LABORATORY Lincoln, Nebraska DATE April 25, 1958

GENERAL METHODS 1A, 1B1a, 2A1, 2B

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 <19mm.	TEXTURAL CLASS
0-5	A1	0.5a	3.0a	3.6a	12.7a	19.1a	37.4	23.7	55.3	10.0	-	l
5-13	B21ca	0.8a	2.0a	2.3a	11.6a	18.7a	34.4	30.2	49.9	11.0	Tr.	cl
13-23	B22ca	0.2a	1.4a	1.6a	8.6a	15.6a	36.7	35.9	39.5	18.8	-	cl
23-30	B23ca	1.2a	2.4a	2.1a	7.8a	14.8a	37.2	34.5	36.9	20.2	Tr.	cl
30-50	B24tca	0.9b	1.7b	1.6b	4.9b	7.7b	40.2	43.0	29.3	21.5	2	sic

pH 8C1a 1:1	1:5	1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	8A2 EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM 8A1a	6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
8.0	8.4	8.6	1.17	.109	11	<0.20	0.6	2				9.3
8.1	8.5	8.6	0.86	.092	9	<0.20	0.7	9				11.8
8.4	8.9	9.0	0.37	.042	9	<0.20	0.6	35				9.5
8.6	9.0	9.2	0.11	.019		<0.20	0.7	33				10.4
8.5	9.0	9.2	0.06			<0.20	0.9	25				14.4

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 5B1a Ca	Mg	H	6P2a Na	6Q2a K	5D2 EXCH. Na %	8A1 SATURATION EXTRACT SOLUBLE 6P1a Na	6Q1a K			8A MOISTURE AT SATURATION %
← milliequivalents per 100g. soil →							← milliequivalents per liter →				
18.5				-	0.8	-	0.2	0.2			44.1
18.6				0.1	0.6	-	0.4	0.1			54.3
11.1				0.1	0.4	1	1.2	0.2			43.4
11.9				0.4	0.5	2	2.8	0.2			51.4
18.2				1.1	0.8	4	4.9	0.2			64.7

a. Common $CaCO_3$ concr.
b. Common $CaCO_3$ concr. Also few smooth brown concr. (Fe-Mn?)

Soil classification: Aridic Paleustoll; fine-silty, mixed, mesic.
Soil: Series not designated.
Soil Nos.: S57TX-98-3; 5758-5762.
Location: From the junction of Texas Highway No. 15 and the Santa Fe Railroad on the west side of Spearman, 5.9 miles north on a county road, then 0.5 mile east into rangeland. (In Sec. 1, Block 4T, Texas and New Orleans Railroad.)
Area: Hansford County, Texas.
Physiography: Upland.
Vegetation: Buffalograss, blue grama, sand dropseed, three-awn grasses, prickly pear, catclaw and wild alfalfa.
Relief: Convex slope of approximately 1.5 percent gradient below escarpment or steep areas of Potter and above lower-lying drainages and Pullman soil.
Collected by: R. E. Daniell, J. S. Allen, W. Brooks, L. Jucquot, M. Turner, P. Mohle, and A. J. Welker.
Described by: R. E. Daniell, June 18, 1957.

A1 5758 0 to 5 inches. Brown (9YR 4/3, 3/3 moist) loam; moderate fine and very fine subangular blocky; surface 1-1/2 inches weaker structure and slightly compacted and has a weak surface crust about 3 mm thick; friable moist; slightly hard dry; many roots and wormcasts; highly calcareous; gradual boundary.

B21ca 5759 5 to 13 inches. Reddish brown (5YR 4/5, 3/5 moist) clay loam; weak fine subangular blocky; friable, moist; slightly hard dry; many wormcasts and nests of wormcasts; common pores up to 2 mm in diameter; highly calcareous with few hard $CaCO_3$ concretions up to 6 mm in diameter; common faint threads and films of $CaCO_3$; clear boundary.

B22ca 5760 13 to 23 inches. Light brown to reddish yellow (7.5YR 7/5, 6/5 moist) clay loam; friable moist; few nests of wormcasts, common pores less than 1 mm in diameter; highly calcareous with many soft $CaCO_3$ concretions; estimated 30 to 40 percent by volume of $CaCO_3$; gradual boundary.

B23ca 5761 23 to 30 inches. Same color as B22ca; clay loam; very weak subangular and angular blocky; few to common pores less than 1 mm in diameter; friable moist; highly calcareous; common soft $CaCO_3$ concretions up to 15 mm in diameter; $CaCO_3$ concretions more pronounced than in C1ca; clear boundary.

B24tca 5762 30 to 50 inches. Reddish brown (5YR 5/4 dry and moist) silty clay; compound weak fine and medium blocky and prismatic; very hard dry; common soft and few hard $CaCO_3$ concretions up to 10 mm in diameter; few ferro-manganese concretions about 3 mm in diameter.

Remarks: Roots are numerous in the A1 horizon and decrease with depth to few at 16 inches and below.

This pedon was sampled as Mansker and appears as Mansker in the Hansford County, Texas Soil Survey. A pedon described on page 26 in the soil survey is located 30 yards east of this pedon. The Mansker series is in the fine-carbonatic, thermic family of the Typic Calciustolls.

Textures above agree with laboratory data. Field textures where different are given below:

A1 - clay loam
B21ca - heavy clay loam
B23ca - heavy clay loam
B24tca - light clay

SOIL CLASSIFICATION Torrertic Paleustoll; fine, mixed, mesic

SOIL Series not designated LOCATION Hansford County, Texas

SOIL NOS. S57TX-98-1 LAB. NOS. 5741-5750

SOIL SURVEY LABORATORY Lincoln, Nebraska DATE April 25, 1958

GENERAL METHODS 1A, 1B1a, 2A1, 2B

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	TEXTURAL CLASS
0-5	Ap	-	0.2	0.5	3.1a	12.8a	56.0	27.4	52.6	18.7	-	sicl
5-9	B21t	-	0.1	0.4	2.7a	9.7a	48.5	38.6	42.6	17.7	-	sicl
9-17	B22t	-	0.1	0.4	1.9a	7.9a	37.2	52.5	36.0	10.6	-	c
17-28	B23t	-	0.1	0.3	1.4a	6.4a	50.4	41.4	35.6	22.2	-	sic
28-39	B24t	-	0.3	0.2	1.2a	6.0a	52.2	40.1	35.6	23.5	-	sic
39-50	B25t	0.1b	0.4b	0.2b	1.1ab	6.2ab	52.6	39.4	35.6	24.0	-	sicl
50-59	B26t	0.4b	0.3b	0.3b	1.6ab	8.2ab	51.3	37.9	38.7	22.0	-	sicl
59-75	B27tca	0.3b	0.2b	0.3b	1.7ab	10.1ab	47.9	39.5	40.5	18.8	-	sicl
75-85	C1ca	0.7b	0.6b	0.6b	3.0ab	10.1ab	43.4	41.6	29.9	25.8	-	sic
85-115	C2cab	0.4b	0.3b	0.3b	2.6ab	13.1ab	44.8	38.5	38.2	21.8	-	sicl

DEPTH INCHES	HORIZON	pH 8C1a 1:1	1:5	1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	8A2 EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM 8A1a	6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
0-5	Ap	6.2	6.6	6.6	1.21	.114	11	<0.20	0.8	-				10.5
5-9	B21t	6.2	6.7	6.8	1.02	.099	10	<0.20	0.5	-				15.0
9-17	B22t	7.2	7.7	7.8	0.71	.073	10	<0.20	0.8	1				18.3
17-28	B23t	8.1	8.6	8.8	0.41	.045	9	<0.20	0.9	4				16.8
28-39	B24t	8.0	8.6	8.8	0.35			<0.20	0.9	3				16.5
39-50	B25t	8.1	8.7	8.9	0.33			<0.20	0.9	2				16.0
50-59	B26t	8.0	8.5	8.7	0.28			<0.20	1.5	3				15.2
59-75	B27tca	7.9	8.3	8.5	0.22			<0.20	1.7	2				15.9
75-85	C1ca	7.9	8.5	8.7	0.14			<0.20	2.6	45				11.0
85-115	C2cab	8.0	8.5	8.8	0.06			<0.20	1.8	26				12.8

DEPTH INCHES	HORIZON	5A1a CATION EXCHANGE CAPACITY NH4Ac	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K	5D2 EXCH. Na %	8A1 SATURATION EXTRACT SOLUBLE 6F1a Na	6Q1a K	8A MOISTURE AT SATURATION %
		milliequivalents per 100g. soil							milliequivalents per liter		
0-5	Ap	19.2	12.4	3.4	5.5	-	1.7	-	0.3	1.1	42.8
5-9	B21t	25.5	17.9	5.1	5.6	0.1	1.3	-	0.4	0.3	58.1
9-17	B22t	30.6	23.2	6.8	3.6	0.3	1.2	1	1.0	0.3	76.1
17-28	B23t	26.4				0.6	1.2	2	2.3	0.3	72.4
28-39	B24t	26.6				1.0	1.3	3	3.5	0.3	64.8
39-50	B25t	26.1				1.3	1.2	4	4.4	0.2	66.2
50-59	B26t	22.2				1.2	1.1	4	6.0	0.3	58.8
59-75	B27tca	22.8				1.2	1.1	4	6.0	0.3	67.3
75-85	C1ca	11.6				0.7	0.5	2	7.2	0.4	49.3
85-115	C2cab	15.8				0.6	0.7	2	5.0	0.3	56.4

a. Few brown concr. (Fe-Mn?)
b. Common $CaCO_3$ concr.

Soil classification: Torrertic Paleustoll; fine, mixed, mesic.
Soil: Series not designated.
Soil Nos.: S57TX-98-1; 5741-5750.
Location: From the courthouse in Spearman, 3.5 miles east on FM Road 759, then 2.6 miles north on a county road, then 150 feet east into a cultivated field. (In Section 41, Block 4T, Texas and New Orleans Railroad.)
Area: Hansford County, Texas.
Vegetation: Fallow at time of sampling. Wheat and grain sorghums commonly grown.
Physiography: Upland plain.
Relief: Nearly level with slopes of less than 0.5 percent. Sampled within an area of more than 1,000 acres.
Collected by: J. S. Allen, W. Brooks, L. Jucquot, M. Turner, P. Mohle, and A. J. Welker.
Described by: R. E. Daniell, June 17, 1957.

Ap 5741 0 to 5 inches. Brown (10YR 5/3, 3/3 moist) silty clay loam; weak fine granular and subangular blocky; friable moist; slightly hard dry; noncalcareous; abrupt boundary.

B21t 5742 5 to 9 inches. Dark brown (8.5YR 4/2, 3/2 moist) silty clay loam; moderate medium and fine blocky breaking readily into moderate fine and very fine angular blocky when moist; firm moist; very hard dry; few to common pores less than 0.5 mm in diameter; noncalcareous; clear boundary.

B22t 5743 9 to 17 inches. Brown (8.5YR 5/2, 3.5/2 moist) clay; same structure and consistency as B21t; similar porosity to B21t but fewer and smaller; noncalcareous; clear boundary.

B23t 5744 17 to 28 inches. Brown (8YR 5/2, 4/2 moist) silty clay; moderate medium blocky, horizontal faces of the peds are more pronounced than the vertical faces - some macro peds almost resemble thick plates; consistency and porosity similar to B22t; calcareous; few small spots and splotches of $CaCO_3$ on ped surfaces in lower 3 inches; gradual boundary.

B24t 5745 28 to 39 inches. Brown (7.5YR 5/4, 3.5/4 moist) silty clay; weak medium and fine blocky with some angular blocky and tendency toward subangular blocky; firm moist; hard to very hard dry; few to common pores 0.5 to 0.75 mm in diameter; calcareous; common soft $CaCO_3$ concretions about 1.5 mm in diameter; gradual boundary.

B25t 5746 39 to 50 inches. Reddish brown (6YR 5/4, 4/4 moist) silty clay loam; weak medium and fine blocky with some subangular blocky; friable moist; ped surfaces and most of soil mass calcareous; common spots, splotches and streaks of $CaCO_3$ mostly between blocks and in the pores; some ped surfaces have darker colored streaks apparently leached from above horizons; gradual boundary.

B26t 5747 50 to 59 inches. Reddish brown (5YR 5/4, 3.5/4 moist) silty clay loam; weak to moderate fine blocky; fine blocks break up into very fine angular blocky; some of soil mass slightly calcareous; remainder highly calcareous with common films and spots of $CaCO_3$ on ped surfaces; friable to firm moist; few to common pores 0.5 to 1 mm in diameter; gradual boundary.

B27tca 5748 59 to 75 inches. Yellowish red (5YR 5/6, 3.5/6 moist) silty clay loam; weak coarse and medium blocky with angular surfaces; firm moist; very hard dry; thin patchy dark shiny coatings on ped surfaces (appear to be manganese); soil mass slightly calcareous with threads and films of $CaCO_3$ and few small specks and spots of soft $CaCO_3$ concretions; clear boundary.

C1ca 5749 75 to 85 inches. Pink (7.5YR 8/4, 7/4 moist) highly calcareous silty clay; friable, moist; many soft and few hard $CaCO_3$ concretions; approximately 30 to 50 percent by volume of $CaCO_3$.

C2cab 5750 85 to 115 inches. Reddish yellow (5YR 6/6 dry and moist) silty clay loam; highly calcareous; estimated 15 to 20 percent by volume of $CaCO_3$.

Remarks: Few tongues or streaks of darker soil in the B21t horizon--probably material from the Ap horizon washed down between peds when the soil was extremely dry and cracked. Krotovinas occurred in the C1cab and C2cab horizons. Some contained dark or very dark brown silty clay loam and were 6 to 8 inches in diameter. Larger krotovinas (10 to 12 inches in diameter) contained a strongly effervescent reddish brown friable silty clay material.

This pedon was sampled as Pullman and appears as Pullman in the soil survey for Hansford County, Texas, issued June 1960. The pedon description appears on page 29; some of the data appear on pages 37 and 38. The Pullman series is in the fine, mixed, thermic family of Vertic Paleustolls.

Textures above agree with laboratory data. Field textures where different are given below:

B21t - clay
B23t - clay
B24t - clay
B25t - silty clay
B26t - clay
B27tca - clay
C2cab - clay loam

SOIL CLASSIFICATION Torrertic Paleustoll; fine, mixed, mesic

SOIL Series not designated — LOCATION Hansford County, Texas

SOIL NOS. S57TX-98-2 — LAB. NOS. 5751-5757

SOIL SURVEY LABORATORY Lincoln, Nebraska — DATE April 25, 1958

GENERAL METHODS 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1 VERY COARSE SAND 2-1	COARSE SAND 1.0-.5	MEDIUM SAND .5-.25	FINE SAND .25-.10	VERY FINE SAND .10-.05	SILT .05-.002	CLAY < .002	.2-.02	.02-.002	2A2 > 2	TEXTURAL CLASS
0-5	Ap	-	0.1a	0.1a	1.2a	8.7a	57.7	32.2	46.1	21.3	-	sicl
5-9	B21t	-	0.1a	0.1a	1.3a	7.4a	48.7	42.4	38.3	18.9	-	sic
9-18	B22t	-	0.1a	0.2a	1.3a	7.0a	48.5	42.9	36.5	20.1	-	sic
18-29	B23t	-	0.1a	0.2a	1.3a	7.2a	49.5	41.7	39.0	18.8	-	sic
29-40	B24tca	0.5c	0.3b	0.3b	1.9b	8.6b	49.7	38.7	38.9	21.0	-	sicl
40-47	B25tca	0.5c	0.3b	0.3b	2.6b	10.7b	48.1	37.5	41.9	19.1	-	sicl
47-66	B26tca	0.2c	0.3b	0.3b	3.1b	14.0b	43.8	38.3	43.8	16.7	-	sicl

	pH 8C1a		ORGANIC MATTER			8A2	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM @ 25°C 8A1a	6E1a		MOISTURE TENSIONS		
	1:5	1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	EST% SALT (BUREAU CUP)		$CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
1:1												
6.5	6.9	7.0	1.26	.114	11	<0.20	0.5	-				13.0
6.9	7.4	7.4	0.94	.089	11	<0.20	0.5	-				17.8
7.4	7.9	8.1	0.67	.065	10	<0.20	0.7	1				18.6
8.0	8.6	8.8	0.42	.045	9	<0.20	0.8	2				17.3
8.3	8.7	8.9	0.34			<0.20	1.0	4				16.2
8.1	8.6	8.8	0.26			<0.20	1.5	3				15.8
7.8	8.4	8.5	0.17			<0.20	2.6	2				15.5

5A1a	EXTRACTABLE CATIONS 5B1a					5D2	8A1 SATURATION EXTRACT SOLUBLE					8A
CATION EXCHANGE CAPACITY NH_4Ac	6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K	EXCH. Na %	6F1a Na	6Q1a K				MOISTURE AT SATURATION %
← milliequivalents per 100g. soil →							← milliequivalents per liter →					
22.5	15.2	4.3	5.6	0.1	1.7	-	0.3	0.6				52.1
29.5	21.5	6.2	3.6	0.2	1.3	1	0.5	0.3				66.0
29.5	21.9	7.3	2.4	0.4	1.1	1	1.3	0.2				75.7
26.6				0.8	1.1	2	2.7	0.2				67.1
24.3				1.2	1.1	4	4.7	0.2				58.9
22.7				1.5	1.0	5	7.1	0.2				62.8
24.2				1.6	0.9	4	10.2	0.3				60.4

a. Few smooth brown concr. (Fe-Mn?)
b. Common $CaCO_3$ concr. And few, smooth brown concr. (Fe-Mn?)
c. Many $CaCO_3$ concr.

Soil classification: Torrertic Paleustoll; fine, mixed, mesic.
Soil: Series not designated.
Soil Nos.: S57TX-98-2; 5751-5757.
Location: From the courthouse in Spearman, 2.5 miles east on FM Road 759, then 2.84 miles south on a county road, then 900 feet east into a cultivated field. (In Sec. 115, Block 4T, Texas and New Orleans Railroad.)
Area: Hansford County, Texas.
Vegetation: Fallow at time of sampling. Wheat and grain sorghum commonly grown.
Physiography: Upland plain.
Relief: Nearly level with slopes of less than 0.5 percent. Sampled within an area of more than 1,000 acres.
Collected by: R. E. Daniell, J. S. Allen, W. Brooks, L. Jucquot, M. Turner, P. Mohle, and A. J. Welker.
Described by: R. E. Daniell, June 17, 1957.

Ap 5751 0 to 5 inches. Dark grayish brown (10YR 4/2.5, 3/2.5 moist) silty clay loam; weak fine granular and subangular blocky; friable moist; surface crust about 3 mm thick with dry color of 10YR 5/2; noncalcareous; abrupt boundary.

B21t 5752 5 to 9 inches. Dark grayish brown (10YR 4/2.5, 3/2.5 moist) silty clay; moderate fine blocky readily breaking up into fine and very fine angular blocky; firm moist; very hard dry; few to common pores less than 0.5 mm in diameter; few wormcasts; thin patchy clay skins; noncalcareous; clear boundary.

B22t 5753 9 to 18 inches. Brown (8.5YR 4/3, 3/3 moist) silty clay; moderate medium and fine blocky that breaks into very fine angular blocky; firm moist; very hard dry; few pores less than 0.5 mm in diameter; roots mostly between peds; thin patchy clay skins; noncalcareous; clear boundary.

B23t 5754 18 to 29 inches. Brown (8.5YR 5/3, 4/3 moist) silty clay; similar structure, consistency and porosity to B22t; thin patchy clay skins; calcareous; gradual boundary.

B24tca 5755 29 to 40 inches. Brown to reddish brown (6YR 5/4, 4/4 moist) silty clay loam; weak medium and fine blocky; firm to friable moist; very hard dry; few to common pores less than 0.75 mm in diameter; calcareous with few small spots, splotches or accumulations of $CaCO_3$ mostly less than 6 mm in diameter; gradual boundary.

B25tca 5756 40 to 47 inches. Reddish brown (5YR 5/4, 4/4 moist) silty clay loam; similar structure and porosity to B24tca; friable moist; hard dry; highly calcareous with few small spots or accumulations of $CaCO_3$; common specks and threads of $CaCO_3$; gradual boundary.

B26tca 5757 47 to 66 inches. Reddish brown (5YR 5/4, 4/4 moist) silty clay loam; weak medium and coarse blocky; ped surfaces are irregular; common pores less than 1 mm in diameter; some of soil mass is noncalcareous, remainder is calcareous with many threads, specks and splotches of $CaCO_3$; few to common coatings, thin and patchy, of darker color, probably manganese on the larger ped surfaces, mostly on the vertical faces.

B27tca 66 to 78 inches. Reddish yellow (7.5YR 7/5, 6/5 moist) silty clay; many pores mostly less than 1 mm in diameter; common soft $CaCO_3$ concretions up to 1 inch in diameter; highly calcareous with an estimated 15 to 20 percent by volume of $CaCO_3$.

Remarks: The structure in the B22t and B23t horizons has a tendency to be platy; the horizontal cleavage is more pronounced than the vertical. Some of the darker color A horizon has fallen between the cracks into the B22t horizon. Krotovinas occur in the lower portion of the 47- to 66-inch layer. They contain a porous reddish-brown silty clay material.

This pedon was sampled as Pullman and the location is mapped Pullman in the soil survey for Hansford County, Texas, issued June 1960. The Pullman series is in the fine, mixed, thermic family of Vertic Paleustolls.

Textures above agree with laboratory data. Field textures where different are given below:

B21t - clay
B22t - clay
B23t - clay
B24tca - clay
B25tca - silty clay
B26tca - silty clay

SOIL CLASSIFICATION: Arenic Plinthic Paleudult; clayey, kaolinitic, thermic

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL Conroe gravelly loamy fine sand SOIL Nos. S64TX-170-5 LOCATION Montgomery County, Texas

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 64275-64284

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	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)	3B2 Cm	Coarse fragments 3B1: 2A2 > 2 (<76) Pct.	2 – 19 Pct. of < 76mm	19 – 76 Pct. of < 76mm
		Pct. of < 2 mm															
0-4	A1	79.8	17.0	3.2	1.4	8.0	13.3	34.1	23.0	10.8	6.2	53.6	56.8		17	17	-
4-14	A21	83.7	12.2	4.1	2.5	7.5	12.7	40.0	21.0	6.5	5.7	52.8	62.7		38	38	-
14-25	A22	78.2	15.1	6.7	3.4	7.2	12.2	35.2	20.2	9.0	6.1	50.9	58.0		47	47	-
25-31	B1t	46.5	13.7	39.8	2.1	4.9	8.1	19.7	11.7	6.1	7.6	29.7	34.8	0.87	20	20	-
31-38	B21t	42.4	13.5	44.1	2.8	5.2	7.4	16.4	10.6	6.0	7.5	26.6	31.8	0.94	10	10	-
38-47	B22t	44.5	12.1	43.4	3.5	5.9	7.6	16.7	10.8	5.1	7.0	26.2	33.7	0.96	7	7	-
47-57	B23t	44.6	11.2	44.2	1.8	6.0	7.5	17.9	11.4	4.9	6.3	27.9	33.2	0.96	6	6	-
57-68	B24t	42.7	8.1	49.2	1.2	2.6	3.4	22.2	13.3	2.1	6.0	33.7	29.4	0.99	2	2	-
68-78	B25t	48.2	6.4	45.4	0.2	1.2	5.2	31.3	10.3	1.3	5.1	32.7	37.9	1.00	tr	tr	-
78-96+	B26t	61.8	4.7	33.5	tr	1.3	14.2	42.1	4.2	0.6	4.1	21.7	57.6	1.00	tr	tr	-

Depth (in.)	6A1a Organic carbon	6B2a Nitrogen	C/N		Carbonate as $CaCO_3$	6C2a Ext. iron as Fe	Bulk density: 4A1f ⅓ bar	4A1h Oven dry	4D1 COLE	Water content: 4B1c ⅓ bar	4B2 15 bar		4C1 WRD		pH: 8C1c (1:1) 1N KCl	8C1a (1:1) H_2O
	Pct.	Pct.			Pct.	Pct.	g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in/in			
0-4	0.94	0.048	20			0.2									3.8	4.5
4-14	0.23					0.2									4.1	5.0
14-25	0.17					0.4									4.0	4.9
25-31	0.19					3.1	1.61	1.69	0.014		20.3	14.3	0.08		3.4	4.6
31-38	0.08					4.6	1.58	1.65	0.015		22.9	16.0	0.10		3.3	4.6
38-47	0.08					4.9	1.63	1.73	0.019		19.5	16.0	0.06		3.3	4.4
47-57	0.07					3.6	1.74	1.77	0.007		16.8	15.9	0.01		3.2	4.3
57-68	0.07					2.6	1.71	1.76	0.009		17.2	17.2	-		3.1	4.3
68-78	0.08					1.6	1.72	1.76	0.008		16.4	15.8	0.01		3.2	4.4
78-96+	0.02					1.1	1.78	1.82	0.007		14.1	11.6	0.04		3.2	4.4

Depth (in.)	Extractable bases 5B1a: 6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	6H2a Ext. acidity	CEC: 5A3a Sum cations		6G1d Ext. Al		Ratios to clay 8D1: CEC Sum	Ext. iron	15-bar water	8D3 Ca/Mg		Base saturation: 5C3 Sum cations Pct.	5C1 NH_4OAc Pct.
	meq/100 g																
0-4	1.2	0.5	-	tr	1.7	4.1	5.8		0.7		1.81	0.06				29	
4-14	0.3	0.3	tr	tr	0.6	1.6	2.2		0.5		0.54	0.05				27	
14-25	0.3	0.4	tr	tr	0.7	1.4	2.1		0.5		0.31	0.06				33	
25-31	1.1	1.5	tr	0.1	2.6	7.2	9.9		2.4		0.25	0.08	0.36	0.7		27	
31-38	0.3	1.5	0.1	tr	1.9	7.9	9.8		3.0		0.22	0.10	0.36			19	
38-47	0.2	1.8	0.1	tr	2.1	7.7	9.8		3.1		0.22	0.11	0.37			21	
47-57	-	1.7	tr	tr	1.7	7.3	9.0		2.7		0.20	0.08	0.36			19	
57-68	0.1	1.4	tr	tr	1.5	6.9	8.4		3.4		0.17	0.05	0.35			18	
68-78	0.1	1.1	0.1	tr	1.3	6.7	8.0		3.2		0.18	0.04	0.35			16	
78-96+	-	0.7	tr	tr	0.7	4.4	5.1		2.4		0.15	0.03	0.35			14	

Depth (in.)	Clay Fraction Analysis 7A1b-d — Mt.	Chl. Int. [a]	Vm.	Mi.	Int.	Qtz.	Kl, DTA	Gibbsite
		7A2 X-ray					% 7A3	
0-4		x				x	37	
4-14		xx				xx	37	
14-25								
25-31								
31-38								
38-47		x				-	53	
47-57								
57-68								
68-78		x				-	68	
78-96+								

Mt. = Montmorillonite, Chl. = chlorite, Vm. = Vermiculite, mi = mica, Int. = interstratified layer, Qtz. = quartz, Kl. = Kaolinite

Relative amounts: blank = not determined, dash = not detected, tr. = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant.

a. Chl.-Int. in secondary aluminum-chlorite.

Soil classification: Arenic Plinthic Paleudult; clayey, kaolinitic, thermic.
Soil: Conroe gravelly loamy fine sand.
Soil Nos.: S64TX-170-5; 64275-64284.
Location: Montgomery County, Texas. About 4-1/2 miles south-southeast of Willis, Texas; 60 feet east of private road and 1/4 mile northeast of its intersection with FM Road 2432, which is 4.4 miles southeast of intersection of FM Road 2432 and U.S. Highway 75 at Willis, Texas; northwest part of photo AWU-9W-170.
Vegetation and use: Shortleaf and loblolly pine (loblolly site of 61 feet for age 50 years); understory of yaupon, haw, sweetgum, and wax myrtle. Pine tap roots are "clubbed" or blunted at depths of about 36 to 48 inches, averaging about 42 inches, but fine roots extend below the depth between the bridged red mottles in the yellowish and grayish soil.
Topography: Gently sloping, slope of about 2 percent; pedon site is low ridgetop with convex surface; elevation about 290 feet; about 5 feet higher than shallow intermittent drain head and about 60 feet higher than Camp Creek; about 800 to 1,000 feet distance to an intermittent drain. *Conroe soil area is more than 100 acres and it occupies the upper 1/3 of the sideslopes as well as the ridgetop. The soil area is some 100 to 300 yards wide.
Drainage and permeability: Well drained. Slow runoff. Slowly permeable.
Parent material: Loamy, clayey and moderately sandy, acid, continental sediments probably of the Citronelle geological group, undifferentiated, which is of Late Pliocene or Early Pleistocene geologic age.
Collected by: J. G. Cady, H. Oakes, G. S. McKee, W. R. McClintock, H. A. Moncrief, May 13, 1964.
Described by: G. S. McKee and H. Oakes.

A1 64275 0 to 4 inches. Light gray (10YR 7/2) gravelly loamy fine sand, grayish brown (10YR 5.5/2) when moist; contains about 20 to 30 percent by volume of dark reddish brown subrounded iron concretions that are up to about 2 cm diameter, and that are slightly roughened or pitted; occasional quartzitic sand grains are imbedded in the concretions; structureless; very friable; nonsticky when wet; loose when dry; contains plentiful tree, shrub and grass roots; pH 6.0; clear boundary.
A21 64276 4 to 14 inches. Very pale brown (10YR 7/4) gravelly loamy fine sand, light yellowish brown (10YR 5.5/4) when moist; structureless; loose when moist, nonsticky when wet, loose when dry; contains 30 to 40 percent by volume of subrounded iron concretions as in the horizon above; it seems that the amount of concretions gradually increases with depth; contains plentiful roots; pH 6.0; arbitrary lower boundary.
A22 64277 14 to 25 inches. Similar to layer above except the number of iron concretions seems to be slightly greater (measured amount for A21 and A22 is 40 percent by volume); this layer divided from the A21 for sampling purpose; pH 6.0; clear irregular boundary.
B1t 64278 25 to 31 inches. Brownish yellow (10YR 6/6) clay loam, yellowish brown (10YR 5/6) when moist; with common (about 10 percent) of distinct fine and medium yellowish red mottles (hue 2.5YR on outsides of mottles and 10R in centers of the mottles); insides of some of the mottles are slightly cemented dark red incipient iron concretions; weak blocky structure; few patchy clay films on outsides of some peds; friable; slightly sticky, hard when dry; contains a few fine pores; contains common tree roots; contains about 2 to 5 percent of hard subrounded dark reddish brown iron concretions like those in the A horizons; pH 5.5; gradual lower boundary.
B21t 64279 31 to 38 inches. Yellow (10YR 7/6) clay, brownish yellow (10YR 6.5/6) when moist, with many prominent coarse and medium red mottles (hues of 2.5YR and 10R); the mottles are weakly cemented and some have slightly cemented iron concretions in their centers; the mottles are not connected or bridged together; contains occasional reddish yellow mottles; moderate medium blocky; continuous clay films; firm, sticky, extremely hard; contains few fine pores; contains few subrounded strongly cemented iron concretions in addition to the slightly cemented iron concretions; contains a few tree roots through the yellowish matrix; pH 5.5; gradual boundary.
B22t 64280 38 to 47 inches. Prominently and coarsely mottled red (2.5YR 4/8 and 10R 4/8) and yellow (10YR 7/6) clay with common number of coarse light brownish gray mottles on the outsides of some of the large peds of 3- to 4-inch diameter; many of the coarse red mottles are bridged together; a few roots penetrate through the thinner parts of the red mottles and through the unbridged, uncemented parts of the yellow and light brownish gray soil and tend to cluster in the uncemented part; brownish root stainings present; moderate coarse blocky breaking to fine and medium blocks; continuous clay films; firm, sticky, extremely hard; contains fewer of the strongly cemented subrounded iron concretions than in layer just above; pH 5.5; diffuse boundary.
B23t 64281 47 to 57 inches. About the same colors and same texture as horizon just above but has more horizontal streaks of light brownish gray and some white, mostly horizontal streaks, and a few pinkish mottles; some apparent evidence of weak bedding planes especially in the lower part; moderate coarse blocky, some of which breaks to medium sizes; thick clay films evident on the yellow and red mottles but patchy on the gray faces; very few roots penetrate the reddish slightly cemented red mottles; firm, sticky, extremely hard; contains occasional strongly cemented subrounded iron concretions; some of the gray more clayey streaks are vertical through the red, coarse, slightly cemented mottles; roots are mostly in the gray soil material; pH 5.0; diffuse boundary.
B24t 64282 57 to 68 inches. Similar to above but more evidence of old bedding planes; thick continuous clay films on the peds; the gray streaks are more clayey; some of the gray horizontal streaks are continuous for more than 10 feet; some gray streaks are vertical; both vertical and horizontal streaks are 1/8 to about 1 inch thick; pine tree roots grow through the vertical and horizontal gray streaks of clay and cluster in that portion; coarse blocky structure; thick continuous clay coatings (skins) on peds; pH 5.0; diffuse boundary.
B25t 64283 68 to 78 inches. Prominently and coarsely mottled brownish yellow and red clay with some white streaks; moderate coarse blocky structure, but there is evidence of old bedding planes; outsides of some of the coarse blocks have prominent glossy continuous clay coatings that can be seen in cross section with the naked eye; coarse red mottles are weakly cemented; has occasional strongly cemented subrounded iron concretions up to about 1 cm diameter; some bridging of coarse red mottles; occasional small tree roots in the gray portion of the soil; pH 5.0; gradual boundary.
B26t 64284 78 to 96 inches plus. Distinctly and coarsely mottled weak red (10R 5/4); red (2.5YR 4/8 and 10R 4/8) and very pale brown (10YR 7/4) sandy clay loam; has few old root channels filled with yellowish brown clay; very coarse blocky; evidence of old bedding planes; occasional coarse red mottle is weakly cemented, apparently by iron oxide; the clay plugs in the filled root channels are at various angles from the horizontal plane, are mostly less than 5 cm diameter, and seem to extend less than 6 inches and mostly 2 to 3 inches in length; few thick continuous clay coatings up to about 2 mm thick are on the horizontal bedding planes; pH 5.0.

Remarks: Colors are for dry soil unless otherwise indicated. Associated soils are Fuquay loamy fine sand, which adjoins in a slightly lower sideslope position to the north. Splendora and Sorter soils occupy adjoining "flat" and slightly ponded areas to the west. Wicksburg loamy fine sands occupy sloping areas to natural drains. Permanent water table is at about 30-foot depth, but a temporary perched water table occurs above the cemented layer, above about 38-inch depth during the cool, moist season of about 3 months. Textures above agree with laboratory data. Field textures where different are given below:

B1t - sandy clay B25t - sandy clay

SOIL CLASSIFICATION-GROSSARENIC PALEUDULT
LOAMY, SILICEOUS, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SERIES - - - - - - -DARCO

SOIL NO - - - - - - S54TX-234-90 COUNTY - - - VAN ZANDT

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K196-202

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (- - - - - SAND - - - - -)									PARTICLE SIZE ANALYSIS (A)		(ETHYLENE GLYCOL) RETAINED		(B)	BULK DEN
		SAND 2-.05	SILT .05-.002	CLAY LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	SAND .05-.002	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	2 MM	.002 MM	LT .0002 MM	4A3A
IN		(- - - - - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - - - - -)									(PCT LT.002)		(- - MG/G - - -)			G/CC
000-6	A1	88.4	9.9	1.7									47	53	2.1			
006-27	A21	90.7	7.7	1.6														
027-47	A22	92.1	7.0	0.9														
047-74	A23	93.5	6.0	0.5									80	20	1.0			
074-78	B21T	78.5	3.3	18.2									41	59	12.8		138	
078-94	B22T	84.0	5.8	10.2									30	70	7.7		162	
094-132	C	82.4	15.9	1.7														

DEPTH	ORGANIC MATTER 6A1A ORGN	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	(- -EXTRACTABLE BASES 5B1A- -) 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	(CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO CA TO MG	CA CARB EQ 6E1E	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	CARB PCT	PCT		FE PCT	PCT	(- - - - - - - - MEQ / 100G - - - - - - - -)								PCT		PCT			
000-6	0.52					1.4	0.4	0.1	0.1	2.0	3.0	39A		67	3.5		6.4		
006-27	0.12					0.5	0.2	TR	0.1	0.8	1.2			67	2.5		6.3		
027-47	0.06					0.2	0.2	0.1	0.1	0.6	0.8			75	1.0		5.3		
047-74	0.06					0.1	0.1	0.1	0.1	0.4	0.6			67	1.0		5.5		
074-78	0.17					1.3	1.6	0.1	0.3	3.3	9.2	50A		36	0.8		5.6		
078-94	0.12					0.5	0.6	0.2	0.1	1.4	6.1	50A		23	0.8		4.4		
094-132	0.06					0.1	0.1	TR	0.1	0.3	1.1			27	1.0		4.5		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S54TX-234-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-6	QZ1	QZ1 FD3		CL2 KK2 MI2 QZ2	KK1 CL2
6-27	QZ1	QZ1 FD3	CL2 KK2 QZ2 MI3		
27-47	QZ1	QZ1 FD3 KK3 MI3	KK2 CL2 QZ2 MI3		
47-74	QZ1	QZ1 FD3 MI3 KK3		MI2 CL2 KK2 QZ2	KK1 CL3
74-78	QZ1	QZ1 FD2 MI3 KK3		MI2 CL2 KK2 QZ2	KK1 MV2
78-94	QZ1 FD2	QZ1 FD3		KK2 CL2 QZ2 MI3	KK1 MV2
94-132	QZ1	QZ1 FD3 MI3	KK1 MI2 CL2 QZ2		

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLONITE, QZ=QUARTZ, CL=CHLORITE, MV=DIFFUSE, HYDRATED, EXPANSIBLE AND MICACEOUS (13-18A).

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Grossarenic Paleudult; loamy, siliceous, thermic.
Soil: Darco fine sand.
Soil Nos.: S54TX-234-90; K196-202.
Location: Van Zandt County, Texas. South of Grad Saline 11 miles, 1 mile northwest of Colfax; 300 yards southwest of paved farm road.
Topography: Gently sloping upland, convex surface with 2 percent gradient.
Vegetation: Thickly covered with small hardwood trees.
Sampled by: I. C. Mowery, March 1, 1954.
Described by: I. C. Mowery.

A1 K196 0 to 6 inches. Grayish brown (10YR 5/1.5; 3/1.5 when moist) fine sand; single grain; very friable, loose; pH 6.0; numerous grass and weed roots; clear smooth boundary.

A21 K197 6 to 27 inches. Pale brown (10YR 6.5/3; 3.5/3 when moist) sand; single grain; very friable, loose; pH 6.0; roots less numerous; continues through layer below.

A22 K198 27 to 47 inches. Very pale brown (10YR 7/3; 5/3 when moist) sand, same as layer above (A21); pH 5.5; continues through horizon below.

A23 K199 47 to 74 inches. Very pale brown (10YR 8/3; 7/3 when moist) sand, pH 6.0; same as layers A21 and A22; clear smooth boundary.

B21t K200 74 to 78 inches. Mottled light brownish gray (10YR 6/2; 5/2 when moist) and strong brown (7.5YR 5/8; 4/8 when moist) sandy loam; the gray part is more clayey than the strong brown; massive; slightly firm, very hard, slightly sticky; pH 4.5; clear smooth boundary.

B22t K201 78 to 94 inches. Light yellowish brown (10YR 6/5; 4/5 when moist) loamy fine sand; structureless; friable; hard or weakly cemented; pH 4.5; gradual smooth boundary.

C K202 94 to 132 inches. White (10YR 8/2; 7/2 when moist) loamy fine sand; single grain; very friable, loose; pH 4.5.

Remarks: 1. Pedon was sampled as Lakeland sand. This soil is outside the range of the Lakeland in having an argillic horizon within 80 inches of the surface.

2. Textures above agree with laboratory data. Field textures where different are given below:

A1 - loamy fine sand
A21 - loamy fine sand
A22 - loamy fine sand
A23 - loamy fine sand
B21t - light sandy clay loam
B22t - light fine sandy loam

SOIL CLASSIFICATION- GROSSARENIC PALEUDULT
LOAMY, MIXED, THERMIC
SERIES - - - - - - -SERIES NOT DESIGNATED

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S54TX-21-90 COUNTY - - - BRAZOS

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K188-195

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (PCT LT 2MM) SAND 2-.05 MM	SAND .05-.002 MM	SILT .002 MM	CLAY LT .002 MM	SAND VCOS 2-1 MM	SAND CORS 1-.5 MM	SAND MEDS .5-.25 MM	SAND FNES .25-.10 MM	SAND VFNS .10-.05 MM	SAND 2-.05 MM	SILT .05-.002 MM	CLAY LT .002 MM	PARTICLE SIZE ANALYSIS (A) (PCT LT.002) CRSE CLAY .002-.0002 MM	FINE CLAY LT .0002 MM	ETHYLENE GLYCOL RETAINED (B) LT 2 MM	ETHYLENE GLYCOL RETAINED (B) LT .002 MM	ETHYLENE GLYCOL RETAINED (B) LT .0002 MM	BULK DEN 4A3A G/CC
000-7	A1													63	37	1.3			
007-22	A21	84.7	13.7	1.7															
022-37	A22	82.2	15.9	1.9										77	23	0.8			
037-46	A23	79.4	17.8	2.9															
046-53	B21T	68.4	19.3	12.4										59	41	6.4		130	
053-73	B22T	58.1	9.8	32.2										32	68	33.4		162	
073-97	B23T	68.5	6.9	24.6															
097-120	C	76.6	5.4	18.0															

DEPTH IN	ORGANIC MATTER 6A1A ORGN PCT	6B1A NITG PCT	C/N	IRON 6C3 EXT FE PCT	PHOS 6S1A TOTL PCT	EXTRACTABLE BASES 5B1A- (MEQ / 100G) 6N2E CA	6D2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO CA TO MG	CA 6E1E CARB EQ PCT	PH 8C1A 1/1 H2O	PH 8C1C 1/2 KCL	PH 8C1E 1/2 CACL
000-7	0.46					1.6	0.4	TR	0.2	2.2	2.8	33A		79	4.0		6.3		
007-22	0.06					0.5	0.1	TR	0.1	0.7	1.1			64	5.0		6.3		
022-37	0.06					0.4	0.1	TR	0.1	0.6	0.9	17A		67	4.0		6.7		
037-46	0.06					0.5	0.2	TR	0.1	0.8	1.1			73	2.5		6.5		
046-53	0.12					1.0	0.8	0.1	0.2	2.1	3.9	29A		54	1.8		5.2		
053-73	0.06					0.9	2.3	0.8	0.3	4.3	18.2	56A		24	0.4		4.4		
073-97	0.06					0.5	2.2	0.9	0.2	3.8	14.2			27	0.2		4.4		
097-120	0.06					0.6	2.1	0.8	0.2	3.7	11.7			32	0.3		4.5		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S54TX-21-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-7	QZ1 FD3	QZ1 MI3 FD3		KK2 VC2 QZ2 MI3	VC1 KK2
7-22	QZ1	QZ1 MI3 FD3	MI2 KK2 QZ2		
22-37	QZ1	QZ1 MI3 FD3 KK3		MI2 KK2 QZ2 VC3	KK1 VC2
37-46	QZ1	QZ1 MI3 FD3 KK3	MI2 KK2 QZ2		
46-53	QZ1 FD3	QZ1 MI3 KK3 FD3		MI2 KK2 VC2 QZ2	KK1 VC1
53-73	QZ1	MI2 KK2 QZ2 FD3		MI1 KK2 MT2 QZ3	MT1 KK2
73-93	QZ1	KK2 MI2 QZ2 FD3	MT1 KK2 MI3 QZ3		
97-120	QZ1 FD3	KK1 MI2 QZ2 FD3	MT1 KK2 MI3 QZ3		

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, VC=CHLORITE-VERMICULITE OR VERMICULITE-CHLORITE INTERSTRATIFIED.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Grossarenic Paleudult; loamy, mixed, thermic.
Soil: Series not designated.
Soil Nos.: S54TX-21-90; K188-195.
Location: Brazos County, Texas; 12 miles north of Bryan; 5-3/4 miles north of Tabor; 100 feet south of county road, 1,320 feet southeast of Bee Creek channel, 50 feet west of property line fence.
Cover: Mixed hardwoods.
Topography: Upland with convex surface, gradient of 1 percent.
Sampled by: I. C. Mowery, February 1954.
Described by: I. C. Mowery.

A1 K188 0 to 7 inches. Light brownish gray (10YR 6/2; 5/2 when moist) loamy fine sand; single grain; loose, very friable; abundant small tree roots; clear smooth boundary.

A21 K189 7 to 22 inches. Very pale brown (10YR 8/3; 7/3 when moist) loamy fine sand; single grain; very friable, loose; abundant small tree roots; diffuse smooth boundary.

A22 K190 22 to 37 inches. Very pale brown (10YR 8/3.5; 7/3.5 when moist) loamy fine sand; single grain; very friable, loose; roots less abundant; gradual smooth boundary.

A23 K191 37 to 46 inches. Very pale brown (10YR 8/4; 7/4 when moist) loamy fine sand with common medium faint yellow and distinct reddish yellow mottles; loose, saturated with water when sample was taken; gradual smooth boundary.

B21t K192 46 to 53 inches. Very pale brown (10YR 8/3; 7/3 when moist) fine sandy loam with common faint yellow, and white mottles and distinct medium yellowish red mottles centered around ferruginous material; friable; massive; saturated when sampled; abrupt smooth boundary.

B22t K193 53 to 73 inches. White (10YR 8/2; 7/2 when moist) sandy clay loam with common coarse distinct red (10R 4/6; same when moist) mottles; weak medium blocky; very firm, very hard, sticky; gradual smooth boundary.

B23t K194 73 to 97 inches. White (10YR 8/2; 7/2 when moist) sandy clay loam with common medium distinct red (2.5YR 4/8; same when moist) mottles; firm, very hard, sticky; gradual smooth boundary.

C K195 97 to 120 inches plus. White (10YR 8/2; 7/2 when moist) fine sandy loam with few medium distinct light red (2.5YR 5/8) mottles; friable.

Remarks:
1. Pedon was sampled as Lakeland loamy fine sand. The soil is outside the range of the Lakeland series in having an argillic horizon within 80 inches of the surface.
2. Great group and order are based on NaOAc determination, but the soil may be Grossarenic Paleudalfs. In addition, this soil may have an ustic moisture regime.
3. Textures above agree with laboratory data. Field textures where different are given below:

   B22t - heavy sandy clay
   B23t - heavy sandy clay loam
   C - light sandy clay loam

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Plinthic Paleudult; clayey, kaolinitic, thermic

SOIL Series not designated SOIL Nos. S64TX-170-6 LOCATION Montgomery County, Texas

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 64285-64294

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

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)	3B2 Cm	Coarse fragments 3B1: 2A2 ≥ 2 (<76) Pct.	2 – 19 Pct. of < 76mm	19 – 76 Pct. of < 76mm
		Pct. of < 2 mm															
0-4	A1	82.1	14.5	3.4	2.8	9.8	18.9	35.6	15.0	8.2	6.3	40.9	67.1		24	24	-
4-13	A21	83.1	13.0	3.9	5.3	12.1	18.3	33.8	13.6	7.1	5.9	36.6	69.5	0.76	34	34	-
13-19	A22	80.3	12.7	7.0	5.8	9.8	17.0	34.0	13.7	6.8	5.9	36.4	66.6	0.73	36	36	tr
19-25	B1t	55.6	9.7	34.7	5.7	8.5	11.9	20.8	8.7	4.5	5.2	23.3	46.9	1.00	tr	tr	-
25-32	B21t	43.1	9.8	47.1	4.1	8.0	11.0	14.4	5.6	3.0	6.8	14.9	37.5	1.00	tr	tr	-
32-41	B22t	47.1	8.5	44.4	5.4	12.0	11.8	12.8	5.1	13.1	5.4	13.3	42.0	1.00	tr	tr	-
41-49	B23t	42.0	20.4	37.6	3.8	13.6	10.7	10.4	3.5	16.9	3.5	24.7	38.5	1.00	tr	tr	-
49-65	B24t	45.5	5.1	49.4	2.0	10.2	13.8	16.1	3.4	1.8	3.3	11.2	42.1	1.00	tr	tr	-
65-81a/	B31t	42.5	18.1	39.4	1.1	5.9	15.4	17.6	2.5	15.7	2.4	23.0	40.0	1.00	tr	tr	-
81-100	B32t	63.0	5.1	31.9	0.1	3.0	30.8	25.8	3.3	2.1	3.0	10.9	59.7	1.00	tr	tr	-
65-81b/	B31t	47.4	4.2	48.4	0.8	5.4	17.8	20.8	2.6	1.2	3.0	9.2	44.8				

Depth (in.)	6A1a Organic carbon	6B2a Nitrogen	C/N		Carbonate as $CaCO_3$	6C2a Ext. iron as Fe	Bulk density: 4A1f ⅓ bar	Bulk density: 4A1h Oven dry	4D1 COLE	Water content: 4B1c ⅓ bar	Water content: 4B2 15 bar	4C1 WRD	pH: 8C1c (1:1) 1N KCl	pH: 8C1a (1:1) H_2O
	Pct.	Pct.			Pct.	Pct.	g/cc	g/cc		Pct.	Pct.	in/in		
0-4	0.68	0.034	20			0.2							4.6	5.3
4-13	0.32					0.4	1.60	1.57	0.005		5.3	1.5	0.05	4.0	5.1
13-19	0.28					0.5	1.74	1.74	0.001		7.1	2.4	0.06	4.1	5.2
19-25	0.25					1.9	1.57	1.66	0.018		18.0	12.1	0.09	4.0	5.1
25-32	0.16					3.2	1.63	1.71	0.016		19.6	16.8	0.05	4.2	5.2
32-41	0.08					3.8	1.73	1.78	0.011		17.7	15.5	0.04	4.2	5.3
41-49	0.13					4.6	1.71	1.78	0.014		17.7	14.9	0.05	3.9	5.0
49-65	0.02					4.0	1.65	1.70	0.011		19.5	17.0	0.04	3.5	4.9
65-81a/	0.08					2.9	1.72	1.78	0.011		17.3	16.1	0.02	3.3	4.6
81-100	-					1.6	1.78	1.82	0.007		13.9	11.6	0.04	3.5	4.3
65-81b/	0.02					1.8								3.2	4.6

Depth (in.)	Extractable bases 5B1a: 6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	6H2a Ext. acidity	CEC: 5A3a Sum cations	6G1d Ext. Al	Ratios to clay 8D1: CEC Sum	Ratios to clay 8D1: Ext. iron	Ratios to clay 8D1: 15-bar water	8D3 Ca/Mg	Base saturation: 5C3 Sum cations Pct.	5C1 NH_4OAc Pct.
	meq/100 g													
0-4	1.5	0.3	-	tr	1.8	2.0	3.8	0.1	1.12	0.06			47	
4-13	0.3	0.3	-	tr	0.6	1.2	1.8	0.4	0.46	0.10	0.38		33	
13-19	0.5	0.5	tr	tr	1.0	1.3	2.3	0.3	0.33	0.07	0.34		43	
19-25	2.7	2.2	0.1	0.1	5.1	4.9	10.0	0.4	0.29	0.05	0.35	1.2	51	
25-32	3.3	2.9	0.1	0.1	6.4	5.5	11.9	0.3	0.25	0.07	0.36	1.1	54	
32-41	2.6	2.4	0.1	0.1	5.2	5.1	10.3	0.3	0.23	0.08	0.35	1.1	50	
41-49	1.6	1.9	tr	tr	3.5	5.0	8.5	0.9	0.23	0.12	0.40	0.8	41	
49-65	0.8	1.8	0.1	tr	2.7	6.0	8.7	1.6	0.18	0.08	0.34		31	
65-81a/	0.6	1.7	tr	tr	2.3	5.4	7.7	1.9	0.20	0.07	0.41		30	
81-100	0.1	1.0	tr	tr	1.1	3.8	4.9	1.7	0.15	0.05	0.36		22	
65-81b/	0.6	1.8	tr	0.1	2.5	6.3	8.8	2.3	0.18	0.04			28	

Depth (in.)	Clay Fraction Analysis 7A1b-d: Mt.	Chl.	Vm.	Mi	Chl. Int. c/	Qtz.	KI. DTA %	Gibbsite
	7A2 X-ray						7A3	
0-4				-	xx	x	33	
4-13				-	xxx	xx	33	
13-19				-	xx	x	40	
19-25				-	x	tr	42	
25-32				-	xx	-	44	
32-41				tr	xx	-	43	
41-49				tr	x	-	42	
49-65				tr	x	-	50	
65-81a/				tr	x	-	50	
81-100				tr	x	-	48	
65-81b/				tr	x	-	52	

Mt. = Montmorillonite, Chl. = chlorite, Vm. = Vermiculite, mi = mica, Int. = Interstratified layer, Qtz. = quartz, Kl. = Kaolinite

Relative amounts: blank = not determined, dash = not detected, tr. = trace, x = small, xx = moderate, xxx = abundant, xxxx = dominant.

a. Red material.
b. Gray material.
c. Chl. Int. is a secondary aluminum chlorite.

Soil classification: Plinthic Paleudult; clayey, kaolinitic, thermic.
Soil: Series not designated.
Soil Nos.: S64TX-170-6; 64285-64294.
Location: Montgomery County, Texas. About 3.8 miles south-southeast of Willis, Texas; about 400 feet south of the FM Road 2432, and 3.8 miles south-southeast of intersection of FM Road 2432 and U.S. Highway 75 at Willis, Texas; EC part of photo AWU-4W-49.
Vegetation and use: Shortleaf and loblolly pine (loblolly site of 61 feet for age 50 years); understory of yaupon, haw, sweetgum and wax myrtle; pine tree tap roots are "clubbed" or blunted at depths of about 36 to 48 inches, averaging about 42 inches, but smaller pine tree roots extend below and grow between the bridged or connected red coarse mottles in the yellowish and grayish portion of uncemented soil.
Topography: Gently sloping, convex surface, gradient of about 2 percent; upper 1/3 of slope, about 300 feet north of the ridgetop. Elevation is about 285 to 290 feet; intermittent shallow drain to the east is about 4 to 6 feet lower and about 60 feet lower to the larger intermittent (Camp) creek.
Drainage and permeability: Well drained. Slow runoff. Slowly permeable.
Parent material: Loamy, clayey, and moderately sandy acid, continental sediments, probably of the Citronelle geological group, undifferentiated, which is of Late Pliocene or Early Pleistocene geologic age.
Collected by: J. G. Cady, H. Oakes, G. S. McKee, W. R. McClintock, H. A. Moncrief, May 15, 1964.
Described by: G. S. McKee and H. Oakes.

A1 64285 0 to 4 inches. Light brownish gray (10YR 6/1.5) gravelly loamy sand, grayish brown (10YR 5/2) when moist; structureless; very friable, nonsticky; loose when dry; contains an estimated 20 to 30 percent by volume of strongly cemented subrounded dark reddish brown iron concretions that are up to about 2 cm diameter but mostly are 0.5 cm to 1 cm diameter; the concretions are slightly pitted and have occasional quartzitic sand grains imbedded in the surfaces of the concretions; contains occasional roundish quartz pebbles up to about 3/4-inch diameter, mostly smaller; contains plentiful tree, shrub and grass roots; pH 5.5; clear boundary.

A21 64286 4 to 13 inches. Very pale brown (10YR 7/4) gravelly loamy sand, light yellowish brown (10YR 6/4) when moist; structureless; loose when moist, nonsticky, loose when dry; contains a measured 40 percent by volume of the dark reddish brown iron concretions, the same as in the layer above; it appears that the concretions are slightly less numerous in the upper part and increase in number with depth through the A22; contains occasional quartzitic pebbles as in layer above; contains plentiful roots; pH 5.5; arbitrary boundary.

A22 64287 13 to 19 inches. Same as layer above; layer separated for sampling purpose; pH 5.5; clear irregular boundary.

B1t 64288 19 to 25 inches. Brownish yellow (10YR 6/6) sandy clay loam, yellowish brown (10YR 5/6) when moist, with a few distinct fine yellowish red and reddish yellow mottles and occasional red mottles; weak blocky structure; few thin patchy clay films on outsides of some peds; friable, slightly sticky, hard; few fine pores; contains about 2 percent by volume of the dark reddish brown subrounded iron concretions as in the A horizons; some mottles are associated with or surrounding the iron concretions; insides of some mottles are weakly cemented (apparently incipient iron concretions); contains common number of roots; contains occasional fine siliceous pebbles; pH 6.0; gradual boundary.

B21t 64289 25 to 32 inches. Yellow (10YR 7/6) clay, brownish yellow (10YR 6/6) when moist, with many (about 10 to 15 percent) distinct medium red and yellowish red mottles; the redder mottles have weakly cemented or incipient iron concretions in their centers; moderate medium blocky and a few subangular blocks; contains occasional strongly cemented brownish iron concretions up to 2 cm diameter and occasional fine whitish siliceous pebbles; few fine pores in peds; contains common tree roots and root holes; pH 6.0; gradual boundary.

B22t 64290 32 to 41 inches. Prominently and coarsely mottled pale brown (10YR 6/3) and red (2.5YR 4/6) sandy clay with a few distinct medium brownish yellow mottles; moderate mostly medium blocky; some coarse, breaking to fine blocky; some bridging between red mottles; continuous clay films on some of the peds and in some pores; firm, sticky, extremely hard; red mottles are weakly cemented and especially in centers form incipient iron concretions; occasional fine pores in the yellowish material; has common tree roots and the tap roots of pine trees are blunted or "clubbed" at the bottom of this horizon; pH 6.0; diffuse boundary.

B23t 64291 41 to 49 inches. About same colors as horizon above but texture clay loam and has some prominent coarse light gray (10YR 7/1) mottles; the gray is not of continuous streaks as in the B23t horizon of pedon S64Tex-170-5; there is more bridging across of the red mottles, some 5 percent of the face of layer in the pit is bridged; some of the red mottles are 10R hue; continuous clay films in crevices between apparent coarse blocks; same consistence as layer above except the red mottles are harder and it is difficult to break them between the thumb and fingers; contains small tree roots up to about 3/4-inch diameter, which are growing through the yellow and gray uncemented part of the soil; no evidence of bedding planes in this horizon; contains occasional brownish strongly cemented iron concretions, but fewer than in layer above; contains occasional fine whitish siliceous pebbles; pH 5.5; diffuse boundary.

B24t 64292 49 to 65 inches. Similar to layer above, but sandy clay and contains more very pale brown mottles and more bridging of red mottles; thick continuous clay films in crevices on surface of coarse blocks; has occasional fine siliceous pebbles; no definite horizontal gray streaks in this pedon as were present in the B24t of S64Tex-170-5; pH 5.5; diffuse boundary.

B31t 64293 65 to 81 inches. Prominently and coarsely mottled red, light gray and white weakly stratified clay, sandy clay, clay loam and some sandy loam; the light gray is heavy sandy clay but not in continuous layers and they are not in any particular pattern but seem to occur erratically across the face of the pit and are more concentrated in areas 1 foot or so across the face of the pit; some of the weakly cemented red mottles are bridged or connected; very coarse blocky structure and very thick, up to 2 mm, continuous glossy clay coatings of yellowish brown are on the vertical and horizontal faces; few roots penetrate through the gray and are in clusters in crevices; pH 5.0; diffuse boundary.

B32t 64294 81 to 100 inches. Prominently and distinctly mottled red and brownish yellow weakly stratified sandy clay loam with some light gray streaks or coarse mottles of heavy sandy clay; has occasional thick clay coatings on outsides of the coarse blocks; some weakly cemented red mottles and some pink mottles; the occasional fine tree roots penetrate the light gray softer soil material; pH 5.0.

Remarks: Colors are for dry soil unless otherwise indicated. The cementation and bridging of red mottles is more pronounced in the B23t and B24t horizons of this pedon than in S64Tex-170-5. In both areas part of the areas have been mined. The A horizons and the upper part of the Bt are mixed together to form aggregate for road construction. Adjoining soil to the east and west along intermittent broad natural drainage area is Splendora fine sandy loam, which lies some 4 to 6 feet lower. Blanton and Lucy soils adjoin to the north and are on about the same level to slightly lower elevations. Depth to permanent water table is about 30 feet, but temporary perched water table occurs above the cemented layer, above about 41-inch depth during the cool moist season of about 3 months. Textures above agree with laboratory data. Field textures where different are given below:

A1 - loamy fine sand
A21 - loamy fine sand
B23t - sandy clay
B32t - sandy loam and sandy clay

SOIL CLASSIFICATION-RHODIC PALEUDULT
CLAYEY, KAOLINITIC, THERMIC
SERIES - - - - - - -NACOGDOCHES

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S57TX-203-91 COUNTY - - - SAN AUGUSTINE

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K487-492

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (PCT LT 2MM) SAND 2-.05	SAND .05-.002	SILT .002-LT	CLAY LT .002	SAND VCOS 2-1	SAND CORS 1-.5	SAND MEDS .5-.25	SAND FNES .25-.10	SAND VFNS .10-.05	PARTICLE SIZE ANALYSIS (A) (PCT LT.002) SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	ETHYLENE GLYCOL RETAINED (MG/G) LT 2 MM	LT .002 MM	LT .0002 MM	BULK DEN 4A3A G/CC
000-6	AP	56.0	32.7	11.3		5.8	4.1	2.1	34.4	9.6				33	67				
006-28	B21T	28.8	28.6	42.5		2.3	1.8	0.9	18.1	5.8				30	70				
028-41	B22T	30.2	25.6	44.1		6.0	2.4	0.9	16.0	5.1				29	71				
041-48	B23T	61.4	18.1	20.5		37.0	10.6	2.4	9.0	2.4				32	68				
048-68	B3	31.5	25.3	43.3		8.5	6.0	1.9	11.2	3.9				37	63				
068-76	C	22.5	24.0	53.5		4.4	4.7	1.9	8.5	3.2				37	63				

DEPTH IN	ORGANIC MATTER 6A1A ORGN CARB PCT	6B1A NITG EXT PCT	C/N	IRON 6C3 FE EXTR PCT	PHOS 6S1A TOTL PCT	EXTRACTABLE BASES 5B1A (MEQ / 100G) 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO CA TO MG	CA CARB EQ 6E1E PCT	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
000-6	0.58			2.5	1.2	0.3	TR	0.2	1.7	5.4	33A	47A	31	4.0		6.0		
006-28	0.46			4.8	2.7	1.3	TR	0.3	4.3	11.3	32A	43A	39	2.1		5.1		
028-41	0.23			5.6	1.1	1.2	TR	0.1	2.4	14.4	28A	37A	18	0.9		5.0		
041-48	0.23			9.2	0.8	0.9	TR	0.2	1.9	15.3	30A	36A	12	0.9		5.2		
048-68	0.35			13.4	1.7	1.9	TR	0.4	4.0	16.0	32A	38A	18	0.9		5.0		
068-76	0.23			15.8	2.2	2.2	TR	0.3	4.7	16.8	37A	41A	16	1.0		5.0		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S57TX-203-91

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-6	QZ1	QZ1 FD3 MI3		KK1 QZ2 MI2	KH1 MI2
6-28	QZ1	QZ1 FD3 MI3 KK3		KK1 QZ2 MI2	KH1 MI3
28-41	QZ1	QZ1 MI3 KK3		KK1 QZ2 MI2	KH1 MI3
41-48	QZ1	QZ1		KK1 QZ2 MI3	KH1 MI3
48-68	QZ1	QZ1		KK1 MI2 QZ3	KH1 MI3
68-76	QZ1	QZ1 MI3 KK3		KK1 MI2 QZ3	KH1 MI3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, QZ=QUARTZ, KH=TABULAR HALLOYSITE.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Rhodic Paleudult; clayey, kaolinitic, thermic .
Soil: Nacogdoches fine sandy loam.
Soil Nos.: S57TX-203-91; K487-492.
Location: San Augustine County, Texas. East from intersection of Highways 21 and 147 east of San Augustine on Highway 21 3.7 miles; thence southeast through gap in fence 0.2 mile through field to point 75 feet west of the southwest corner of a small cemetery in cultivated field. Cover: Cultivated.
Topography: Gently sloping ridgetop with a gradient of about 1-1/2 percent.
Sampled by: L. L. Gordon, June 1957.
Described by: L. L. Gordon.

Ap K487 0 to 6 inches. Red (2.5YR 4/6; 3/6, moist) fine sandy loam, massive to weak granular (surface 1/2 inch is massive crust); friable moist, hard dry; few fine and medium pores and wormcasts; few iron concretions 3-8 mm in diameter; clear smooth boundary.

B21t K488 6 to 28 inches. Red (10R 4/6; 3/6, moist) clay; moderate to strong fine subangular blocky; friable to firm, hard dry, sticky and plastic wet; clayskins almost continuous; few fine hard iron concretions 2-8 mm in diameter; fine and medium pores and wormcasts are common; few small ferromanganese concretions in lower part; gradual smooth boundary.

B22t K489 28 to 41 inches. Same as above horizon except moderate structure and contains few fine brownish yellow mottles which seem to surround soft concretions; semihard ferromanganese concretions common and larger than in above horizon 2-8 mm in diameter; gradual smooth boundary.

B23t K490 41 to 48 inches. Red (10R 4/6; 3/6, moist) sandy clay loam with common distinct brownish yellow mottles, some of which are soft concretions containing some glauconite; moderate medium subangular blocky; firm, hard dry; small hard iron concretions common; few small ferromanganese concretions; clayskins evident but not continuous; gradual smooth boundary.

B3 K491 48 to 68 inches. Red (10R 4/6; 3/6, moist) clay with many distinct medium and coarse mottles of brownish yellow and numerous lenses or thin strata of greensand; firm moist, hard dry; brownish yellow ferruginous concretions and fragments are common; a 2-inch layer of this material was encountered at 48 inches; gradual smooth boundary.

C K492 68 to 76 inches plus. Mottled red (2.5YR 4/6; 3/6, moist) and brownish yellow (10YR 6/6; 4/6, moist) glauconitic clay with few soft brownish yellow concretions; few lenses of greensand; the sandy clay appears to be the brownish yellow portion.

Remarks:
1. The clay fraction has appreciable tabular halloysite. The high content of coarse and very coarse sand in the 41-48 inch horizon apparently was interited from the stratified parent material.

2. Textures above agree with laboratory data. Field textures where different are given below:

B23t - clay
C - clay to sandy clay

SOIL CLASSIFICATION- RHODIC PALEUDULT
FINE-LOAMY, THERMIC

SERIES - - - - - - -SERIES NOT DESIGNATED

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S57TX-203-90 COUNTY - - - SAN AUGUSTINE

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K481-486

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (PCT LT 2MM) SAND 2-.05	SILT .05-.002	CLAY LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	PARTICLE SIZE ANALYSIS (A) SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	(ETHYLENE GLYCOL) RETAINED LT 2 MM	LT .002 MM	LT .0002 MM	BULK DEN 4A3A G/CC
000-5	AP	72.4	22.3	5.3	2.1	2.9	3.1	54.3	10.2				40	60				
005-15	B21T	51.1	22.7	26.2	2.4	1.7	3.0	37.6	7.5				25	75				
015-38	B22T	42.6	22.9	34.5	3.7	1.6	1.4	30.1	5.9				23	77				
038-52	B23T	51.5	22.2	26.3	3.8	2.0	1.7	37.8	6.2				28	72				
052-65	B24T	51.0	23.7	25.3	2.3	2.0	2.2	37.4	7.2				30	70				
065-72	C	58.3	19.6	22.1	7.0	5.4	5.4	36.1	5.4				32	68				

DEPTH IN	ORGANIC MATTER 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON 6C3 EXT FE PCT	PHOS 6S1A TOTL PCT	EXTRACTABLE BASES 5B1A (MEQ / 100G) 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC LT 2 MM	CAP 5A2A) LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO CA 8D3 CARB EQ TO MG	CA 6E1E H2O PCT	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
000-5	0.58			0.6		1.9	0.2	TR	0.2	2.3	4.3	32A	49A	53	9.5		6.4		
005-15	0.52			1.5		2.5	1.1	TR	0.4	4.0	10.5	35A	51A	38	2.3		4.9		
015-38	0.29			2.4		1.9	1.3	TR	0.3	3.5	12.5	34A	48A	28	1.5		5.0		
038-52	0.23			2.0		1.0	0.8	TR	0.2	2.0	11.3	33A	48A	17	1.3		4.8		
052-65	0.12			3.2		0.7	0.7	TR	0.2	1.6	9.7	34A	51A	16	1.0		4.7		
065-72	0.17			4.5		0.6	0.6	TR	0.2	1.4	10.7	38A	53A	14	1.0		4.7		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S57TX-203-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-5	QZ1	QZ1		KK1 MI2 QZ2 VR3 FD3	KH1 MT3
5-15	QZ1	QZ1		KK1 QZ2 MI2 VR3 FD3	KH1
15-38	QZ1	QZ1 MI3 KK3		KK1 MI2 QZ2 VR3	KH1 MI3
38-52	QZ1	QZ1 MI3 KK3		KK1 MI2 QZ2 VR3	KH1
52-65	QZ1	QZ1 MI3 KK3		KK1 MI2 QZ2 VR3	KH1 MI3
65-72	QZ1	QZ1 MI3 KK3		KK1 MI2 QZ2 VR3	KH1

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT. 2 = 10 - 40 PCT. 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, VR=VERMICULITE, KH=TABULAR HALLOYSITE.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Rhodic Paleudult; fine-loamy, thermic.
Soil: Series not designated.
Soil Nos.: S57TX-203-90; K481-486.
Location: San Augustine County, Texas. From the intersection of Highways 96 and 147 south of San Augustine 0.8 mile south of Highway 147, east of road on berm of highway between fence and road ditch. Cover: Annual grasses and weeds.
Topography: Gently sloping with a slope gradient of approximately 3-1/2 percent.
Sampled by: L. L. Gordon, June 1957.
Described by: L. L. Gordon.

Ap K481 0 to 5 inches. Strong brown (7.5YR 4/6; 4/6, moist) fine sandy loam; weak granular; (moderate medium granular in the upper 2 inches); very friable, slightly hard dry; few fine pores and roots; few fine ferruginous concretions 2-8 mm in diameter; gradual smooth boundary.

B21t K482 5 to 15 inches. Red (2.5YR 4.5/6; 3.5/6, moist) sandy clay loam; weak subangular blocky; friable, hard dry, slightly sticky and plastic wet; few fine pores; few ferruginous concretions 2-6 mm in diameter; gradual smooth boundary.

B22t K483 15 to 38 inches. Red (10R 4/6; 3/6, moist) clay loam; moderate medium subangular blocky; firm moist, hard dry, sticky and plastic wet; clayskins evident but not continuous; few fine pores; few ferruginous concretions as in above horizon; gradual smooth boundary.

B23t K484 38 to 52 inches. Red (10R 4/6; 3/6, moist) sandy clay loam with common to many fine and medium mottles of brownish yellow; same structure and consistence as above horizon except structure slightly weaker; iron concretions as in above horizon but common rather than few; gradual smooth boundary.

B24t K485 52 to 65 inches. Red (2.5YR 5/6; 4/6, moist) sandy clay loam with many medium and coarse brownish yellow mottles and few distinct medium mottles of light gray; weak platy; firm moist, hard dry; iron concretions as in above horizon; few lenses of sandy clay mostly in the brownish yellow portion; gradual smooth boundary.

C K486 65 to 72 inches. Mottled red (2.5YR 5/6; 4/6, moist), brownish yellow (10YR 6/6; 5/6, moist) and light gray (10YR 7/2; 6/2, moist) interbedded sandy clay loam with pockets or lenses of greensand which are light olive brown in color; firm moist, very hard dry; few iron concretions and ironstone fragments 2-25 mm in diameter.

Remarks: 1. Pedon was sampled as Magnolia series. The soil is outside the range of the Magnolia series in being of a fine-loamy family instead of clayey. Since this soil is very deeply developed, the mineralogy probably is siliceous.

2. Textures above agree with laboratory data. Field textures where different are given below:

B21t - sandy clay loam to light sandy clay
C - sandy clay loam and clay

SOIL CLASSIFICATION-TYPIC PELLUDERT
FINE, MONTMORILLONITIC, THERMIC
SERIES - - - - - - -LAKE CHARLES

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S55TX-79-94 COUNTY - - - FORT BEND

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K297-304

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1			PARTICLE SIZE ANALYSIS (B)										ETHYLENE GLYCOL	BULK DEN
		SAND	SILT	CLAY	VCOS	CORS	MEDS	FNES	VFNS	SAND	SILT	CLAY	CRSE CLAY	FINE CLAY	RETAINED	4A3A
		2-.05	.05-.002	LT .002	2-1	1-.5	.5-.25	.25-.10	.10-.05	2-.05	.05-.002	LT .002	.002-.0002	LT .0002	LT 2 MM	LT .002 MM	LT .0002 MM	
IN		PCT LT 2MM											PCT LT.002		MG/G	G/CC
000-15	A11	9.6	35.9	54.5			0.8A	3.6	5.2				25	75		
015-31	A12	8.6	34.9	56.5			0.8A	3.3	4.5				23	77		
031-46	A13G	6.6	31.0	62.3			0.6A	2.4	3.6				24	76		
046-60	AC1G	5.6	29.0	65.4			0.7A	1.8	3.1				28	72		
060-68	AC2CA	7.5	32.3	60.2			2.1A	1.4	4.0				30	70		
068-75	2C1	5.6	66.1	28.4			0.5A	0.6	4.5				37	63		
075-85	2C2	3.6	39.5	56.9			2.4A	0.6	0.6				44	56		
085-96	2C3	2.4	67.9	29.7			1.0A	0.5	0.9				37	63		

DEPTH	ORGANIC MATTER 6A1A ORGN	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	EXTRACTABLE BASES 5B1A CA	MG	NA	K	SUM EXTB	CAT EXC CAP 5A2A LT 2	LT .002	LT .0002	BASE SAT 5C2	RATIO CA MG	CARB EQ	PH 8C1A 1/1 H20	8C1C 1/2 KCL	8C1E 1/2 CACL
	CARB											MM	MM	MM		CA TO MG	6E1E			
IN	PCT	PCT		PCT	PCT	MEQ / 100G									PCT		PCT			
000-15	2.44					24.1	11.7	1.4	0.7	37.9	45.9	738	1048	83	2.1		5.8		
015-31	1.74					24.5	12.3	3.8	0.5	41.1	47.0	738	1048	87	2.0		6.2		
031-46	1.57					27.3	16.0	6.1	0.6	50.0	53.9	858	1028	93	1.7		7.2		
046-60	0.81						17.8	7.2	0.7		52.8	858	1068				7.8		
060-68	0.46						14.5	6.3	0.7		42.1	828	1008				8.0		
068-75	0.17						7.1	3.0	0.3		17.6	768	978				8.4		
075-85	0.17						11.5	5.3	0.7		32.6	768	878				8.2		
085-96	0.12						8.6	3.3	0.6		19.3	748	968				8.3		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S55TX-79-94

DEPTH	SAND	SILT	CLAY	COARSE CLAY	FINE CLAY
INCHES	2 - 0.05MM	0.05 - 0.002MM	LESS THAN 0.002MM	0.002 - 0.0002MM	LT 0.0002MM
0-15	QZ1	QZ1		MI1 KK2 QZ2 MT3	MT1 MI3 KK3
15-31	QZ1 FD3	QZ1 FD2		MI1 KK2 QZ2 MT3	MT1 MI3 KK3
31-46	QZ1	QZ1 FD3		MI1 KK2 QZ2 MT2	MT1 MI3 KK3
46-60	QZ1	QZ1 FD3		MI1 KK2 MT2 QZ2	MT1 KK3
60-68	QZ1 FD3	QZ1 MI3 KK3 FD3		MI1 VR2 KK2 QZ2	MT1 KK3
68-75	QZ1 FD3	QZ1 MI3 KK3 FD3 VR3		MI2 VR2 KK2 QZ2	MT1 KK3 MI3
75-85	QZ1 CA2 FD3	QZ1 MI2 KK3 VR3		MI2 VR2 KK2 QZ3	MT1 KK3 MI3
85-96	QZ1 FD3 CA3	QZ1 MI3 KK3 FD3		MI2 VR2 KK2 QZ3	MT1 KK3 MI3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT. 2 = 10 - 40 PCT. 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, VR=VERMICULITE, CA=CALCITE.

(A) THE VERY COARSE, COARSE, AND MEDIUM SAND FRACTIONS HAVE BEEN COMBINED.
(B) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Typic Pelludert; fine, montmorillonitic, thermic.
Soil: Lake Charles clay.
Soil Nos.: S55TX-79-94; K297-304.
Location: Fort Bend County, Texas; 0.5 mile west-northwest of Rosenberg along Texas Highway 36, south of the highway 250 yards and north of a county road 100 feet in a native pasture. Cover: Andropogons, brown-seeded paspalum, panicum and bermudagrass.
Topography: Site is upland with very gentle slope and the surface has a gilgai microrelief.
Sampled by: I. C. Mowery, May 1955.
Described by: I. C. Mowery.

A11 K297 0 to 15 inches. Very dark gray (10YR 2.5/1; 2/1 moist) clay; compound moderate, very fine, fine and medium subangular blocky; very firm when moist, very sticky and plastic when wet, aggregates very hard when dry; pH 6.3; numerous grass roots; diffuse smooth boundary.

A12 K298 15 to 31 inches. Very dark gray (10YR 2.5/1; 2/1 moist) clay with a few faint fine dark brown spots; moderate medium blocky; very firm, very hard, very sticky; distinct intersecting slickensides; pH 8.0; very few grass roots; gradual wavy boundary.

A13g K299 31 to 46 inches. Very dark gray (10YR 2.5/1; 2/1 moist) clay with few fine light gray spots; moderate medium blocky; distinct intersecting slickensides; very firm, very sticky and plastic, very hard; pH 8.0; very few grass roots; gradual wavy boundary.

AC1g K300 46 to 60 inches. Dark gray (10YR 4/1; 3/1 moist) clay with few fine grayish brown mottles; weak medium and fine blocky; distinct intersecting slickensides; very firm, very sticky, very hard; few small hard $CaCO_3$ concretions 3/4 inch in diameter; soil mass alkaline but noncalcareous; gradual wavy boundary.

AC2ca K301 60 to 68 inches. Reddish brown (5YR 5/4; 4/4 moist) clay with dark gray and grayish brown soil material filling small crevices, distinct intersecting slickensides; numerous soft lumps and small and large hard concretions of $CaCO_3$; moderate medium and fine blocky; gradual wavy boundary.

IIC1 K302 68 to 75 inches. Reddish yellow (7.5YR 6/6; 5/6 moist) silt clay loam; massive; friable when moist; occasional $CaCO_3$ concretions; clear smooth boundary.

IIC2 K303 75 to 85 inches. Reddish brown (5YR 5/4; 4/4 moist) clay; weak blocky; few large soft and small hard $CaCO_3$ concretions, clear smooth boundary.

IIC3 K304 85 to 96 inches. Reddish yellow (7.5YR 6/6; 5/6 moist) silty clay loam; massive; friable; occasional small hard $CaCO_3$ concretions.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

IIC1 - silt loam
IIC3 - silt loam

SOIL CLASSIFICATION-TYPIC PELLUDERT
FINE, MONTMORILLONITIC, THERMIC
SERIES - - - - - - -LAKE CHARLES

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S55TX-101-90 COUNTY - - - HARRIS

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K312-316

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (PCT LT 2MM) SAND 2-.05 MM	SILT .05-.002 MM	CLAY LT .002 MM	SAND VCOS 2-1 MM	SAND CORS 1-.5 MM	SAND MEDS .5-.25 MM	SAND FINES .25-.10 MM	SAND VFNS .10-.05 MM	SAND 2-.05 MM	SILT .05-.002 MM	CLAY LT .002 MM	PARTICLE SIZE ANALYSIS (A) (PCT LT .002) CRSE CLAY .002-.0002 MM	FINE CLAY LT .0002 MM	(ETHYLENE GLYCOL) RETAINED (B) LT 2 MM	LT .002 MM	LT .0002 MM	BULK DEN 4A3A G/CC
000-15	A11	6.5	38.1	55.4	0.3	0.1	0.0	1.3	4.8				20	80	68.0	203	245	
015-27	A12	5.6	36.0	58.4	0.2	0.1	0.0	1.1	4.2				22	78	76.0	207	247	
027-38	A13G	5.6	34.3	60.1	0.0	0.1	0.0	1.1	4.4				21	79	74.0	208	249	
038-64	ACG	6.6	35.8	57.7	0.2	0.2	0.1	1.2	5.0				22	78	78.0	211	246	
064-108	C1G&C2G	7.9	34.8	57.3	1.0	1.3	0.4	1.6	3.7				25	75	80.0	213	239	

DEPTH IN	ORGANIC MATTER 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON PHOS 6C3 EXT FE PCT	6S1A TOTL PCT	EXTRACTABLE BASES 5B1A (MEQ / 100G) 6N2E CA	6O2D MG	6P1A NA	6Q2A K	CAT EXC CAP 5A2A SUM EXTB	BASE SAT LT 2 MM 5C2 PCT	RATIO CA LT .002 MM 8O3 TO	CARB EQ 1/1 6E1E MG PCT	PH 8C1A H2O 1/1	8C1C KCL 1/2	8C1E CACL 1/2
000-15	2.84					35.9	8.0	1.3	0.5	45.7	87A	105A		5.2		
015-27	1.68					39.0	8.0	2.6	0.5	50.1	89A	107A		6.1		
027-38	1.22					39.5	8.1	3.2	0.5	51.3	88A	109A		6.5		
038-64	0.70					38.2	7.9	2.9	0.6	49.6	92A	109A		6.8		
064-108	0.17					38.2	7.6	3.0	0.6	49.4	92A	104A		7.9		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S55TX-101-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-15	QZ1	QZ1 MI3 KK3 FD3		KK2 QZ2 MI2 VR3 VC3	MT1 KK3 MI3
15-27	QZ1	QZ1 MI3 KK3 FD3		KK2 QZ2 MI2 VR3 VC3	MT1 KK3 MI3
27-38	QZ1	QZ1 MI2 KK3 FD3		KK2 VR2 QZ2 MI2	MT1 KK3
38-64	QZ1	QZ1 MI2 FD3 KK3		KK2 VR2 QZ2 MI2	MT1 KK3
64-108+	QZ1	QZ1 MI2 KK2 FD3		KK2 VR2 QZ2 MI2	MT1 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 60 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, VR=VERMICULITE, VC=CHLORITE-VERMICULITE OR VERMICULITE-CHLORITE INTERSTRATIFIED.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Typic Pelludert; fine, montmorillonitic, thermic.
Soil: Lake Charles clay.
Soil Nos.: S55TX-101-90; K312-316.
Location: Harris County, Texas; 2.5 miles northeast of Crosby along railroad, 3.2 miles south of U.S. Highway 90 along paved road, and on east side of a native meadow under power line.
Cover: Native meadow.
Topography: Level with distinct gilgai microrelief.
Sampled by: I. C. Mowery, May 1955.
Described by: I. C. Mowery.

A11 K312 0 to 15 inches. Dark gray (10YR 4/1; 3/1 moist) clay; compound moderate to strong fine and medium subangular blocky and granular; very firm, extremely sticky; pH 6.0; numerous roots; gradual smooth boundary.

A12 K313 15 to 27 inches. Dark gray (2.5Y 4/.5; 3/.5 moist) clay; moderate fine and medium subangular blocky and weak granular; consistence same as above; pH 6.0; few ferromanganese concretions; few roots; gradual wavy boundary.

A13g K314 27 to 38 inches. Dark gray (2.5Y 4/0; 3/0 moist) clay with few fine distinct brownish yellow spots; moderate medium angular blocky; distinct intersecting slickensides; pH 7.0; gradual wavy boundary.

ACg K315 38 to 64 inches. Gray (2.5Y 5/0; 4/0 moist) clay with few fine distinct dark yellowish brown spots; weak coarse blocky; same consistence; pH 7.0; few roots; few ferromanganese concretions; gradual wavy boundary.

C1g K316 64 to 90 inches. Mottled light gray and light yellowish brown clay with moderately numerous small hard $CaCO_3$ concretions; pH 8.0; gradual wavy boundary.

C2g K316 90 to 108 inches. Mottled white (2.5Y 8/2; 7/2 moist) pale yellow (2.5Y 7/4; 6/4 moist) and yellowish brown (10YR 5/6; 4/6 moist) clay with numerous hard $CaCO_3$ concretions and a few ferromanganese concretions.

SOIL CLASSIFICATION-TYPIC PELLUDERT
FINE, MONTMORILLONITIC, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SERIES - - - - - - -LAKE CHARLES

SOIL NO - - - - - - S55TX-235-90 COUNTY - - - VICTORIA

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K371-375

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (- - - - SAND - - - - - -)								PARTICLE SIZE ANALYSIS (A)			CRSE CLAY	FINE CLAY	(ETHYLENE GLYCOL) RETAINED (B)		BULK DEN
		SAND	SILT	CLAY	VCOS	CORS	MEDS	FNES	VFNS	SAND	SILT	CLAY			LT	LT	LT
		2-	.05-	LT	2-	1-	.5-	.25-	.10-	2-	.05-	LT	.002-	LT	2	.002	.0002
		.05	.002	.002	1	.5	.25	.10	.05	.05	.002	.002	.0002	.0002	MM	MM	MM
IN		(- - - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - - -)								(PCT LT.002)					(- - MG/G - - -)		G/CC
000-9	A11	20.8	28.5	50.7	0.2	0.6	0.8	12.7	6.5				15	85	82.0		
009-23	A12	19.9	28.1	52.0	0.1	0.5	0.9	12.2	6.2				17	83	90.0		
023-37	A13	20.1	28.0	51.9									17	83	84.0		
037-61	AC1CG	20.8	26.7	52.6	0.6	0.8	0.9	12.3	6.3				18	82	85.0		
	AC2CAG																
061-90	AC3CAG&C	25.8	28.1	46.2	1.2	1.2	1.3	15.7	6.2				20	80	66.0		

DEPTH	ORGANIC MATTER 6A1A ORGN	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	EXTRACTABLE BASES 5B1A 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO 8D3 CA TO MG	CA CARB EQ 6E1E	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	(- - - - - - - - MEQ / 100G - - - - - - - -)								PCT		PCT			
000-9	2.73					32.1	8.3	1.3	0.7	42.4	48.6	98A	117A	87	3.9		5.9		
009-23	1.57					33.3	8.6	2.6	0.6	45.1	49.6	99A	120A	91	3.9		6.1		
023-37	1.28					32.6	8.5	4.1	0.6	45.8	49.2	99A	122A	93	3.8		6.7		
037-61	0.87						8.9	6.1	0.6		48.3	100A	125A			1.4	7.5		
061-90	0.17						7.0	5.3	0.7		34.3	88A	108A			10.5	8.0		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S55TX-235-90

DEPTH	SAND	SILT	CLAY	COARSE CLAY	FINE CLAY
INCHES	2 - 0.05MM	0.05 - 0.002MM	LESS THAN 0.002MM	0.002 - 0.0002MM	LT 0.0002MM
0-9	QZ1	QZ1 FD3 MI3		QZ1 KK2 MI2 CL3	MT1 KK3
9-23	QZ1	QZ1 FD3 MI3		QZ1 KK2 VC2 MI3	MT1 KK3
23-37	QZ1	QZ1 FD3 MI3		QZ1 KK2 MI2 VC2	MT1 KK3
37-61	QZ1	QZ1 FD3 MI3		QZ1 KK2 VC2 MI2	MT1 KK3
61-90+	QZ1	QZ1 FD3 MI3 KK3		QZ1 KK2 MI2 MT3	MT1 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, CL=CHLORITE, VC=CHLORITE-VERMICULITE OR VERMICULITE-CHLORITE INTERSTRATIFIED.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Typic Pelludert; fine, montmorillonitic, thermic.
Soil: Lake Charles clay.
Soil Nos.: S55TX-235-90; K371-375.
Location: Victoria County, Texas; 1.8 miles north of Bloomington, thence 1.4 miles east in native meadow. Cover: Native meadow with gilgai microrelief.
Topography: Nearly level.
Sampled by: Harvey Oakes, August 1955.
Described by: Harvey Oakes.

A11 K371 0 to 9 inches. Black (10YR 2/1, same moist) clay; compound moderate fine subangular blocky and medium granular; readily crumbles to a mass of firm fine peds when moist, peds extremely hard dry; soil mass is nearly massive and very plastic wet; pH 6.0; clear boundary.

A12 K372 9 to 23 inches. Very dark gray (10YR 2.5/1; 2/1, moist) clay; compound moderate medium and fine subangular and angular blocky; very firm moist, extremely hard dry; numerous roots between and through peds; few fine pores; few wormcasts; pH 6.7; diffuse boundary.

A13 K373 23 to 37 inches. Same color clay as above; moderate medium and coarse blocky; very firm moist, extremely hard dry; few fine and medium pores; many roots through and between peds; pH 7.5.

AC1g K374 37 to 51 inches. Dark gray (N4/; N3/ moist) clay; weak blocky; extremely firm; few fine pores; few large slickensides; noncalcareous but pH 8.0; diffuse boundary.

AC2cag K374 51 to 61 inches. Clay of same color as above but grading to gray (N5/ dry) in lower part; massive or very weak blocky; slickensides as above; extremely hard; few very fine pores; an occasional fine root; calcareous with few soft fine lumps and an estimated 2 percent by volume of hard concretions of $CaCO_3$; gradual boundary.

AC3cag K375 61 to 71 inches. Mottled light brownish gray and pale olive. (5Y 6/2 and 7/2 dry) calcareous clay with few to many fine soft and hard concretions of $CaCO_3$; few fine grass roots; gradual wavy boundary.

C K375 71 to 90 inches. Pale yellow (2.5Y 7/3; 6/3) calcareous clay with common fine faint mottles of light brownish gray.

SOIL CLASSIFICATION-TYPIC PELLUDERT
FINE, MONTMORILLONITIC, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SERIES - - - - - - -LAKE CHARLES

SOIL NO - - - - - - S55TX-241-90 COUNTY - - - WHARTON

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K319-324

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (SAND)								PARTICLE SIZE ANALYSIS (A)			(ETHYLENE GLYCOL) RETAINED		(B)	BULK DEN
		SAND 2-.05	SILT .05-.002	CLAY LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	LT 2 MM	LT .002 MM	LT .0002 MM	4A3A
IN		PCT LT 2MM								PCT LT.002					MG/G			G/CC
000-12	A11	13.8	40.0	46.2	0.3	0.8	0.4	7.2	5.1				21	79	58.0	224	244	
012-30	A12	12.9	39.5	47.6	0.2	0.7	0.5	6.7	4.8				21	79	65.0	221	249	
030-48	A13G	10.7	41.3	48.0	0.2	0.6	0.4	5.5	4.0				19	81	60.0	227	259	
048-58	AC1G	13.3	39.8	46.9	1.8	1.5	0.6	5.5	3.9				19	81	60.0	226	257	
058-80	AC2&C1	9.8	39.6	50.6	1.5	1.3	0.5	3.8	2.7				24	76	76.0	204	244	
080-90	C2	5.0	36.7	58.3	0.9	0.7	0.3	2.0	1.1				30	70	81.0	180	220	

DEPTH	ORGANIC MATTER 6A1A ORGN CARB	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	EXTRACTABLE BASES 5B1A 6N2E CA	6Q2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO CA TO MG	CA EQ 6E1E	PH 1/1 H20	1/2 KCL	1/2 CACL
IN	PCT	PCT		PCT	PCT	MEQ / 100G								PCT		PCT			
000-12	2.15					27.4	10.1	0.8	0.6	38.9	41.6	95A	112A	94	2.7		5.9		
012-30	1.10					26.2	12.0	2.1	0.6	40.9	42.0	96A	112A	97	2.2		6.5		
030-48	0.81						14.6	3.2	0.6		43.1	96A	114A			2.8	7.8		
048-58	0.52						16.5	3.8	0.6		41.8	94A	113A			6.5	8.2		
058-80	0.23						16.7	4.1	0.8		36.6	87A	107A			13.0	8.3		
080-90	0.12						13.6	3.8	0.9		32.5	73A	93A			26.0	8.3		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S55TX-241-90

DEPTH	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
INCHES					
0-12	QZ1	QZ1 FD3 MI3		KK2 MI2 QZ2 MT3	MT1 KK3 MI3
12-30	QZ1	QZ1 FD3		KK2 QZ2 MI2 VR2	MT1 KK3 MI3
30-48	QZ1	QZ1 FD3		KK2 QZ2 MI2 VC3	MT1 KK3 MI3
48-58	QZ1	QZ1 FD3 MI3		KK2 QZ2 MI2 VR3 MT3	MT1 KK3 MI3
58-80	QZ1	QZ1 MI2 FD2 KK3		KK2 QZ2 MI2 VR3 CL3	MT1 KK3 MI3
80-90+	QZ1	QZ1 MI2 KK2 FD2		KK2 MI2 QZ2 VR3 CL3	MT1 MI3 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT. 2 = 10 - 40 PCT. 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, VR=VERMICULITE, CL=CHLORITE, VC=CHLORITE-VERMICULITE OR VERMICULITE-CHLORITE INTERSTRATIFIED.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Typic Pelludert; fine, montmorillonitic, thermic.
Soil: Lake Charles clay.
Soil Nos.: S55TX-241-90; K319-324.
Location: Wharton County, Texas. Five miles north of El Campo; 0.5 mile east of Pierce on south side of road to Pierce Ranch headquarters; 50 feet south of road in native pasture. Cover: native pasture.
Topography: Nearly level with distinct gilgai microrelief.
Sampled by: I. C. Mowery, May 1955.
Described by: I. C. Mowery.

A11 K319 0 to 12 inches. Dark gray (10YR 4/.5; 3/.5 moist) clay or silty clay; compound moderate medium and fine subangular blocky and weak granular; very firm, extremely sticky; pH 6.0; numerous grass roots; diffuse wavy boundary to horizon below.

A12 K320 12 to 30 inches. Same color, texture, and consistence as above; compound fine and very fine angular blocky and subangular blocky; pH 7.0; roots less numerous; diffuse wavy boundary.

A13g K321 30 to 48 inches. Same color and consistence as above but silty clay; moderate medium and fine angular blocky, slickensides prominent; few ferromanaganese concretions; few fine roots; pH 8.0; diffuse wavy boundary.

AC1g K322 48 to 58 inches. Slightly lighter colored than above but clay texture; the structure is less pronounced and coarser; consistence the same; few small hard $CaCO_3$ and ferromanganese concretions present; slickensides noticeable; pH 8.0; gradual wavy boundary.

AC2 K323 58 to 68 inches. Mottled light brownish gray (2.5Y 6/2; 5/2 moist) and weak brownish yellow clay with a few pink spots in lower part; coarse blocky; consistence same; few to numerous hard $CaCO_3$ concretions; calcareous; diffuse wavy boundary.

C1 K324 68 to 80 inches. Transition with occasional $CaCO_3$ concretions; diffuse boundary.

C2 80 to 90 inches plus. Not described.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

A11 - clay

SOIL CLASSIFICATION- TYPIC PELLUDERT
VERY FINE, MONTMORILLONITIC, THERMIC
SERIES - - - - - - -SERIES NOT DESIGNATED

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S55TX-120-90 COUNTY - - - JACKSON

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K365-369

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (PCT LT 2MM) SAND 2-.05	SILT .05-.002	CLAY LT .002	SAND VCOS 2-1	SAND CORS 1-.5	SAND MEDS .5-.25	SAND FNES .25-.10	SAND VFNS .10-.05	PARTICLE SIZE ANALYSIS (A) (PCT LT.002) SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	ETHYLENE GLYCOL RETAINED (8) LT 2 MM	LT .002 MM	LT .0002 MM	BULK DEN 4A3A G/CC
000-9	A11	8.7	29.3	62.0	0.1	0.6	0.7	5.2	2.1				18	82	104.0			
009-25	A12	6.9	27.8	65.3	0.1	0.5	0.5	4.3	1.5				17	83	110.0			
025-40	A13G	8.0	27.5	64.5	0.1	0.5	0.6	5.0	1.8				16	84	109.0			
040-53	AC1G	8.6	27.7	63.7	1.1	1.0	0.7	4.3	1.5				17	83	109.0			
053-87	AC2CAG& CCA	4.3	34.3	61.4	0.7	0.8	0.4	1.8	0.6				19	81	111.0			

DEPTH IN	ORGANIC MATTER 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON PHOS 6C3 EXT FE PCT	6S1A TOTL PCT	EXTRACTABLE BASES 5B1A (MEQ / 100G) 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO CA TO MG	CA EQ 6E1E PCT	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
000-9	2.84					35.6	12.0	1.0	0.8	49.4	57.6	102A	119A	86	3.0		5.6		
009-25	1.16					37.9	12.9	2.1	0.8	53.7	60.0	102A	122A	90	2.9		6.2		
025-40	1.04					38.1	13.9	3.5	0.8	56.3	61.0	102A	119A	92	2.7		7.5		
040-53	0.52						14.7	4.9	0.9		59.2	104A	122A			5.0	8.0		
053-87	0.12						13.9	5.0	0.9		53.1	102A	120A			19.5	8.1		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1C AND 7A2A) S55TX-120-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-9	QZ1	QZ1 FD3		QZ1 KK2 MI2	MT1 KK3
9-25	QZ1	QZ1 FD3		QZ2 KK2 MI2 CL3	MT1 KK3
25-40	QZ1	QZ1 FD3		QZ2 KK2 MI2 CL3 MT3	MT1 KK3
40-53	QZ1	QZ1 FD3		QZ2 KK2 MI2 MT3	MT1 KK3
53-87	QZ1	QZ1 FD3 MI3 KK3		QZ2 KK2 VR2 MI2 CL3	MT1 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, VR=VERMICULITE, CL=CHLORITE.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(8) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Typic, Pelludert; very fine, montmorillonitic, thermic.
Soil: Series not designated.
Soil Nos.: S55TX-120-90; K365-369.
Location: Jackson County, Texas; 3.6 miles northeast of Inez on Highway 59, west side of road in native meadow. Cover: Native meadow with gilgai microrelief.
Topography: Nearly level.
Sampled by: Harvey Oakes, August 1955.
Described by: Harvey Oakes.

A11 K365 0 to 9 inches. Very dark gray (10YR 3/1; 2/1, moist) clay; moderate fine subangular blocky and granular; when moist easily crumbled to fine firm peds that are extremely hard dry, very sticky and plastic wet; pH 6.0; gradual wavy boundary.

A12 K366 9 to 25 inches. Very dark gray (10YR 3/1; 2/1) clay; compound moderate medium subangular and angular blocks; very firm moist, peds extremely hard dry; few fine pores; roots numerous through and between peds; pH 6.8; gradual wavy boundary.

A13g K367 25 to 40 inches. Very dark gray (N3/; N/2) clay; moderate medium blocky; consistence similar to above; few fine pores; numerous roots in upper part; few in lower part; pH 8.0; gradual wavy boundary.

AC1g K368 40 to 53 inches. Dark gray (N3.5); N2.5) clay; weak blocky; very firm; few fine pores; few large slickensides; few roots; contains few to many small hard concretions of $CaCO_3$. Color is N4/ in lower part; noncalcareous but pH 8.0; occasional root; gradual wavy boundary.

AC2cag K369 53 to 61 inches. Light brownish gray (2.5Y 6/2; 5/2) clay; massive or very weak blocky; few large slickensides; calcareous with numerous soft fine lumps and fine hard concretion of $CaCO_3$ ranging up to 3 mm in diameter; no roots; gradual wavy boundary.

Ccs K369 61 to 87 inches. Light gray (2.5 Y 7/2, dry) clay with many medium distinct mottles of light yellowish brown; strongly calcareous with few soft lumps of $CaCO_3$ ranging up to 10 mm in diameter.

Remarks: Pedon was sampled as Lake Charles clay. The soil is outside the range of the Lake Charles series in that the clay fraction is greater than 60 percent in the 10- to 40-inch control section.

SOIL CLASSIFICATION-TYPIC PELLUDERT
FINE, MONTMORILLONITIC, HYPERTHERMIC
SERIES - - - - - - -FRANCITAS

SOIL NO - - - - - - S70TX-29-25 COUNTY - - - CALHOUN

GENERAL METHODS- - -1A,1B1B,2A1,2B SAMPLE NOS.70L174-70L179

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE MRTSC
SOIL SURVEY INVESTIGATIONS UNIT
LINCOLN, NEBRASKA

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B															RATIO
					FINE	SAND					SILT			FAML	INTR	FINE	NON-	8D1
		SAND	SILT	CLAY	CLAY	VCOS	CORS	MEDS	FNES	VFNS	COSI	FNSI	VFSI	TEXT	II	CLAY	CO3-	15-
		2-	.05-	LT	LT	2-	1-	.5-	.25-	.10-	.05	.02	.005-	SAND	.2-	TO	CLAY	BAR
		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	2-.1	.02	CLAY		TO
IN		PCT LT 2MM														PCT	PCT	CLAY
000-16	A11	19.7	43.2	37.1	25.9	TR	.2	.2	4.3	15.0	19.0	24.2		4.7	37.6	70		.46
016-40	A12	15.1	37.1	47.8	33.3	TR	.2	.2	3.5	11.2	14.7	22.4		3.9	28.9	70		.44
040-50	AC1	12.5	34.0	53.5	32.4	.7	.6	.3	2.8	8.1	11.8	22.2		4.4	22.2	61		.43
050-71	AC2	9.8	33.8	56.4	21.6	.5	.5	.3	2.0	6.5	10.1	23.7		3.3	18.3	38		.42
071-91	C1	37.8	44.3	17.9	10.1	TR	.1	.2	4.4	33.1	20.8	23.5		4.7	58.0	56		.45
091-110+	2C2	75.6	19.5	4.9	3.1	TR	.1	.2	13.7	61.6	15.0	4.5		14.0	90.0	63		.43

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2					BULK DENSITY				WATER CONTENT				CARBONATE		PH	
	VOL.	WEIGHT				4A1D	4A1H	4D1	4B1C	4B1C	4B2	4C1		6E1B	3A1A	8C1A	8C1E
	GT	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	1/10	1/3-	15-	WRD		LT	LT	1/1	1/2
	2	75				.074	PCT	BAR	DRY		BAR	BAR	BAR	CM/		2	.002	H2O	CACL
IN	PCT	PCT	PCT LT 75			LT20	G/CC	G/CC			PCT	PCT	PCT	CM		PCT	PCT		
000-16	0	0	0	0	0	90	0						17.1			0		6.9	6.6
016-40	TR	0	0	0	TR	92	TR						20.8			0		7.4	7.2
040-50	TR	0	0	TR	TR	93	TR						23.2			0		7.6	7.5
050-71	TR	0	0	TR	TR	95	TR						23.8			4	0	7.7	7.7
071-91	TR	0	0	TR	0	85	TR						8.0			17	0	8.1	7.8
091-110+	TR	0	0	TR	0	56	TR						2.1			7	0	8.5	7.8

DEPTH	ORGANIC MATTER			IRON	PHOS	EXTRACTABLE BASES 5B4A-					ACTY	AL	CAT EXCH	RATIO	RATIO	CA	BASE SAT
	6A1A	6B1A	C/N	6C2A	6S1A	6N2E	6Q2D	6P2A	6Q2A		6H1A	6G1D	5A3A	5A6A	8D1	8D3	5F	5C3	5C1
	ORGN	NITG		EXT	TOTL	CA	MG	NA	K	SUM	BACL	KCL	EXTB	NHAC	NHAC	CA	SAT	EXTB	NHAC
	CARB			FE						EXTB	TEA	EXT	ACTY		TO	TO	NHAC	ACTY	
IN	PCT	PCT		PCT	PCT	MEQ / 100 G									CLAY	MG	PCT	PCT	PCT
000-16	0.93					11.9	8.5	2.8	0.9	24.1	3.9		28.0	25.6		1.4	46	86	94
016-40	0.74					15.7	13.6	8.6	0.7	38.6	1.9		40.5	34.1		1.2	46	95	113
040-50	0.39					16.9A	16.9A	13.7	0.7	48.2				38.2					
050-71	0.16					21.5A	16.8A	13.2	0.8	52.3				37.1					
071-91	0.03					4.7A	4.8A	2.9	0.3	22.7				11.1					
091-110+	0.01					0.6A	1.6A	1.3	0.1	13.6				3.6					

DEPTH	SATURATED PASTE			NA	NA	SALT	GYP	SATURATION EXTRACT 8A1									ATTERBERG	
	8E1	8C1B	8A	5D2	5E	8D5	6F1A	8A1A	6N1B	6Q1B	6P1A	6Q1A	6I1A	6J1A	6K1A	6L1A	6M1A	4F1	4F2
	REST	PH	H2O	ESP	SAR	TOTL		EC	CA	MG	NA	K	CO3	HCO3	CL	SO4	NO3	LQID	PLST
	OHM-					SOLU		MMHOS/										LMIT	INDX
IN	CM		PCT	PCT		PPM	PCT	CM	MEQ / LITER									PCT	
000-16	1330	6.2	55.2	9	9	370		1.05	1.7	1.3	10.6								
016-40	350	6.8	72.5	11	19	3800		7.41	10.0	15.0	66.5								
040-50	190	7.4	76.6	16	20	8200		13.40	22.3	28.0	101.0								
050-71	240	7.4	75.0	13	19	12000		19.80	30.0	35.5	111.0								
071-91	370	7.7	36.5	6	13	3200		10.80	21.5	19.5	61.0								
091-110+	710	8.1	30.8	8	14	480		2.26	5.5	5.0	33.0								

(A) METHODS 6N4C FOR CA AND 6O4C FOR MG.

Soil classification: Typic Pelludert; fine, montmorillonitic, hyperthermic.
Soil: Francitas silty clay loam.
Soil Nos.: S70TX-29-25; 70L174-70L179.
Location: East-northeast of Port Lavaca 9.3 miles on Texas Highway 35 to intersection of Farm Road 2143; 4.6 miles east on Farm Road 2143 to Texas Highway 172; 1 mile east on paved county road; 0.38 mile south on paved county road; 800 feet east of county road on a private road; 80 feet north of private road in native range.
Area: Calhoun County, Texas.
Vegetation and use: Vegetation is nearly all Gulf cordgrass used as native range.
Moisture: Dry colors given unless otherwise stated.
Drainage and permeability: Poorly drained. Surface runoff is very slow. Very slow permeability. Water table rose to 86 inches.
Parent material: The soil is believed to have developed in the Beaumont geological formation. This soil is developed in alkaline clays and silty clays within 5 miles of the bays. It has been affected by salts from the bays.

Slope and land form: The area represented by the pedon is nearly level with gilgai microrelief. Approximate elevation above sea level is 15 feet and the site is 0.6 mile west of Carancuhua Bay (saline). The pedon represents an area of over 200 acres.

Collected and described by: Irvin C. Mowery, January 27, 1970, from wall of pit dug with a backhoe in wet field conditions.

A11 70L174 0 to 16 inches. Very dark gray (2.5Y 3/0) silty clay loam, (actually 11Y 3/0); black (2.5Y 2/0) moist; strong fine angular and subangular blocky structure; peds extremely hard; very firm, very sticky and plastic; many fine roots; surface of peds shiny; neutral (pH 7.0); gradual wavy boundary.

A12 70L175 16 to 40 inches. Very dark gray (2.5Y 3/0) clay, (actually 11Y 3/0); black (2.5Y 2/0) moist; strong fine angular blocky structure; extremely hard, very firm, very sticky and plastic; common fine roots; shiny pressure faces on peds; few slickensides below 30 inches; saline; moderately alkaline but noncalcareous (pH 8.0); gradual wavy boundary.

AC1 70L176 40 to 50 inches. Gray (10YR 5/1) clay, dark gray (10YR 4/1) moist; weak angular blocky structure; very hard, very firm, very sticky and plastic; few fine roots; intersecting slickensides; few fine hard $CaCO_3$ concretions; few fine Fe-Mn concretions; shiny pressure faces on peds; saline; moderately alkaline but noncalcareous (pH 8.0); gradual wavy boundary.

AC2 70L177 50 to 71 inches. Light gray (10YR 7/1) clay, same color (10YR 6/1) moist, with common medium distinct brownish yellow (10YR 6/6) mottles; weak angular blocky structure; very hard, very sticky and plastic; few fine roots; distinct slickensides just above C horizon; few fine hard $CaCO_3$ concretions; few fine Fe-Mn concretions; weakly calcareous; saline; moderately alkaline; gradual wavy boundary.

C1 70L178 71 to 91 inches. Light gray (5Y 7/1) loam, same color (5Y 6/1) moist, with pockets and streaks of pink (7.5YR 7/4) and reddish yellow (7.5YR 6/6) silt loam or very fine sandy loam; massive; very hard to soft, firm to friable, sticky; bedding planes observed; few fine and coarse $CaCO_3$ concretions; moderately calcareous; saline; moderately alkaline; gradual wavy boundary.

IIC2 70L179 91 to 110 inches plus. Pink (7.5YR 7/4) loamy very fine sand, light brown (7.5YR 6/4) moist, with common fine faint reddish yellow (7.5YR 6/6) and a few medium distinct light gray (10YR 7/1) mottles; massive; friable; saline; strongly calcareous.

Remarks: Water table rose to 86 inches.

Textures above agree with laboratory data. Field textures where different are given below:

A11 - clay
C1 - silty clay
IIC2 - very fine sandy loam

SOIL CLASSIFICATION-TYPIC PELLUDERT
FINE, MONTMORILLONITIC, HYPERTHERMIC
SERIES - - - - - - -FRANCITAS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE MRTSC
SOIL SURVEY INVESTIGATIONS UNIT
LINCOLN, NEBRASKA

SOIL NO - - - - - - S70TX-29-27 COUNTY - - - CALHOUN

GENERAL METHODS- - -1A,1B1B,2A1,2B SAMPLE NOS. 70L180-70L185

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B															RATIO
					FINE	SAND						SILT			FAML	INTR	FINE	NON-	8D1
		SAND	SILT	CLAY	CLAY	VCOS	CORS	MEDS	FNES	VFNS	COSI	FNSI	VFSI	TEXT	SAND	.2-	CLAY	CO3-	15-
		2-	.05-	LT	LT	2-	1-	.5-	.25-	.10-	.05	.02	.005-	II	.2-	.02	TO	CLAY	BAR
IN		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	2-.1	.02		CLAY	PCT	TO CLAY
		PCT LT 2MM															PCT	PCT	
000-16	A11	23.6	38.2	38.2	28.6	.0	.3	.4	5.2	17.7	16.3	21.9		5.9	38.3	75			.51
016-38	A12	13.9	29.5	56.6	39.0	TR	.1	.2	2.8	10.8	10.5	19.0		3.1	23.7	69			.49
038-59	AC1	12.3	25.4	62.3	26.9	1.5	.9	.3	2.0	7.6	7.0	18.4		4.7	16.2	43			.42
059-69	AC2	12.6	30.2	57.2	18.2	1.2	.6	.2	1.8	8.8	7.5	22.7		3.8	17.9	32			.42
069-82	C1	18.1	39.5	42.4	17.7	.6	.6	.2	1.7	15.0	12.5	27.0		3.1	29.1	42			.40
082-108+	C2	19.2	39.5	41.3	18.1	.5	.5	.2	2.3	15.7	12.3	27.2		3.5	30.1	44			.40

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2						BULK DENSITY			WATER CONTENT				CARBONATE		PH	
	VOL.	WEIGHT					4A1D	4A1H	4D1	4B1C	4B1C	4B2	4C1	6E1B	3A1A	8C1A	8C1E
	GT	GT					1/3-	OVEN	COLE	1/10	1/3-	15-	WRD	LT	LT	1/1	1/2
	2	75	75-20	20-5	5-2	LT	20-2	DRY		BAR	BAR	BAR	CM/	2	.002	H2O	CACL
IN	PCT	PCT	PCT LT 75			.074	PCT LT20	G/CC	G/CC	PCT	PCT	PCT	CM	PCT	PCT		
000-16	TR	0	0	0	TR	88	TR					19.6		0		7.6	7.2
016-38	TR	0	0	TR	TR	93	TR					27.7		1	0	8.3	7.8
038-59	TR	0	0	TR	TR	92	TR					26.4		3	0	8.0	7.8
059-69	TR	0	0	0	TR	93	TR					24.0		7	0	7.8	7.9
069-82	0	0	0	0	0	91	0					17.1		18	0	8.1	8.0
082-108+	0	0	0	0	0	91	0					16.7		19	0	8.0	8.0

DEPTH	ORGANIC MATTER			IRON	PHOS	EXTRACTABLE BASES 5B4A-					ACTY	AL	CAT EXCH	RATIO	RATIO	CA	BASE SAT	
	6A1A	6B1A	C/N	6G2A	6S1A	6N2E	6Q2D	6P2A	6Q2A		6H1A	6G1D	5A3A	5A6A	8D1	8D3	5F	5C3	5C1
	ORGN	NITG		EXT	TOTL	CA	MG	NA	K	SUM	BACL	KCL	EXTB	NHAC	NHAC	CA	SAT	EXTB	NHAC
	CARB			FE						EXTB	TEA	EXT	ACTY		TO	TO	NHAC	ACTY	
IN	PCT	PCT		PCT	PCT	MEQ / 100 G									CLAY	MG	PCT	PCT	PCT
000-16	1.70					23.7A	7.3A	2.7	0.7	34.4			36.2						
016-38	1.00					22.9A	13.2A	11.7	1.0	48.8			48.6						
038-59	0.41					22.5A	15.9A	23.0	1.0	62.4			51.0						
059-69	0.20					22.9A	12.9A	21.6	0.9	58.3			44.1						
069-82	0.04					19.9A	8.0A	14.4	0.6	42.9			27.9						
082-108+	0.04					18.8A	7.7A	13.7	0.7	40.9			26.2						

DEPTH	SATURATED PASTE			NA	NA	SALT	GYP	SATURATION EXTRACT 8A1-									ATTERBERG	
	8E1	8C1B	8A	5D2	5E	8D5	6F1A	8A1A	6N1B	6O1B	6P1A	6Q1A	6I1A	6J1A	6K1A	6L1A	6M1A	4F1	4F2
	REST					TOTL		EC	CA	MG	NA	K	CO3	HCO3	CL	SO4	NO3	LQID	PLST
	OHM-	PH	H2O	ESP	SAR	SOLU		MMHOS/										LMIT	INDX
IN	CM		PCT	PCT		PPM	PCT	CM	MEQ / LITER									PCT	
000-16	1000	6.9	66.7	5	10	530		1.21	1.6	1.8	12.8							59B	38
016-38	530	7.5	99.7	17	26	2000		2.77	2.1	1.4	35.0								
038-59	430	7.5	98.8	8	42	12000		15.30	20.8	19.5	190.0							89B	64
059-69	200	7.7	85.3	7	47	14000		19.00	22.3	18.8	215.0								
069-82	230	7.9	69.9	19	33	11000		18.20	17.5	14.0	130.0							63B	45
082-108+	220	7.9	71.6	24	31	7300		12.80	13.0	9.8	104.0								

- -(A) METHODS 6N4C FOR CA AND 6O4C FOR MG.
(B) DETERMINED BY TEXAS HIGHWAY DEPT.

Soil classification: Typic Pelludert; fine, montmorillonitic, hyperthermic.
Soil: Francitas clay loam.
Soil Nos.: S70TX-29-27; 70L180-70L185.
Location: Five miles southwest and southeast of Port Lavaca on Texas Highway 238 to the intersection with Texas Highway 316; 0.95 mile southeast on Texas Highway 316; 1.1 miles northeast on field road; 100 feet southeast from break in slope to the bay, 80 feet northwest of field road, and 100 feet southwest of gully.
Area: Calhoun County, Texas.
Vegetation and use: Vegetation at the pedon site is Angleton grass (Andropogon). Nearby is field usually planted to cotton or grain sorghum. Original native vegetation was Gulf cordgrass.
Moisture: Dry colors given unless otherwise stated.
Drainage and permeability: Poorly drained. Surface runoff is very slow. Very slowly permeable.
Parent material: The soil is believed to have developed in the Beaumont geological formation. This soil is developed in alkaline clays and silty clays within 5 miles of the bays. It has been affected by salts from the bays.
Slope and land form: The area represented by the pedon is nearly level with a weak gilgai microrelief. Approximate elevation above sea level is 11 feet and the site is about 1,200 feet south of Chocolate Bay, a part of Matagorda Bay (saline). The pedon represents an area of about 1,000 acres.
Collected and described by: Irvin C. Mowery, February 9, 1970, from the wall of a pit dug with a backhoe in wet field conditions.

A11 70L180 0 to 16 inches. Very dark gray (10YR 3/1) clay loam, black (10YR 2/1) moist; strong fine angular and subangular blocky structure; extremely hard, very firm, very sticky and plastic; many fine roots; peds have shiny surfaces; many fine pores; mildly alkaline (pH 7.5); gradual wavy boundary.

A12 70L181 16 to 38 inches. Dark gray (10YR 4/1) clay, very dark gray (10YR 3/1) moist; strong medium and fine angular blocky structure; extremely hard, very firm, very sticky and plastic; common fine roots; few slickensides in lower part; peds have shiny surfaces; saline; moderately alkaline but noncalcareous (pH 8.0); gradual wavy boundary.

AC1 70L182 38 to 59 inches. Gray (10YR 5/1) clay, dark gray (10YR 4/1) moist; strong medium and fine angular blocky structure; very hard, very firm, very sticky and plastic; common fine roots; intersecting slickensides; shiny surfaces on peds; few fine $CaCO_3$ concretions; saline; moderately alkaline; gradual wavy boundary.

AC2 70L183 59 to 69 inches. Very pale brown (10YR 7/3) clay, pale brown (10YR 6/3) moist; weak angular blocky structure; very hard, very firm, very sticky and plastic; few fine roots; thick dark coatings on peds; conspicuous intersecting slickensides; many very fine pores; shiny pressure faces; few fine (1/32-inch) and coarse (1-inch) $CaCO_3$ concretions; few fine Fe-Mn concretions; saline; weakly calcareous; moderately alkaline; gradual wavy boundary.

C1 70L184 69 to 82 inches. Very pale brown (10YR 7/3), pale brown (10YR 6/3) moist, with a few medium faint light gray (10YR 6/1) and a few medium distinct brownish yellow (10YR 6/6) mottles; moderate medium angular blocky structure; very hard, very firm, very sticky and plastic; few fine roots; few intersecting slickensides; few fine (1/16-inch) $CaCO_3$ concretions; few faint masses of what appears to be Fe-Mn concretions; saline; strongly calcareous; moderately alkaline; gradual wavy boundary.

C2 70L185 82 to 108 inches plus. Very pale brown (10YR 7/4) clay, light yellowish brown (10YR 6/4) moist, with a few fine faint light gray (2.5Y 7/2) mottles; moderate medium angular blocky structure; very hard, very firm, very sticky; few fine roots; shiny pressure faces; few fine $CaCO_3$ concretions; few Fe-Mn stains; saline; strongly calcareous; moderately alkaline.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

A11 - clay
AC2 - silty clay
C1 - silty clay loam
C2 - silty clay loam

SOIL CLASSIFICATION-ENTIC PELLUDERT
FINE, MONTMORILLONITIC, THERMIC

SERIES - - - - - - -BEAUMONT

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S55TX-36-90 COUNTY - - - CHAMBERS

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K326-330

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1								PARTICLE SIZE ANALYSIS (A)			ETHYLENE GLYCOL RETAINED			BULK DEN
		SAND	SILT	CLAY	VCOS	CORS	MEDS	FNES	VFNS	SAND	SILT	CLAY	CRSE CLAY	FINE CLAY	LT	LT	LT	4A3A
		2-	.05-	LT	2-	1-	.5-	.25-	.10-	2-	.05-	LT	.002-	LT	2	.002	.0002	
		.05	.002	.002	1	.5	.25	.10	.05	.05	.002	.002	.0002	.0002	MM	MM	MM	
IN		PCT LT 2MM											PCT LT.002		MG/G			G/CC
000-7	AP	14.8	43.0	42.2									27	73				
007-23	A12	11.9	40.4	47.7									29	71				
023-33	AC1G	14.3	38.5	47.2									29	71				
033-53	AC2G	12.0	40.0	48.0									29	71				
053-72	CG	9.5	40.6	49.9									29	71				

DEPTH	ORGANIC MATTER 6A1A ORGN	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	EXTRACTABLE BASES 5B1A 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM	CAT EXC CAP 5A2A LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO CA TO MG	CA CARB EQ 6E1E	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	MEQ / 100G				EXTB	MM	MM	MM	PCT		PCT			
000-7	1.97					20.0	4.3	0.8	0.4	25.5	26.1	66A	84A	98	4.6		6.1		
007-23	1.22					14.2	4.9	1.2	0.3	20.6	27.6	68A	88A	74	2.9		4.6		
023-33	0.64					13.5	5.6	1.5	0.3	20.9	26.5	70A	82A	79	2.4		4.6		
033-53	0.35					15.1	5.8	2.0	0.3	23.2	28.8	71A	88A	80	2.6		4.9		
053-72	0.17					17.8	6.7	2.6	0.4	27.5	29.7	76A	94A	93	2.7		5.6		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S55TX-36-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-7	QZ1	QZ1 FD3		MI2 MT2 KK2 QZ2	MT1 KK3
7-23	QZ1	QZ1 FD3		MI2 MT2 KK2 QZ3	MT1 KK3
23-33	QZ1	QZ1 FD3		MI2 KK2 MT2 QZ2	MT1 KK3
33-53	QZ1	QZ1 FD3 MI3		MI2 MT2 KK2 QZ2	MT1 KK3
53-72	QZ1	QZ1 FD3 MI3		MT2 MI2 KK2 QZ3	MT1 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Entic Pelludert; fine, montmorillonitic, thermic.
Soil: Beaumont silty clay.
Soil Nos.: S55TX-36-90; K326-330.
Location: Chambers County, Texas. North of High Island 10.7 miles; 0.4 miles west of State Highway 124 and 100 feet north of paved county road, opposite pipe yard. Cover: Previously cultivated to rice.
Topography: Nearly level upland.
Sampled by: I. C. Mowery, May 1955.
Described by: I. C. Mowery.

Ap K326 0 to 7 inches. Gray (10YR 5/1.5; 4/1.5 moist) silty clay with common medium faint yellowish brown mottles; weak to moderate fine subangular and angular blocky; very firm, very sticky; pH 6.0; numerous roots; has a distinct plow pan; gradual change.

A12 K327 7 to 23 inches. Gray (10YR 5/1; 4/1 moist) silty clay with common medium faint yellowish brown mottles; moderate coarse and medium angular blocky; very firm, very hard, extremely sticky; aggregates have shiny surfaces; pH 5.5; few roots; gradual change.

AC1g K328 23 to 33 inches. Light gray (10YR 6/1; 5/1 moist) clay with many medium distinct dark brown mottles; moderate medium and fine angular blocky; same consistence as above; pH 5.5; gradual change.

AC2g K329 33 to 53 inches. Light gray (2.5Y 7/1; 6/1 moist) on boundary between silty clay and clay with common medium distinct brownish yellow (10YR 6/6; 5/6 moist) mottles; consistence and structure same as above; pH 6.5; continues through next layer.

Cg K330 53 to 72 inches plus. Silty clay similar to horizon just above, but brownish yellow mottles are more numerous; pH 6.5.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

Ap - clay
A12 - clay
AC2g - clay
Cg - clay

SOIL CLASSIFICATION Entic Pelludert; fine, montmorillonitic, thermic

SOIL Beaumont silty clay LOCATION Jefferson County, Texas

SOIL NOS. S59TX-123-2 LAB. NOS. 11598-11604

SOIL SURVEY LABORATORY Lincoln, Nebraska DATE March 1961

GENERAL METHODS 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	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	3A1 0.02-0.002	2A2 > 2	TEXTURAL CLASS
0-8	Ap	0.1	0.1	0.1	1.4	8.5	42.8	47.0	25.6	26.9	-	sic
8-16	A12	0.2	<0.1	<0.1	1.0	6.3	41.8	50.7	20.9	28.1	-	sic
16-26	A12	<0.1	<0.1	0.1	1.3	6.5	40.5	51.6	22.5	25.6	-	sic
26-35	AC1	<0.1	<0.1	0.1	1.1	6.2	37.1	55.5	20.2	24.0	-	c
35-43	AC2	<0.1	<0.1	0.1	1.1	6.8	35.9	56.1	21.3	22.4	-	c
43-60	Cg	<0.1	<0.1	<0.1	1.1	7.8	35.2	55.9	22.8	21.2	-	c
9-21		0.4a	0.1a	<0.1	1.1	8.1	31.5	58.8	23.2	17.4	-	c

8C1a pH 1:1	6C1a Free Iron Fe_2O_3 %	6G2a Ext. Alum-inum me/100g.	ORGANIC MATTER 6A1a ORGANIC CARBON % b	6B1a NITRO-GEN %	C/N	BULK DENSITY 4A1a Field State g/cc	4A1c 30-cm g/cc	4A1h Oven Dry g/cc	MOISTURE TENSION$ 4B4 Field State %	4B3 30-cm %	4B1b 1/3 bar pieces %	4B2 15 Bar %
5.1	1.4	1	1.68	0.120	14							19.7
4.7	1.2	4	1.59	0.113	14	1.38	1.37	1.81	30.4	30.2		21.2
4.6	1.1	4	1.15	0.080	14	1.36	1.35	1.87	31.9	31.1		21.2
4.8	1.5	2	0.90									22.6
5.5	2.1	<1	0.46			1.43		1.96	28.5			22.0
6.6	2.4	<1	0.25			1.42	1.46	1.97	29.6	27.8		21.5
5.4	2.0	<1	0.86									24.2

5A1a CATION EXCHANGE CAPACITY NH_4OAc	EXTRACTABLE CATIONS 6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K	5B1a BASE SAT. % NH_4OAc EXCH. 5C1	Base Sat. % on Sum Cations 5C3	Sum Ext. Bases 5B1a	Sum Ext. Cat-ions 5A3a	Ca/Mg 8D3	6E1a $CaCO_3$ Equiv. %	8D1 1/ CEC per 100 g. clay
←	milliequivalents per 100g. soil →											
24.9	12.3	6.5	13.0	1.0	0.3	81	61	20.1	33.1	1.9		53
26.9	10.9	5.9	16.5	1.4	0.3	69	53	18.5	35.0	1.8		53
26.6	11.7	6.1	15.5	1.5	0.3	74	56	19.6	35.1	1.9		52
27.8	14.1	7.3	12.5	1.8	0.4	85	65	23.6	36.1	1.9		50
28.1	17.0	8.8	6.9	1.9	0.4	100	80	28.1	35.0	1.9		50
30.0	18.2	9.3	4.4	2.0	0.4	100	87	29.9	34.3	2.0	<1	54
29.5	15.6	9.2	9.9	1.8	0.4	92	73	27.0	36.9	1.7		50

a. Many (Fe-Mn?) concr.

b. 19 kg/M^2 to 60 inches (Method 6A).

1/ Calculated value. $\frac{\text{CEC by } NH_4OAc}{\% \text{ clay}} \times 100$

Soil classification: Entic Pelludert; fine, montmorillonitic, thermic.
Soil: Beaumont silty clay.
Soil Nos.: S59TX-123-2; 11598-11604.
Location: Jefferson County, Texas. West of county courthouse 0.8 mile at Beaumont on Franklin Street, thence south by west on Avenue A 2.2 miles, thence south on West Port Arthur Road 2.4 miles, thence west and south on Hillebrandt Road 5.1 miles, thence east on farm road 0.6 mile, thence north of field road approximately 200 feet in rice field.
Soil moisture: Near field capacity when sampled.
Collected by: L. L. Gordon, J. R. Coover, R. B. Grossman, G. J. Post, August 1959.
Described by: L. L. Gordon and R. B. Grossman.

Ap 11598 0 to 8 inches. Dark gray (2.5Y 4/1) moist; silty clay with common fine and medium distinct reddish brown mottles and coatings along root channels; moderate medium and fine blocky in upper 3 inches, weak blocky below; sticky and plastic but stiff; common fine fibrous roots; few fine pores; pH 5.2; abrupt boundary.

A12 11599 8 to 16 inches and 11600 16 to 26 inches. Dark gray (2.5Y 4/1) moist; silty clay with common fine and a few medium distinct reddish brown and dark yellowish brown mottles and coatings along root channels; moderate medium blocky; surface of peds is blanched gray; medium blocks are grouped into coarse blocks; surface of some peds as well as some pores are coated reddish brown; sticky and plastic but stiff; few fine pores; few fine fibrous roots and occasional medium root; pH 5.0; gradual boundary. This horizon was sampled in two increments.

AC1 11601 26 to 35 inches. Gray (2.5Y 4.5/1) moist; clay with many (about 30 percent) medium mottles of strong brown and many fine distinct yellowish red mottles and coatings along root channels; sticky and very plastic; prominent coarse diagonal slickensides; fine to medium blocky-sized irregular or wedge-shaped structural units are delineated by the intersection of the prominent slickensides and more nearly horizontal moderately expressed shear planes; few fine roots; few very fine pores; occasional krotovina of dark gray (2.5Y 4/1) clay 1-1/2 inches in diameter; pH 5.2; gradual wavy boundary.

AC2 11602 35 to 43 inches. Gray (2.5Y 4.5/1) moist; clay with many (35 to 40 percent) prominent medium mottles of strong brown; yellowish red mottling or coating of some peds and pore surfaces is present; slickensides and medium-sized wedge-shaped structural units are evident but are only moderately expressed; consistence same as in above horizon; very few fine roots and very fine pores; krotovinas as in above horizon; pH 5.5; gradual wavy boundary.

Cg 11603 43 to 60 inches. Gray (2.5Y 5.5/0) moist; clay with many distinct coarse and medium mottles of strong brown and yellowish brown; moderate coarse slickensides about every 2 inches horizontally and minor diagonal ones delineating medium irregular blocky or wedge-shaped structural units; sticky and very plastic; very few very fine pores and few very fine roots; krotovinas as in above horizon; pH 7.2.

11604 9 to 21 inches. Material from microhighs in the AC1. The other samples (11598 through 11603) were taken from microlows. See Remarks.

Remarks: A definite wavy boundary of the Cg horizon was evident in the pit. The microhighs occur at approximately 8-1/2 foot intervals; and on the highs combined thickness of the A12 is 7 to 10 inches, and the AC1 is about 13 inches thick. The pH of the AC1 was 6.0 while the pH of the Cg ranges from 7.0 in the upper part to 8.0 at 36 inches. The AC1 horizon in the highs contains more strong brown mottling than was found in this horizon in the lows, consisting of about 30 percent strong brown and 15 percent yellowish red with the base color being gray (2.5Y 4.5/1). The color designations herein refer to moist soil.

Textures above agree with laboratory data. Field textures where different are given below:

Ap - clay
A12 - clay

SOIL CLASSIFICATION-ENTIC PELLUDERT
FINE, MONTMORILLONITIC, THERMIC

SERIES - - - - - - -BEAUMONT

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S55TX-36-91 COUNTY - - - CHAMBERS

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K337-343

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (SAND 2-.05)	(SAND .05-.002)	(CLAY LT .002)	(SAND VCOS 2-1)	(SAND CORS 1-.5)	(SAND MEDS .5-.25)	(SAND FNES .25-.10)	(SAND VFNS .10-.05)	PARTICLE SIZE ANALYSIS (A) (SAND 2-.05)	(SILT .05-.002)	(CLAY LT .002)	CRSE CLAY .002-.0002	FINE CLAY LT .0002	(ETHYLENE GLYCOL) RETAINED 2 MM	LT .002 MM	LT .0002 MM	BULK DEN 4A3A
IN		(PCT LT 2MM)								(PCT LT 2MM)			(PCT LT.002)		(- - MG/G - -)			G/CC
000-9	A11	7.2	37.9	54.9									21	79				
009-22	A12	7.4	36.4	56.3									25	75				
022-36	AC1G	7.1	35.0	58.0									22	78				
036-50	AC2G	7.3	34.2	58.5									21	79				
050-64	AC3G	6.5	33.3	60.1									19	81				
064-78	AC4G	5.8	32.9	61.3									23	77				
078-98	C	10.2	31.2	58.6									23	77				

DEPTH	ORGANIC MATTER 6A1A ORGN CARB	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	(-EXTRACTABLE BASES 5A1A- CA 6N2E	MG 6O2D	NA 6P1A	K 6Q2A	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO CA TO MG 6D3	CA CARB 6E1E	PH 8C1A H2O	8C1C KCL	8C1E CACL
IN	PCT	PCT		PCT	PCT	(- - - - - - - - MEQ / 100G - - - - - - - -)								PCT		PCT		1/2	1/2
000-9	1.80					25.2	7.3	0.7	0.4	33.6	41.5	81A	98A	81	3.5		5.1		
009-22	1.39					22.5	6.3	1.0	0.4	30.2	40.4	80A	95A	75	3.6		4.8		
022-36	1.10					23.1	6.2	1.2	0.4	30.9	40.8	80A	102A	76	3.7		5.0		
036-50	0.93					25.1	6.2	1.3	0.5	33.1	41.2	82A	100A	80	4.0		5.1		
050-64	0.75					27.8	6.2	1.3	0.5	35.8	43.1	80A	95A	83	4.5		5.5		
064-78	0.58					32.6	7.4	1.4	0.5	41.9	46.3	82A	103A	90	6.4		6.6		
078-98	0.12						7.2	1.6	0.5		42.5	85A	103A				8.1		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S55TX-36-91

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-9	QZ1	QZ1 FD3		MT2 KK2 MI2 QZ3	MT1 KK3
9-22	QZ1	QZ1 FD3		MT2 KK2 MI2 QZ3	MT1 KK3
22-36	QZ1	QZ1 FD3		MT2 KK2 MI2 QZ3	MT1 KK3
36-50	QZ1	QZ1 FD3		MT2 KK2 MI2 QZ3	MT1 KK3
50-64	QZ1	QZ1 FD3		MT2 KK2 MI3 QZ3	MT1 KK3
64-78	QZ1	QZ1 FD3 MI3		MT2 KK2 MI3 QZ3	MT1 KK3
78-98+	QZ1	QZ1 MI3 KK3 FD3		MT2 KK2 MI3 QZ3	MT1 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Entic Pelludert; fine, montmorillonitic, thermic.
Soil: Beaumont clay.
Soil Nos.: S55TX-36-91; K337-343.
Location: Chambers County, Texas. South of Mt. Bellview 4.5 miles, 400 yards west of State Highway 146.
Cover: Native pasture.
Topography: Nearly level with a distinct gilgai microrelief.
Sampled by: I. C. Mowery, May 1955.
Described by: I. C. Mowery.

A11 K337 0 to 9 inches. Gray (10YR 5/1; 4/1 moist) clay with a few fine dark yellowish brown spots; moderate medium and fine angular blocky; very fine, very hard, very sticky; numerous roots, concentrated between peds, but come through the peds; pH 6.0; diffuse smooth boundary.

A12 K338 9 to 22 inches. Same color clay but the yellowish brown spots are more numerous and more distinct in the root channels; moderate medium to coarse angular blocky; same consistence as above; pH 5.5; fewer roots; gradual wavy boundary.

AC1g K339 22 to 36 inches. Gray (10YR 5.5/1; 4.5/1 moist) clay strongly mottled with strong brown (7.5YR 5/6; 4/6 moist) with faint brownish yellow coloration; the strong brown is in streaks or old root channels; weak medium angular blocky; consistence same; distinct intersecting slickensides; pH 5.3; very few roots; diffuse boundary.

AC2g K340 36 to 50 inches. Same as above; pH 5.5; very few roots; diffuse boundary.

AC3g K341 50 to 64 inches. Same as above; pH 6.0; gradual boundary.

AC4g K342 64 to 78 inches. Gray (2.5Y 5/.5; 4/.5 moist) clay with few fine faint light olive brown mottles; weak coarse angular blocky; consistence same as horizons above; distinct intersecting slickensides; pH 7.0; clear boundary.

C K343 78 to 98 inches. Mottled light yellowish brown (2.5Y 6/4; 5/4 moist) and light gray (2.5Y 7/2; 6/2 moist) clay; massive; consistence same; few hard $CaCO_3$ concretions 1/4 to 3/4 inches in diameter; and a few ferromanganese concretions.

SOIL CLASSIFICATION-ENTIC PELLUDERT
FINE, MONTMORILLONITIC, THERMIC

SERIES - - - - - - -BEAUMONT

TEXAS AGRICULTURAL
EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S55TX-79-90 COUNTY - - - FORT BEND

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K283-289

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (- - - - - PCT LT 2MM - - - - - -) SAND								PARTICLE SIZE ANALYSIS (B) (PCT LT.002)				(ETHYLENE GLYCOL)		BULK DEN
		SAND 2-.05	SILT .05-.002	CLAY LT .002	VCOS 2-1	CORS 1-.5	MEOS .5-.25	FNES .25-.10	VFNS .10-.05	SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	RETAINED 2 MM	LT .002 MM	LT .0002 MM	4A3A G/CC
000-12	A11	19.8	39.1	41.1		1.1A	9.6	9.1					21	79				
012-25	A12	19.0	33.0	47.9		2.0A	8.8	8.2					22	78				
025-37	A13	19.0	32.7	48.2		1.9A	9.0	8.5					23	77				
037-50	A14	17.7	31.5	50.8		0.8A	8.6	8.3					22	78				
050-66	ACG	16.1	30.0	53.8		0.7A	7.9	7.5					24	76				
066-90	2C1	7.0	24.4	68.6		1.3A	3.0	2.7					32	68				
090-114	2C2	0.6	35.7	63.8		0.2A	0.2	0.2					42	58				

DEPTH IN	ORGANIC MATTER 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON 6C3 EXT FE PCT	PHOS 6S1A TOTL PCT	6N2B	EXTRACTABLE BASES 5B1A- (MEQ / 100G) 6Q2D CA	6P1A MG	6Q2A NA	K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO CA TO MG	CA EQ 6E1E PCT	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
000-12	1.68						11.5	7.3	0.7	0.3	19.8	29.9	72B	95B	66	1.3		4.9		
012-25	0.99						11.6	8.1	1.2	0.3	21.2	32.0	72B	98B	66	1.4		4.9		
025-37	0.75						11.9	9.9	1.7	0.3	23.8	34.3	72B	98B	69	1.2		5.1		
037-50	0.75						15.5	10.8	2.7	0.4	29.4	35.4	76B	97B	83	1.4		5.4		
050-66	0.46						17.2	12.7	4.0	0.4	34.3	37.3	77B	97B	92	1.4		6.5		
066-90	0.17							17.4	5.7	0.9		46.8	80B	96B				7.8		
090-108	0.12							13.6	33.7	0.7		33.7	66B	78B				7.9		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1C AND 7A2A) S55TX-79-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-12	QZ1 FD3	QZ1 FD3		KK2 MT2 QZ2 MI3	MT1 KK3 MI3
12-25	QZ1	QZ1		KK2 MT2 QZ2 MI3	MT1 KK3
25-37	QZ1	QZ1		KK2 MT2 MI2 QZ2	MT1 KK3
37-50	QZ1	QZ1 MI3 KK3 FD3		KK2 MT2 MI2 QZ2 FD3	MT1 KK3
50-66	QZ1	QZ1 MI3 FD3		MT2 KK2 MI2 QZ3 FD3	MT1 KK3
66-90	QZ1	QZ1 MI2 KK2 FD3		MI1 KK2 MT2 QZ3	MI1 KK3
90-108+	QZ1	MI2 QZ2 KK2 FD3		MI1 KK2 MT2 QZ3	MT1 MI2 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ.

(A) THE VERY COARSE, COARSE, AND MEDIUM SAND FRACTIONS HAVE BEEN COMBINED.
(B) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Entic Pelludert; fine, montmorillonitic, thermic.
Soil: Beaumont clay.
Soil Nos.: S55TX-79-90; K283-289.
Location: Fort Bend County, Texas; 4.5 miles west of Rosenberg and 0.4 miles north of U.S. Highway 90A. Cover: Brown-seeded paspalum, panicum, Andropogons and wild indigo.
Topography: Level upland with distinct gilgai microrelief.
Sampled by: I. C. Mowery, May 1955.
Described by: I. C. Mowery.

A11 K283 0 to 12 inches. Gray (10YR 5/1; 3.5/1 moist) clay distinctly mottled with yellowish brown; compound moderate medium, angular blocky and fine subangular blocky; very firm when moist, extremely sticky and plastic when wet, and the aggregates are very hard when dry; contains occasional ferromanganese concretions; pH 5.5; numerous grass roots. Changes gradually to layer below.

A12 K284 12 to 25 inches. Gray (10YR 5/1; 3.5/1 moist) clay with distinct yellowish brown mottles; moderate medium angular blocky; very firm, very hard, very sticky; pH 5.5; fewer roots than above. Changes gradually to horizon below.

A13 K285 25 to 37 inches. Gray (10YR 5.5/1; 5/1 when moist) clay with common dark yellowish brown and occasional strong brown mottles; weak medium angular blocky; very firm, very hard, extremely sticky; pH 6.0; contains ferromanganese concretions up to 1/8 inch in diameter; few grass roots; continues through next layer.

A14 K286 37 to 50 inches. Same as layer above. Changes gradually to layer below.

ACg K287 50 to 66 inches. Light gray (2.5Y 6/.5; 5/.5 moist) clay distinctly mottled with light olive brown; weak angular blocky; very firm, very hard, extremely sticky; ferromanganese concretions present; pH 7.0; occasional fine roots. Changes gradually to horizon below.

IIC1 K288 66 to 90 inches. Pale yellow (2.5Y 7/4; 6/4 moist) clay faintly mottled with light gray; lower part has pinkish mottles; dark gray clay in small crevices; about 2 percent of mass is soft lumps and hard concretions of $CaCO_3$. Changes gradually to horizon below.

IIC2 K289 90 to 114 inches plus. Yellowish red (4YR 5/8; 4/8 moist) clay with a few distinct light gray mottles; contains occasional $CaCO_3$ concretions.

SOIL CLASSIFICATION Entic Pelludert; fine, montmorillonitic, thermic

SOIL Beaumont clay LOCATION Jefferson County, Texas

SOIL NOS. S59TX-123-1 LAB. NOS. 11592-11597

SOIL SURVEY LABORATORY Lincoln, Nebraska DATE March 1961

GENERAL METHODS 1A, 1B1a, 2A1, 2B

		PARTICLE-SIZE DISTRIBUTION (In mm.) (per cent) 3A1									2A2	
DEPTH INCHES	HORIZON	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	TEXTURAL CLASS
0-7	Ap	<0.1	<0.1	<0.1	0.5	10.0	38.7	50.8	25.0	24.1	-	c
7-13	A12	<0.1	<0.1	<0.1	0.7	8.2	38.0	53.1	21.6	25.1	-	c
13-24	A13	<0.1	<0.1	<0.1	0.4	7.4	35.0	57.2	18.7	24.0	-	c
24-32	AC1	<0.1	<0.1	<0.1	0.4	7.9	33.0	58.7	19.1	22.1	-	c
32-44	AC2g	<0.1	<0.1	<0.1	0.4	7.8	32.4	59.4	19.2	21.3	-	c
44-60	Cg	<0.1	<0.1	<0.1	0.2	7.1	27.3	65.4	16.5	18.1	-	c

			ORGANIC MATTER			BULK DENSITY			MOISTURE TENSIONS			
8C1a pH 1:1	6C1a Free Iron Fe_2O_3 %	6G2a Ext. Aluminum me/100g	6A1a ORGANIC CARBON % a/	6B1a NITROGEN %	C/N	4A1a Field State g/cc	4A1c 30-cm. g/cc	4A1h Oven Dry g/cc	4B4 Field State %	4B3 30-cm %	4B1b 1/3 bar pieces %	4B2 15 Bar %
5.0	1.3	2	1.44	0.123	12	1.33	1.43	1.76	31.6	25.0	30.8	20.1
4.6	1.1	4	0.91	0.075	12	1.33	1.40	1.83	32.6	28.2	32.5	20.5
4.8	1.4	2	0.69	0.062	11	1.30	1.41	1.89	35.8	28.8	36.0	23,0
4.9	1.4	2	0.53									22.9
5.2	1.4	<1	0.45			1.33	1.35	1.94	34.0	32.5	36.0	22.8
6.5	2.3	<1	0.18			1.37	1.39	1.96	33.2	31.3	36.3	24.9

5A1a	EXTRACTABLE CATIONS 5B1a					BASE SAT. %	Base Sat. % on Sum Cations	Sum Ext. Bases	Sum Ext. Cations	Ca/Mg	6E1a	8D1
CATION EXCHANGE CAPACITY NH_4OAc	6N2b Ca	6Q2b Mg	6H1a H	6P2a Na	6Q2a K	NH_4OAc EXCH. 5C1	5C3	5B1a	5A3a	8D3	$CaCO_3$ Equiv %	1/ CEC per 100 g. clay
← milliequivalents per 100g. soil →												
26.4	15.7	6.0	13.6	1.2	0.4	88	63	23.3	36.9	2.6		52
29.4	14.6	5.5	14.8	1.5	0.4	75	60	22.0	36.8	2.6		55
30.1	17.8	6.6	12.6	1.6	0.4	88	68	26.4	39.0	2.7		53
30.1	19.4	6.8	10.9	1.7	0.4	94	72	28.3	39.2	2.8		51
30.3	21.8	7.4	7.7	1.8	0.4	104	80	31.4	39.1	2.9		51
33.4	26.7	8.8	4.5	2.1	0.5	114	89	38.1	42.6	3.0	<1	51

a/ 13 Kg/M^2 to 60 inches (Method 6A).

1/ Calculated value. $\frac{\text{CEC by } NH_4OAc}{\% \text{ clay}} \times 100$

Soil classification: Entic Pelludert; fine, montmorillonitic, thermic.
Soil: Beaumont clay.
Soil Nos.: S59TX-123-1; 11592-11597.
Location: Jefferson County, Texas; 0.8 mile west of the county courthouse at Beaumont on Franklin Street, thence south by west on Avenue A 2.2 miles, thence south on West Port Arthur Road 2.4 miles, thence west and south on Hillebrandt Road 3.8 miles, east of road 120 yards and south of field road 200 feet on Texas Riceland Farm.
Setting: The area sampled was nearly level with gradient of less than 0.5 percent. It was in rice in 1957 and is now in pasture and has a cover of vaseygrass, carpetgrass, long tom, and annual weeds. Moisture was at field capacity in all horizons when sampled.
Collected by: L. L. Gordon, J. R. Coover, R. B. Grossman, and G. J. Post, August 1959.
Described by: L. L. Gordon and R. B. Grossman.

Ap 11592 0 to 7 inches. Dark gray (10YR 4.5/1) moist; clay with common fine and medium faint brownish yellow and common distinct fine and medium dark brown mottles; many root channels and ped surfaces are coated dark reddish brown; weak blocky to massive; sticky and plastic but stiff; contains common fine fibrous roots; this horizon contains more dark reddish brown coating of ped surfaces and root channels than horizon below; pH 5.2; abrupt boundary.

A12 11593 7 to 13 inches. Dark gray (10YR 4/1) moist; clay with common faint fine brownish yellow and distinct fine strong brown mottles; moderate medium blocky and few coarse blocks; same consistence as layer above; few to common fine roots; few fine pores, some of which are coated with dark reddish brown; most of the brownish yellow mottling occurs inside the peds; pH 5.0; clear boundary.

A13 11594 13 to 24 inches. Dark gray (10YR 4/1) moist; clay with common to many faint fine and medium brownish yellow (10YR 6/8) and few distinct strong brown (7.5YR 5/8) mottles; moderate medium blocky with tendency to compound pentahedral or wedge-shaped structural units medium blocky in size formed by intersection of primary slickensides which show striation and secondary shear planes; sticky and very plastic; few to common fine pores; few fine fibrous roots; some root channels have dark reddish brown coatings of iron; pH 5.0; gradual wavy boundary.

AC1 11595 24 to 32 inches. Dark gray (10YR 4/1) moist; clay with common to many faint fine and medium brownish yellow and few distinct strong brown mottles; fine to medium moderately expressed pentahedral or wedge-shaped structural units formed by intersection of primary slickensides and secondary shear planes; sticky and plastic, slightly more sticky than horizon above; structural units are moderately expressed in this horizon while only weakly expressed in horizon above; few very fine roots; occasional very fine pore; roots penetrate structural units; krotovinas of about 1 inch in diameter and gray (10YR 4.5/0) occur slightly less frequently than in horizon below; pH 5.0; gradual wavy boundary.

AC2g 11596 32 to 44 inches. Gray (10YR 5/1) moist; clay with many fine and medium yellowish brown (10YR 5/6) moist; and few medium distinct strong brown (7.5YR 5/6) moist; mottles; the gray makes up approximately 60 percent of the mass; distinct primary slickensides showing striation occur approximately 2 inches apart; these are intersected by secondary shear planes to form structural units medium and fine blocky in size; very plastic and sticky; occasional fine roots and few to common fine pores; gray clay krotovinas about 1 inch in diameter occur every 8 to 10 inches; pH 5.5; gradual wavy boundary.

Cg 11597 44 to 60 inches. Coarsely mottled yellowish brown (10YR 5/5) moist; and light gray (2.5Y 6/1) moist; clay; primary slickensides occur diagonally every 2 or 3 inches, these are intersected by more horizontal shear planes at about 1-inch intervals delineating irregular or wedge-shaped structural units which are medium blocky in size; the slickensides are light gray in color and contain very little of the yellowish brown mottling; sticky and very plastic; krotovinas as in above horizon; very few fine roots; few very fine pores mostly inside the peds; pH 7.5.

Remarks: The color descriptions herein refer to moist soil. Some of the data for this pedon were published in the soil survey for Jefferson County, Texas, issued February 1965, pages 64, 65, and 66.

Micromorphology (Method 4E1): Hydrous iron oxides are strongly segregated throughout the pedon. Many of the hydrous iron-oxide accumulations show faint extinction on rotation of the stage, suggestive of oriented silicate clay partially masked by iron coatings. Silicate clay segregation is strongest in the A12 (11593) and A13 (11594) horizons. The clay-rich segregations occur within the fabric formed by the skeletal grains (sand and silt) rather than as coatings on macrovoid walls, and are apparently rich in hydrous iron oxides to judge from the reddish brown color. The subsurface bodies are probably a result of reorientation along shear planes, not illuviation of clay. At most, only a very few clay films occur. Orientation within skeletal interstices is weak, but orientation across several interstices is strong.

SOIL CLASSIFICATION-ENTIC PELLUDERT
VERY FINE, MONTMORILLONITIC, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SERIES - - - - - - -SERIES NOT DESIGNATED

SOIL NO - - - - - - S55TX-123-90 COUNTY - - - JEFFERSON

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K266-270

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (PCT LT 2MM) SAND 2-.05	SILT .05-.002	CLAY LT .002	SAND VCOS 2-1	SAND CORS 1-.5	SAND MEDS .5-.25	SAND FNES .25-.10	SAND VFNS .10-.05	PARTICLE SIZE ANALYSIS (A) SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	ETHYLENE GLYCOL RETAINED LT 2 MM	ETHYLENE GLYCOL RETAINED LT .002 MM	GLYCOL (B) LT .0002 MM	BULK DEN 4A3A G/CC
000-8	AP	3.2	32.4	64.4									28	72	75.1		196	
008-20	A12	2.4	30.0	67.7									26	74	77.5		191	
020-32	A13	2.2	29.4	68.3									24	76	75.7		203	
032-50	ACG	2.0	28.1	69.9									23	77	80.1		215	
050-74	C	2.4	25.2	72.3									27	73	79.4		231	

DEPTH IN	ORGANIC MATTER 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON 6C3 EXT FE PCT	PHOS 6S1A TOTL PCT	EXTRACTABLE BASES 5B1A (MEQ / 100G) 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	8D3 CA TO MG	CARB EQ 6E1E PCT	CA 8C1A 1/1 H2O	PH 8C1C 1/2 KCL	8C1E 1/2 CACL
000-8	2.78					32.9	9.0	1.4	0.6	43.9			76A		3.7		5.1		
008-20	2.20					35.1	9.0	1.9	0.6	46.6	53.7		74A	87	3.9		5.6		
020-32	1.86					35.6	8.6	1.8	0.6	46.6	52.7		77A	88	4.1		6.0		
032-50	0.70					37.2	9.5	1.8	0.6	49.1	53.7		79A	91	3.9		6.4		
050-74	0.29					37.2	9.7	2.0	0.7	49.6	54.7		79A	91	3.8		6.5		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S55TX-123-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-8	QZ1	QZ1 MI3 KK3 FD3		MT2 KK2 MI3 QZ3	MT1 KK3
8-20	QZ1	QZ1 MI3 KK3 FD3		KK2 MT2 MI2 QZ2	MT1 KK3
20-32	QZ1	QZ1 MI3 KK3 FD3		KK1 MI2 MT2 QZ2	MT1 KK3
32-50	QZ1	QZ1 MI3 KK3 FD3		MT2 KK2 MI2 QZ3	MT1 KK3
50-74	QZ1	QZ1 MI3 KK3 FD3		MT2 KK2 MI2 QZ3	MT1 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Entic Pelludert; very fine, montmorillontic, thermic.
Soil: Series not designated.
Soil Nos.: S55TX-123-90; K266-270.
Location: Jefferson County, Texas. Rice Experiment Station in northwest part of southeast field 250 yards south of northwest corner of field; 30 feet from fence. Cover: Rice-pasture rotation.
Topography: Nearly level with a gilgai microrelief which may be filled or leveled by cultivation.
Sampled by: Harvey Oakes, March 1955.
Described by: Harvey Oakes.

Ap K266 0 to 8 inches. Dark gray (2.5YR 4/1; very dark gray 2.5YR 3/1, moist) clay; moderate fine angular blocky in upper 2 inches; nearly massive below; thin weak platy crust on surface when dry, very sticky and plastic wet, extremely hard dry; abrupt boundary.

A12 K267 8 to 20 inches. Gray (2.5YR 5/1; 4/1, moist) clay with numerous fine and medium distinct mottles of light yellowish brown; weak angular blocky; very plastic, extremely hard dry; few very fine pores; gradual boundary.

A13 K268 20 to 32 inches. Gray clay similar to above but with more mottles; consistence similar to horizon above; gradual boundary.

ACg K269 32 to 50 inches. Mottled light gray (5YR 6/1, dry) and olive (5YR 5/3, dry) clay; massive; very plastic wet, extremely hard dry; gradual boundary.

C K270 50 to 74 inches. Light gray (5YR 7/2, dry) clay with common distinct mottles of pale yellow; very compact and apparently nearly impervious.

Remarks: This pedon was sampled as Beaumont clay. It is outside the series range of the Beaumont series in being in the very fine textural family.

SOIL CLASSIFICATION- TYPIC CHROMUSTERT
FINE, MONTMORILLONITIC, THERMIC

SERIES - - - - - - -SERIES NOT DESIGNATED

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S63TX-25-90 COUNTY - - - BROWN

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K1496-1499

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1			SAND								PARTICLE SIZE ANALYSIS (A)		(ETHYLENE GLYCOL) RETAINED		BULK DEN
		SAND 2- .05	SILT .05- .002	CLAY LT .002	VCOS 2- 1	CORS 1- .5	MEDS .5- .25	FNES .25- .10	VFNS .10- .05	SAND 2- .05	SILT .05- .002	CLAY LT .002	CRSE CLAY .002- .0002	FINE CLAY LT .0002	LT 2 MM	LT .002 MM	LT .0002 MM	4A3A
IN		PCT LT 2MM											PCT LT.002		MG/G			G/CC
000-5	AP	13.9	49.1	37.0									19	81				
005-17	A11	9.0	45.9	45.1									24	76				
017-24	AC	7.1	40.6	52.3	0.0	0.0	0.0	3.2	3.9				26	74				
024-32	CCR	3.6	23.9	72.6									5	95				

DEPTH	ORGANIC MATTER 6A1A ORGN	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	EXTRACTABLE BASES 5R1A- 6N2E CA	6Q2D MG	6P1A NA	6Q2A K	SUM	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO CA 8D3	CARB EQ 6E1E	PH 8C1A 1/1	8C1C 1/2	8C1E 1/2
	CARB									EXTB					TO		H20	KCL	CACL
IN	PCT	PCT		PCT	PCT	MEQ / 100G								PCT	MG	PCT			
000-5	1.10					22.5	3.6	0.5	1.0	27.6	33.4	79A	93A	83	6.3		7.0		
005-17	1.00						5.0	1.2	0.9		44.6	84A	99A			2.0	7.8		
017-24	1.00						4.8	1.7	0.8		42.4	87A	99A			7.0	8.0		
024-32	0.40						1.5	1.1	0.3		12.1	97A	104A			72.0	8.1		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S63TX-25-90

DEPTH	SAND	SILT	CLAY	COARSE CLAY	FINE CLAY
INCHES	2 - 0.05MM	0.05 - 0.002MM	LESS THAN 0.002MM	0.002 - 0.0002MM	LT 0.0002MM
0-5	QZ1	QZ1 MI3 KK3 FD3		MI1 KK2 MT2 QZ2	MT1 MI3 KK3
5-17	QZ1 FD3	QZ1 MI3 KK3 FD3		MI1 KK2 MT2 QZ2 FD3	MT1 MI3 KK3
17-24	QZ1 FD3	QZ1 MI3 KK3 FD3		MI1 KK2 MT2 QZ2 FD3	MT1 MI3 KK3
24-32	QZ1	QZ1 MI3 KK3 FD3		MI1 KK2 MT2 QZ3 FD3	MT1 MI3 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT. 2 = 10 - 40 PCT. 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Typic Chromustert; fine, montmorillonitic, thermic.
Soil: Series not designated.
Soil Nos.: S63TX-25-90; K1496-1499.
Location: Brown County, Texas; 4.5 miles southeast of May on the Eppley farm. Approximately 200 yards north of residence; 50 yards into field on west side of road. Cover: Idle cropland.
Topography: Large flat mesa top of a square mile or more; gradient about 0.5 percent.
Sampled by: Harvey Oakes, July 3, 1963.
Described by: Harvey Oakes.

Ap K1496 0 to 5 inches. Reddish brown (5YR 4/3) silty clay loam; dark reddish brown (5YR 3/3) moist; surface 1½ inches weak platy and of sandy clay; massive or weak coarse blocky below; extremely hard and firm.

A11 K1497 5 to 17 inches. Reddish brown (5YR 4/3) dry; silty clay; dark reddish brown (5YR 3/3) moist; coarse irregular blocky that breaks to moderate medium and fine irregular blocky; pressure faces and slickensides distinct; extremely hard and firm, very plastic; noncalcareous; few particles of partly weathered chert.

AC K1498 17 to 24 inches. Silty clay of similar color as above; structure weaker but pressure faces and slickensides apparent; few small soft particles of $CaCO_3$ and partly weathered fragments of limestone.

C&R K1499 24 to 32 inches. Pink (7.5YR 7/4) dry strongly calcareous fine earth clay texture, probably mostly $CaCO_3$ with interbedded fragments of crystalline limestone that are dominant in lower part with pink calcareous material in cracks and interstices.

R 32 to 35 inches plus. Limestone, fractured.

Remarks: 1. This pedon was sampled as Crawford clay. The soil is outside the range of the Crawford series in having a silty clay loam A horizon and in being Typic instead of Udic Chromusterts.

2. Textures above agree with laboratory data. Field texture where different are given below:

Ap - clay
A12 - clay
AC - clay

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Udic Chromustert; clayey, montmorillonitic, thermic, shallow

SOIL Crawford silty clay SOIL Nos. S63TX-50-5 LOCATION Coryell County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 18141-18148 March 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

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)	3A1a Non-Carbonate <0.002	Fine Clay to Clay h	Coarse fragments 2A2: 3B1 >2 (<19) Pct.	Coarse fragments 2A2: 2-19	Coarse fragments 2A2: 19-76
		Pct. of <2 mm												Pct.			Pct. of <76 mm	
0-5	Ap	10.5c	47.8	41.7	0.4	0.6	0.8	3.5	5.2	25.5	22.3	32.8	5.3	42	76	tr		
5-12	A11	8.9c	43.8	47.5	0.4	0.4	0.7	2.6	4.6	22.7	21.1	28.8	4.1	48	76	tr		
12-21	A12	8.4c	42.5	49.1	0.5	0.3	0.7	2.7	4.2	21.5	21.0	27.3	4.2	49	79	tr		
21-28	A13	7.2c	42.5	50.3	0.2	0.3	0.6	2.2	3.9	21.2	21.3	26.4	3.3	50	76	tr		
28-38	R	8.3d	32.5	59.2	2.7	1.1	0.6	1.4	2.5	13.8	18.7	17.1	5.8	59		22		
38-49	Cca	16.3e	58.7	25.0	1.3	2.2	1.9	4.5	6.4	11.2	47.5	20.2	9.9	22		29		
38-49	a	8.1e	24.8	67.1	0.9	1.1	0.9	2.2	3.0	7.3	17.5	11.5	5.1	67		3		
38-49	b	13.7e	70.8	15.5	0.9	1.6	1.5	3.8	5.9	12.1	58.7	20.3	7.8	14		19		

Depth (In.)	6A1a Organic carbon	6B1a Nitrogen	C/N	Carbonate as $CaCO_3$: 6E1b <2mm	Carbonate as $CaCO_3$: 3A1a <0.002 mm	6C2a Ext. Iron as Fe	Bulk density: 4A1a Field-State	Bulk density: 4A1d 1/3-Bar	Bulk density: 4A1b Air-Dry	4D1 COLE	Water content: 4B4 Field-State	Water content: 4B1c 1/3-Bar	Water content: 4B2 15-Bar	4C1 1/3-to 15-Bar		pH: 8C1b Sat. Paste	pH: 8C1a 1:1	pH: 8C1a 1:10
	Pct.	Pct.		Pct.	Pct.	Pct.	g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.				
0-5	1.06	0.077	14			1.7							15.3			6.0	6.0	6.4
5-12	1.03	0.066	16			1.9	1.50	1.39	1.89	0.11	23.6	27.0	17.6	0.13		5.8	5.8	6.2
12-21	0.94	0.064	15			1.9	1.58	1.37	1.86	0.11	17.9	28.0	18.5	0.13		6.2	6.2	6.4
21-28	0.92	0.061	15	-		1.8	1.62	1.34	1.88	0.12	17.5	29.8	20.0	0.13		6.5	6.6	6.6
28-38	1.09	0.067	16	6	-	2.4							24.1			7.5	7.6	7.9
38-49	0.19			72	3	0.7							9.2			8.0	8.1	8.5
38-49	0.56			18	tr	2.6							27.6					
38-49	0.08			85	2	0.4							4.5					

Depth (In.)	Extractable bases 6N2a Ca	Extractable bases 6O2a Mg	Extractable bases 6P2a Na	5B1a 6Q2a K	5B1a Sum	6H1a Ext. Acidity	Cat. Exch. Cap. 5A3a Sum Cations	Cat. Exch. Cap. 5A1a NH_4OAc	Water extract from saturated paste: Ca	Mg	6P1a Na	6Q1a K	CO_3	HCO_3	8A1 Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter								mmho/cm
0-5	26.5	3.8	0.1	0.8	31.2	5.3	36.5	29.3			0.2	0.1					0.34
5-12	30.4	3.7	0.1	0.6	34.8	6.0	40.8	33.1			0.3	0.1					0.57
12-21	32.6	3.3	0.1	0.6	36.6	5.6	42.2	34.9			0.3	0.1					0.49
21-28	34.7	3.3	0.1	0.6	38.7	4.4	43.1	35.5			0.3	tr					0.36
28-38	41.6f	2.9g	0.1	0.8	45.4			40.0			0.3	0.1					0.48
38-49	16.3f	1.4g	0.1	0.3	18.1			14.5			0.3	tr					0.48
38-49	46.6f	3.3g	0.2	0.9	51.0			42.6									
38-49	9.5f	0.6g	tr	0.1	10.2			7.2									

Depth (In.)	8A Water at Saturation	5D2 Exchangeable Na	5C1 Base Sat. NH_4OAc	Gypsum	Ratios to Clay 8D2: NH_4OAc CEC	Ratios to Clay 8D2: Ext. Iron	Ratios to Clay 8D2: 15-Bar Water
	Pct.	Pct.	CEC Pct.	Pct.			
0-5	49.9	<1	106		0.70	0.04	0.37
5-12	56.2	<1	105		0.70	0.04	0.37
12-21	57.8	<1	105		0.71	0.04	0.38
21-28	57.9	<1	109		0.70	0.04	0.40
28-38	70.0	<1			0.68	0.04	0.41
38-49	39.6	<1			0.66	0.03	0.42
38-49		<1			0.63	0.04	0.41
38-49		<1			0.51	0.03	0.32

a. Subsample of red clay.
b. Subsample of carbonate.
c. Fe-Mn nodules: > 50 percent.
d. Carbonate grains: > 50 percent (2-0.1 mm); 5-25 percent (0.1-0.05 mm).
e. Carbonate grains: > 50 percent.
f. KCl-TEA extraction (Method 6N4b).
g. KCl-TEA extraction (Method 604b).
h. Soil treated for removal of $CaCO_3$ if present.

Soil classification: Udic Chromustert; clayey, montmorillonitic, thermic, shallow.
Soil: Crawford silty clay.
Soil Nos.: S63TX-50-5; 18141-18148.
Location: Coryell County, Texas. Bluebonnet Experiment Station on west edge of McGregor, Texas; 3.12 miles west-southwest of station headquarters.
Vegetation and use: Cropland, in grain sorghum.
Topography: Nearly level landscape with slight gradual increases in elevation and broad slightly depressed areas. Slope gradient is less than 1.5 percent.
Drainage and permeability: Slow to moderate from surface, very slow permeability.
Parent material: Presumed to be clays developing from interstratified marly clays between the limestone strata.
Sampled by and date: J. DeMent, W. R. Elder, J. W. Huckabee, G. Kunze, J. Kirkpatrick, M. Stout, H. Oakes, and R. B. Grossman, April 19, 1963.
Described by: M. Stout.

Ap 18141 0 to 5 inches. Dark brown (7.5YR 3/2) silty clay, darker brown (7.5YR 3/2) moist; weak to moderate very fine granular structure forming a loose mulch in plow layer; very hard; very firm; crumbly; few quartz pebbles, pink, and occasional rounded ironstone; few limestone fragments around on the surface; pH 7.0; noncalcareous; abrupt lower boundary.

A11 18142 5 to 12 inches. Brown (7.5YR 4/2) silty clay; dark brown (7.5YR 3/2) moist; moderate very fine angular blocky structure; common wedge-shaped peds in lower part, and few small slickensides; ped surfaces shiny; extremely hard; extremely firm; few quartz and fine limestone pebbles; pH 6.5; noncalcareous; diffuse lower boundary.

A12 18143 12 to 21 inches. Dark brown (7.5YR 3/2) silty clay; slightly darker brown (7.5YR 3/2) moist; moderate fine and medium blocky structure when dry, breaking to very fine angular blocky structure, moist; common slickensides and wedge-shaped peds; few scattered pebbles of quartz and limestone; extremely hard; extremely firm; pH 6.5; noncalcareous; diffuse lower boundary.

A13 18144 21 to 28 inches. Dark reddish brown (6YR 3/2) silty clay; same color moist; moderate to strong, medium blocky structure when dry, breaking to strong very fine angular blocky structure, moist; common wedge-shaped peds and strong coarse intersecting slickensides; few fine quartz pebbles; pH 8.0; noncalcareous except in lower inch; abrupt irregular lower boundary.

R 18145 28 to 38 inches. Strata of fractured limestone bedrock having rounded corners and filled with dark reddish brown (5YR 3/3) clay, reddish brown (5YR 3.5/4) moist; estimated 17 percent soil fines; 83 percent rock; moderate very fine irregular blocky structure; mildly alkaline, weakly calcareous; pH 8.2; abrupt irregular lower boundary.

Cca 18146 (18147-18148) 38 to 49 inches. Mostly soft mixture of coarse masses of $CaCO_3$, limy yellowish brown mineral fines, and dark red (2.5YR 3/5) moist, clay in irregular pockets leading from above horizon; $CaCO_3$ portion sampled (18148) separately from red clay (18147) and composite mass sampled (18146).

R 49 to 50 inches. Moderately hard shale or chalky marl.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

Ap - clay
A11 - clay
A12 - clay
A13 - clay

Mineralogy data (Methods 7A1a through 7A1d and 7A2a)

Depth Inches	Sand 2-0.05 mm	Silt 0.05-0.002 mm	Coarse clay 0.002-0.0002 mm	Fine clay < 0.0002 mm
0-5	QZ1	QZ1 KK3 FD3	KK1 MI2 QZ2 MT3 FD3	MT1 KK3
5-12	QZ1	QZ1	KK2 MI2 QZ2 MT3 FD3	MT1 KK3
12-21	QZ1	QZ1	MI2 KK2 QZ2 MV3 FD3	MT1 KK3
21-28	QZ1 FD3	QZ1	KK1 MI2 QZ2 MV3 FD3	MT1 KK3

Relative abundance: 1 = > 40 percent, 2 = 10-40 percent, 3 < 10 percent.
Mineral code: FD = feldspar, MI = mica or illite, KK = kaolinite, MT = montmorillonite, QZ = quartz, MV = diffuse, hydrated, expansible and micaceous (13-18Å).

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Udic Chromustert; clayey, montmorillonitic, thermic, shallow

SOIL Crawford silty clay SOIL Nos. S63TX-155-1 LOCATION McLennan County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 18149-18151 March 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (In.)	Horizon	Size class and particle diameter (mm) 3A1 — Total Sand (2–0.05) [a]	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)	Non-Carbonate <0.002	Coarse fragments 2A2: 3B1 > 2 Pct.	Coarse fragments 2A2: 2 – 19 Pct. of < 2 mm	Coarse fragments 2A2: 19 – 76 Pct. of < 2 mm
		Pct. of < 2 mm															
0–4	Ap	11.7	47.9	40.4	0.3	0.7	1.2	4.2	5.3	25.3	22.6	33.1	6.4		tr		
4–13	A11	9.5	43.5	47.0	0.3	0.4	0.9	3.3	4.6	21.1	22.4	27.7	4.9		tr		
13–25	A12	8.8	41.5	49.7	0.3	0.5	0.8	3.0	4.2	19.5	22.0	25.5	4.6		tr		

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6E2a Carbonate as $CaCO_3$ Pct.	Ext. Iron as Fe Pct.	Bulk density: 4A1a Field-State g/cc	4A1d 1/3-Bar g/cc	4A1b Air-Dry g/cc	4D1 COLE	Water content: 4B4 Field-State Pct.	4B1c 1/3-Bar Pct.	4B2 15-Bar Pct.	4C1 1/3-to 15-Bar in./in.	pH: 8C1b Sat. Paste	8C1a 1:1	8C1a 1:10
0–4	1.13	0.086	13	tr(s)								14.4		7.0	7.0	7.3
4–13	0.89	0.062	14			1.48	1.38	1.84	0.10	23.5	27.5	17.8	0.13	6.1	6.1	6.5
13–25	0.79	0.055	14	-(s)		1.48	1.35	1.84	0.11	23.8	27.9	19.1	0.12	6.4	6.5	6.7

Depth (In.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum	6H1a Ext. Acidity	Cat. Exch. Cap.: 5A3a Sum Cations	5A1a NH_4OAc	Ca	Mg	Water extract from saturated paste 8A1: 6P1a Na	6Q1a K	CO_3	HCO_3	Cl	SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter								mmho/cm
0–4	28.7	2.8	0.1	0.7	32.3	3.4	35.7	28.2			0.3	0.1					0.38
4–13	29.8	3.0	0.1	0.6	33.5	5.3	38.8	30.3			0.3	0.1					0.43
13–25	33.3	2.8	0.1	0.6	36.8	5.1	41.9	33.0			0.2	tr					0.38

Depth (In.)	8A Water at Saturation Pct.	5D2 Exchangeable Na Pct	5C1 Base Sat. NH_4OAc CEC Pct.	Gypsum Pct.	Ratios to Clay 6D1: NH_4OAc		15-Bar Water
0–4	49.0	<1	114		0.70		0.36
4–13	54.7	<1	110		0.64		0.38
13–25	58.2	<1	112		0.66		0.38

a. Fe-Mn nodules comprise 5 to 10 percent of the sand.

Soil classification: Udic Chromustert; clayey, montmorillonitic, thermic, shallow.
Soil: Crawford silty clay.
Soil Nos.: S63TX-155-1; 18149-18151.
Location: McLennan County, Texas. Bluebonnet Experiment Station on west edge of McGregor, Texas; 2.6 miles southwest, 255 degrees, of station headquarters.
Vegetation and use: Cropland, in grain sorghum.
Topography: Nearly level landscape with only slight changes in elevation. Gradient is less than 1 percent at pedon site.
Drainage and permeability: Slow to moderate from surface, very slow permeability.
Parent material: Presumed to be clays developing from the interbedded marly clay occurring between limestone strata.
Sampled by and date: J. DeMent, W. R. Elder, J. W. Huckabee, G. Kunze, J. Kirkpatrick, M. Stout, H. Oakes, and R. B. Grossman, April 19, 1963.
Described by: M. Stout.

Ap 18149 0 to 4 inches. Dark brown (7.5YR 3/2) silty clay; slightly darker moist; weak to moderate very fine granular forming a loose mulch in the Ap; few quartz pebbles, pink; very hard, except for 1.5-inch surface mulch; very firm; few stone and limestone fragments on surface; few ironstone pebbles and some chert fragments throughout; noncalcareous; pH 8.0; abrupt lower boundary.

A11 18150 4 to 13 inches. Brown (7.5YR 4/2) silty clay; dark brown (7.5YR 3/2) moist; weak to moderate very fine angular blocky structure, some wedge-shaped peds; all peds have shiny surfaces; few slickensides, small, and not distinct, moist; few quartz pebbles throughout; extremely hard; extremely firm; very sticky surfaces; noncalcareous; pH 6.5; diffuse lower boundary.

A12 18151 13 to 25 inches. Dark brown (7.5YR 3/2) silty clay; darker brown (7.5YR 3/2) moist; moderate to strong medium blocky structure breaking readily to very fine moderate to strong angular blocky; many wedge-shaped peds, intersecting and strong large slickensides; peds are shiny; noncalcareous except in lower 1 inch; pH 7.0; abrupt and irregular lower boundary.

R&A13 25 to 34 inches. Brown (7.5YR 5/2) clay; dark brown (7.5YR 4/2) moist strata of limestone, fractured, very pale brown (white interior), having soil fines in fractures and in rubble; moderate very fine blocky; 20 percent soil fines in rock mass; rock oriented horizontally with horizon; calcareous, pH 8.2; abrupt irregular lower boundary.

R 34 to 36 inches. Same rock as above with 10 to 15 percent pockets of red and brown clay (2.5YR 4/6) and (7.5YR 5/2) and along cleavages; pH 8.0; rock continues.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

Ap - clay
A11 - clay
A12 - clay

SOIL CLASSIFICATION-TYPIC PELLUSTERT
FINE, MONTMORILLONITIC, HYPERTHERMIC

SERIES - - - - - - -VICTORIA

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S55TX-178-90 COUNTY - - - NUECES

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K383-387

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 SAND 2-.05	.05-.002	LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	PARTICLE SIZE ANALYSIS (A) SAND .05-2	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	ETHYLENE GLYCOL RETAINED (B) LT 2 MM	LT .002 MM	LT .0002 MM	BULK DEN 4A3A
IN		PCT LT 2MM								PCT LT 2MM			PCT LT .002		MG/G			G/CC
000-10	A11	21.0	24.8	54.3	0.2	0.3	0.3	7.9	12.3				26	74	60.0	188	238	
010-24	A12	17.4	23.7	58.9	0.2	0.3	0.2	6.5	10.3				28	72	64.0	194	241	
024-40	A13	17.3	23.9	58.8	0.1	0.3	0.2	6.5	10.2				27	73	68.0	203	240	
040-53	ACCA	13.4	25.2	61.4	0.1	0.2	0.1	4.5	8.5				28	72	69.0	197	237	
053-72	CCA	16.3	24.1	59.6	0.0	0.4	0.3	6.1	9.5				28	72	63.0	200	247	

DEPTH	ORGANIC MATTER 6A1A ORGN CARB	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	EXCHANGEABLE BASES 5B1B 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO CA TO MG	CA CARB EQ 6E1E	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	MEQ / 100G								PCT		PCT			
000-10	1.74					3.9	0.4	1.8			43.6	86A	111A			6.8	7.8		
010-24	1.28					7.0	1.5	1.2			44.0	89A	110A			8.4	7.9		
024-40	0.99					8.9	3.6	1.3			43.6	89A	117A			8.8	7.9		
040-53	0.41					9.6	5.9	1.5			41.1	86A	108A			11.1	7.9		
053-72	0.23					8.2	6.9	1.6			34.3	90A	107A			10.8	7.8		

DEPTH	SATURATED PASTE 8E1 REST OHM-CM	8C1B PH	8A H2O	NA 5D2 ESP	NA 5E SAR	SALT 8D5 TOTL SOLU	GYP 6F1A	SATURATION EXTRACT 8A1 8A1A EC	6N1B CA	6O1B MG	6P1A NA	6Q1A K	6I1A CO3	6J1A HCO3	6K1B CL	6L1A SO4	6M1A NO3	ATTERBERG 4F1 LQID LMIT	4F2 PLST INDX
IN			PCT	PCT		PPM	PCT	MMHOS/CM	MEQ / LITER									PCT	
000-10			64	1	1	210		0.48	3.2	0.5	1.0	0.5	0.3	2.7	0.8	1.2			
010-24			78	3	3	260		0.38	2.0	0.3	2.9	0.1	0.3	2.7	0.5	0.7			
024-40			91	7	7	310		0.45	0.5	0.3	4.5	0.0	0.3	3.1	0.3	2.0			
040-53			131	13	9	490		0.51	0.4	0.3	5.2	0.0	0.5	2.9	0.4	2.3			
053-72			128	18	10	540		0.58	0.4	0.3	5.9	0.0	0.5	3.3	0.5	1.7			

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S55TX-178-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-10	QZ1 FD3	QZ1 FD3		QZ1 KK2 MI3 FD3	MT1 MI3 KK3
10-24	QZ1 FD3	QZ1 FD3		QZ1 KK2 MI3 FD3	MT1 MI3 KK3
24-40	QZ1 FD3	QZ1 FD3		QZ1 KK2 MI2 FD3	MT1 MI3 KK3
40-53	QZ1 FD3	QZ1 FD2 MI3		QZ1 KK2 MI2 FD3	MT1 MI3 KK3
53-72	QZ1 FD3	QZ1 FD2		QZ2 KK2 MI2 FD3	MT1 MI3 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Typic Pellustert; fine, montmorillonitic, hyperthermic.
Soil: Victoria clay.
Soil Nos.: S55TX-178-90; K383-387.
Location: Nueces County, Texas; 4.8 miles south of Robstown. Cover: Cultivated area.
Topography: Level.
Sampled by: Harvey Oakes, August 1955.
Described by: Harvey Oakes.

A11 and Ap K383 0 to 10 inches. Very dark gray (10YR 4.5/1; 2/1, moist) clay; moderate fine subangular blocky and granular in the 3-inch surface layer; compound moderate medium subangular blocky and granular below; readily crumbles to firm aggregates when moist, very sticky and plastic wet; calcareous; clear smooth boundary.

A12 K384 10 to 24 inches. Clay of same color as above; compound moderate medium angular block structure parting to very fine angular blocky; firm, extremely hard dry; calcareous; gradual smooth boundary.

A13 K385 24 to 40 inches. Very dark gray (10YR 3.5/1; 2/1) clay; structure and consistence similar to above; intersecting slickensides; calcareous; contains a few soft lumps of $CaCO_3$ up to 3 mm in diameter; gradual wavy boundary.

ACca K386 40 to 53 inches. Dark gray (10YR 4/1; 3/1) clay grading to gray (10YR 5/1, dry) in lower part; weak angular blocky structure; intersecting slickensides; few mottles of light gray below 48 inches; calcareous; clear wavy boundary.

Cca K387 53 to 72 inches. White (10YR 8/2; 7/2) strongly calcareous clay (marl) with numerous soft lumps of $CaCo_3$ and few lumps of gypsum crystals.

Remark: This pedon was described near the type location of the Victoria series.

SOIL CLASSIFICATION-TYPIC PELLUSTERT
FINE, MONTMORILLONITIC, HYPERTHERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION

SERIES - - - - - - -VICTORIA

COLLEGE STATION, TEXAS

SOIL NO - - - - - - S55TX-178-91 COUNTY - - - NUECES

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K388-392

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (PCT LT 2MM)									PARTICLE SIZE ANALYSIS (A) (PCT LT.002)			(ETHYLENE GLYCOL) RETAINED		(B)	BULK DEN
		SAND 2-.05	SILT .05-.002	CLAY LT .002	SAND VCOS 2-1	SAND CORS 1-.5	SAND MEDS .5-.25	SAND FNES .25-.10	SAND VFNS .10-.05	SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	LT 2 MM	LT .002 MM	LT .0002 MM	4A3A
IN																MG/G		G/CC
000-11	A11	14.7	29.9	55.4	0.2	0.3	0.1	6.7	7.4				22	78	77.0	222	268	
011-25	A12	13.6	28.1	58.3	0.3	0.3	0.2	6.3	6.5				24	76	78.0	225	268	
025-38	A13	12.2	28.0	59.8	0.1	0.3	0.1	5.4	6.3				22	78	83.0	243	268	
038-54	AC	11.0	27.8	61.2	0.1	0.3	0.1	4.8	5.7				22	78	81.0	247	267	
054-72	C	11.4	28.1	60.5	0.0	0.3	0.1	5.1	5.9				22	78	80.0	249	266	

DEPTH	ORGANIC MATTER 6A1A ORGN CARB	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	EXCHANGEABLE BASES 5B1B 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT .2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO CA 8D3 CA TO MG	CARB EQ 6E1E	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	MEQ / 100G								PCT		PCT			
000-11	1.97					8.2	4.1	1.3		48.3	70A	112A				8.6	8.1		
011-25	1.57					10.1	4.6	1.4		47.0	72A	113A				9.8	8.1		
025-38	1.04					10.7	15.4	1.8		44.1	87A	111A				11.5	8.2		
038-54	0.35					8.7	18.0	2.1		40.7	83A	108A				13.6	8.2		
054-72	0.23					6.5	16.0	1.7		37.6	83A	109A				12.6	7.9		

DEPTH	(SATURATED PASTE) 8E1 REST OHM-CM	8C1B PH	8A H2O	NA 5D2 ESP	NA 5E SAR	SALT 8D5 TOTL SOLU	GYP 6F1A	8A1A EC	6N1B CA	6O1B MG	SATURATION EXTRACT 8A1- 6P1A NA	6Q1A K	6I1A CO3	6J1A HCO3	6K1B CL	6L1A SO4	6M1A NO3	ATTERBERG 4F1 LQID LMIT	4F2 PLST INDX
IN			PCT	PCT		PPM	PCT	MMHOS/CM			MEQ / LITER							PCT	
000-11			81	7	9	370		0.70	0.9	0.0	6.1	0.1	0.5	3.0	2.4	0.9			
011-25			121	7	19	980		1.30	0.7	0.1	11.9	0.0	0.7	2.7	6.6	3.2			
025-38			148	26	29	2600		3.00	1.4	0.2	25.5	0.2	0.5	2.0	17.2	9.9			
038-54			99	22	23	7900		13.70	25.9	6.2	90.8	1.0	0.3	0.8	40.7	85.6			
054-72			91	20	23	7600		14.50	27.0	6.8	95.0	0.9	0.3	1.2	46.4	83.0			

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S55TX-178-91

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-11	QZ1	QZ1 FD3		QZ2 KK2 MI2 FD3	MT1 MI3 KK3
11-25	QZ1	QZ1 FD3		QZ2 KK2 MI2 FD3	MT1 MI3 KK3
25-38	QZ1	QZ1 FD2		QZ2 KK2 MI2 FD3	MT1 MI3 KK3
38-54	QZ1	QZ1 FD2 MI3		QZ2 KK2 MI2 FD3	MT1 KK3 MI3
54-72+	QZ1	QZ1 FD2 MI3		QZ2 KK2 MI2 FD3	MT1 KK3 MI3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT. 2 = 10 - 40 PCT. 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Typic Pellustert; fine, montmorillonitic, hyperthermic.
Soil: Victoria clay.
Soil Nos.: S55TX-178-91; K388-392.
Location: Nueces County, Texas. Four miles southeast of Bishop. Cover: Cultivated field.
Topography: Nearly level.
Sampled by: Harvey Oakes, August 1955.
Described by: Harvey Oakes.

A11 and Ap K388 0 to 11 inches. Very dark gray (10YR 3/1; 2/1, moist) clay; moderate fine and medium granular in the 4-inch plowed layer and compound moderate fine subangular blocky and granular below; crumbly and friable moist, nearly massive and very plastic wet; calcareous; abrupt smooth boundary.

A12 K389 11 to 25 inches. Black (N2/; same moist) clay; moderate fine angular blocky structure; very firm, extremely hard dry; few fine pores; calcareous; gradual smooth boundary.

A13 K390 25 to 38 inches. Dark gray (10YR 4/1; 3/1) clay; weak medium angular blocky structure; very firm; intersecting slickensides; few fine pores; calcareous; gradual wavy boundary.

AC K391 38 to 54 inches. Pale yellow (5Y 7/3; 6/3) clay with few fine faint mottles of light brownish gray; weak coarse angular blocky structure; intersecting slickensides; very firm; calcareous; diffuse wavy boundary.

C K392 54 to 72 inches. Pale yellow (5Y 7/3; 6/3) calcareous clay with few small soft lumps of $CaCO_3$.

SOIL CLASSIFICATION-TYPIC PELLUSTERT
FINE, MONTMORILLONITIC, HYPERTHERMIC
SERIES - - - - - - -VICTORIA

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - $55TX-205-90 COUNTY - - - SAN PATRICIO

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K393-397

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (SAND 2- .05 / .05- .002 / CLAY LT .002)								PARTICLE SIZE ANALYSIS (A) (SAND 2- .05 / .05- .002 / CLAY LT .002)			ATMYLSNS CRSE CLAY .002- .0002	ATMYLSNS FINE CLAY LT .0002	GLYCOL RETAINED LT 2 MM	GLYCOL LT .002 MM	GLYCOL LT .0002 MM	BULK DEN 4A3A
		SAND 2- .05	SILT .05- .002	CLAY LT .002	VCOS 2- 1	CORS 1- .5	MEDS .5- .25	FNES .25- .10	VFNS .10- .05	SAND 2- .05	SILT .05- .002	CLAY LT .002						
IN		PCT LT 2MM								PCT LT .002)			MG/G					G/CC
000-12	A11	16.3	30.4	53.3	0.1	0.3	0.2	6.2	9.5				22	78				
012-26	A12	18.4	28.3	56.3	0.2	0.4	0.2	5.6	9.0				22	78				
026-42	A13	14.0	30.4	55.6	0.5	0.3	0.1	4.6	8.5				22	78				
042-55	ACCA	10.9	34.0	55.1	0.0	0.2	0.1	3.4	7.2				24	76				
055-72	CCA	6.4	41.6	52.0	0.0	0.2	0.1	1.5	4.6				27	73				

DEPTH	ORGANIC MATTER 6A1A ORGN CARB	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	EXCHANGEABLE BASES 5B1B 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 8A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE RATIO SAT 8C2	8D3 CA TO MG	CARB EQ 6E1E PCT	CA 1/1 H2O	PH 1/2 KCL	8C1C 1/2 CACL	8C1E
IN	PCT	PCT		PCT	PCT	MEQ / 100G								PCT						
000-12	1.33					10.7	3.2	1.2		49.1	92A	127A				6.6	8.1			
012-26	1.16					8.7	5.8	1.0		49.2	91A	127A				6.8	8.1			
026-42	0.93					6.5	11.0	1.0		48.9	89A	126A				6.9	8.0			
042-55	0.44					7.5	14.9	1.4		42.0		126A				9.1	7.8			
055-72	0.17					7.7	14.5	1.3		35.9	98A	118A				14.1	7.8			

DEPTH	SATURATED PASTE 8E1 REST OHM-CM	8C1B PH	8A H2O PCT	NA ESP PCT	NA SAR	SALT 8D5 TOTL SOLU PPM	GYP 6F1A PCT	SATURATION EXTRACT 8A1 8A1A EC MMHOS/CM	6N1B CA	6O1B MG	6P1A NA	6Q1A K	6I1A CO3	6J1A HCO3	6K1B CL	6L1A SO4	6M1A NO3	ATTERBERG 4F1 LQID LMIT PCT	4F2 PLST INDX
IN									MEQ / LITER										
000-12			83	6	6	370		0.68	1.4	0.2	5.3	0.1	0.2	2.5	0.7	3.4			
012-26			96	11	10	390		0.88	0.6	0.0	5.7	0.0	0.3	3.2	0.6	1.0			
026-42			152	19	18	1000		1.00	0.6	0.0	9.7	0.0	0.5	2.4	3.0	4.5			
042-55			151	28	24	2200		2.50	1.4	0.2	21.4	0.2	0.4	1.8	11.7	9.9			
055-72			93	20	19	6800		12.50	27.2	6.3	79.4	0.7	0.0	0.9	35.6	74.8			

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) $55TX-205-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-12	QZ1	QZ1 FD3		QZ1 KK2 MI2 FD3	MT1 KK3 MI3
12-26	QZ1	QZ1 FD3		QZ1 KK2 MI2 FD3	MT1 KK3 MI3
26-42	QZ1	QZ1 FD3 MI3		QZ1 KK2 MI2 FD3	MT1 KK3 MI3
42-55	QZ1	QZ1 FD2		QZ1 KK2 MI2 FD3 MT3	MT1 KK3 MI3
55-72	QZ1	QZ1 FD2 MI3 KK3		QZ1 KK2 MT2 MI2 FD3	MT1 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Typic Pellustert; fine, montmorillonitic, hyperthermic.
Soil: Victoria clay.
Soil Nos.: S55TX-205-90; K393-397.
Location: San Patricio County, Texas. Southeast of Sinton 5.2 miles on U.S. Highway 181; south side of road in cultivated field. Cover: Cultivated field
Topography: Nearly level area.
Sampled by: Harvey Oakes, August 1955.
Described by: Harvey Oakes.

A11 and Ap K393 0 to 12 inches. Very dark gray (N3/; N2/ moist) clay; compound moderate fine subangular blocky and granular; nearly massive and very sticky and plastic wet, peds extremely hard dry; calcareous; gradual smooth boundary.

A12 K394 12 to 26 inches. Very dark gray (N3.5/; N2/) clay; moderate fine angular blocky; easily crumbled to a mass of firm peds when slightly moist, extremely hard dry; calcareous; diffuse wavy boundary.

A13 K395 26 to 42 inches. Dark gray (N4/; N3/) clay; weak blocky structure; intersecting slickensides; very firm, extremely hard dry; calcareous; contains a few small hard lumps and concretions of $CaCO_3$; gradual wavy boundary.

AcCa K396 42 to 55 inches. Gray (N4.5/; N3.5) clay mottled with about 30 percent of pale yellow (5Y 7/3, dry) weak coarse angular blocky; intersecting slickensides; very firm; calcareous; contains numerous small soft lumps and hard concretions of $CaCO_3$; clear wavy boundary.

Cca K397 55 to 72 inches. Pale yellow (2.5Y 7/4; 6/4) calcareous clay.

SOIL CLASSIFICATION Typic Pellustert; fine, montmorillonitic, hyperthermic

SOIL Victoria clay LOCATION Nueces County, Texas

SOIL NOS. S56TX-178-3 LAB. NOS. 5032-5039

SOIL SURVEY LABORATORY Lincoln, Nebraska DATE April 2, 1958

GENERAL METHODS 1A, 1B1a, 2A1, 2B

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	TEXTURAL CLASS
0-5	Ap	0.3a	0.4a	0.3a	4.9a	10.1a	32.2	51.8	30.8	15.8	-	c
5-12	A12	0.1a	0.2a	0.2a	4.5a	14.5a	25.0	55.5	28.8	14.7	-	c
12-19	A13	0.1a	0.2a	0.2a	4.5a	14.4a	24.6	56.0	28.1	15.0	-	c
19-29	A14	0.2	0.2	0.2	4.0	13.0	24.6	57.8	25.8	15.4	-	c
29-38	AC1	0.1a	0.2a	0.2a	3.7a	12.5a	25.1	58.2	24.5	16.4	-	c
38-45	AC2	0.2	0.1	0.2	3.4	12.2	25.6	58.3	24.9	15.9	-	c
45-53	C1	-	0.1	0.1	3.1	12.1	25.9	58.7	24.6	16.1	-	c
53-65	C2	0.1a	0.1a	0.1a	3.1a	12.3a	25.8	58.5	24.8	16.0	-	c

	pH 8C1a		ORGANIC MATTER 6A1a	6B1a		8A2	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM 8A1a	6E1a		MOISTURE TENSIONS		4B2
	1:5	1:10	ORGANIC CARBON %	NITROGEN %	C/N	EST% SALT (BUREAU CUP)		$CaCO_3$ equivalent %	GYPSUM me/100g. SOIL	1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
1:1												
7.9	8.0	8.3	1.18	.086	14	<0.20	1.1	5				18.7
7.9	8.3	8.5	1.03	.061	17	<0.20	1.1	6				23.4
7.9	8.5	8.8	0.98	.061	16	<0.20	2.1	6				25.3
7.9	8.5	8.7	0.87	.053	16	0.34	4.0	7				24.6
7.8	8.5	8.9	0.64			0.46	5.1	8				24.6
7.9	8.5	8.8	0.43			0.55	7.0	8				25.2
7.9	8.5	8.8	0.20			0.66	8.6	9				24.4
7.6	8.1	8.3	0.12			0.98	12.0	9				22.4

	EXTRACTABLE CATIONS					5D2	8A1 SATURATION EXTRACT SOLUBLE					8A
5A1a CATION EXCHANGE CAPACITY NH_4Ac	Ca	6C2b Mg	6H1a H	6P2a Na	6Q2a K	EXCH. Na %	6F1a Na	6Q1a K	6J1a HCO_3	6K1a Cl	6L1a SO_4	MOISTURE AT SATURATION %
← milliequivalents per 100g. soil →							← milliequivalents per liter →					
37.1		4.9	-	1.5	1.8	3	4.8	0.2				69.6
38.4		5.8	-	3.3	1.2	7	7.6	0.1				79.9
37.8		6.4	-	5.8	1.2	12	15.3	0.1				90.1
36.8		6.5	-	9.6	1.4	18	29.6	0.1	4.0	25.3	5.2	99.3
36.4		6.8	-	12.4	1.6	22	42.5	0.2				106.0
35.4		6.3	-	13.7	1.7	23	52.9	0.2	3.3	49.6	18.0	105.3
34.2		6.0	-	14.1	1.8	23	58.8	0.2				103.3
33.0		5.5	-	14.2	1.6	18	85.5	0.3	2.1	65.3	65.2	96.2

a. Few shell-like fragments reacting to HCl

Soil classification: Typic Pellustert; fine, montmorillonitic, hyperthermic .
Soil: Victoria clay .
Soil Nos.: S56TX-178-3; 5032-5039 .
Location: Travel west, starting at the railroad intersection in Robstown, for 5.5 miles on the road along the north side of the Texas-Mexican Railway; then go 1.9 miles south and 0.4 mile east; travel 0.5 miles south. The soil is in a field on the Hilpert farm.
Area: Nueces County, Texas.
Cover: None; plowed after preceding crop of grain sorghum.
Parent material: Very pale brown highly calcareous clay of Pleistocene age (Beaumont clay).
Topography: Level; no perceptible slope.
Landscape position: Nearly level or level plain (Coastal terrace); sample from a large flat area of several thousand acres.
Moisture when sampled: Dry through the A horizon; only slightly moist below.
Collected by: J. S. Allen, J. R. Coover, R. E. Daniell, H. C. Dean, G. Darby, G. E. Franki, and H. Oakes.
Described by: H. Oakes, November 8, 1956.

Ap 5032 0 to 5 inches. Very dark gray (10YR 3/1, 2.5/1 moist) clay; moderate fine granular; easily crumbled to fine aggregates when moist; soil naturally separates to very hard fine aggregates on drying after being wet; very sticky and plastic wet; calcareous; abrupt smooth boundary.

A12 5033 5 to 12 inches. Very dark gray (10YR 3/1 dry) clay; weak angular blocky structure in upper 2 inches and moderate to strong fine and very fine angular blocky below; firm; extremely hard dry; few to common fine and very fine pores; calcareous; gradual wavy boundary.

A13 5034 12 to 19 inches. Very dark gray (10YR 3/1 dry) clay; strong fine and very fine angular blocky; peds have glossy surfaces when slightly moist; firm extremely hard dry; few to common fine and very fine pores; slickensides in lower part; calcareous; gradual wavy boundary.

A14 5035 19 to 29 inches. Very dark gray (10YR 3.5/1, 3/1 moist) clay; compound structure of moderate coarse angular blocky parting to medium to fine angular blocky; firm; extremely hard dry; few fine pores; distinct or pronounced intersecting slickensides; calcareous; gradual wavy boundary.

AC1 5036 29 to 38 inches. Very dark gray (10YR 3.5/1 dry) clay with common fine and medium distinct mottles of gray (10YR 5/1 dry) moderate coarse angular blocky with few fine subangular blocks; consistence as above; few fine pores; pronounced intersecting slickensides; calcareous; gradual wavy boundary.

AC2 5037 38 to 45 inches. Finely mottled dark gray (10YR 4/1 dry) and grayish brown (10YR 5/2 dry) clay; weak blocky; firm; extremely hard; few fine pores; few soft lumps of $CaCO_3$ up to 6 mm in diameter; pronounced intersecting slickensides; calcareous; gradual wavy boundary.

C1 5038 45 to 53 inches. Very pale brown (10YR 7/3, 6/3 moist) clay with splotches and streaks of gray; apparently weak blocky; firm; highly calcareous with few soft lumps of $CaCO_3$; no apparent slickensides; diffuse boundary.

C2 5039 53 to 65 inches. Similar to above but contains an estimated 1 to 2 percent by volume of soft lumps of gypsum crystals and few nests of wormcasts of very dark gray.

Remarks: This pedon description and some of the data are published in the soil survey for Nueces County, Texas, issued June 1965; description on page 59, data on pages 56 and 57.

SOIL CLASSIFICATION- TYPIC PELLUSTERT
FINE, MONTMORILLONITTIC, HYPERTHERMIC

SERIES - - - - - - -SERIES NOT DESIGNATED

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S55TX-13-90 COUNTY - - - BEE

GENERAL METHODS- - -1A1,1B1B,2A1,2B SAMPLE NOS. K378-382

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 - SAND											PARTICLE SIZE ANALYSIS (A)		ETHYLENE GLYCOL RETAINED (B)		BULK DEN
		SAND	SILT	CLAY	VCOS	CORS	MEDS	FNES	VFNS	SAND	SILT	CLAY	CRSE CLAY	FINE CLAY	LT	LT	4A3A
		2-	.05-	LT	2-	1-	.5-	.25-	.10-	2-	.05-	LT	.002-	LT	2	.002	.0002
		.05	.002	.002	1	.5	.25	.10	.05	.05	.002	.002	.0002	.0002	MM	MM	MM
IN		PCT LT 2MM											PCT LT.002		MGPG		G/CC
000-11	AP	41.6	18.0	40.4	0.3	2.0	2.2	28.9	11.2				30	70	50.0		
011-22	A12	37.9	18.3	43.8	0.4	2.0	2.0	23.6	9.9				27	73	52.0		
022-40	A13	37.2	19.7	43.1	0.4	2.0	2.1	23.1	9.6				29	71	50.0		
040-55	ACCA	32.1	21.8	46.1									28	72	58.0		
055-72	CCA	35.0	21.1	43.9	0.1	1.3	1.9	22.2	9.5				27	73	61.0		

DEPTH	ORGANIC MATTER 6A1A ORGN CARB	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	EXCHANGEABLE BASES 5B1B 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2	RATIO CA 8D3 CA TO MG	CARB EQ 6E1E	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	MEQ / 100G								PCT		PCT			
000-11	1.39					5.3	1.8	0.7		33.0	82A	124A				4.1	7.9		
011-22	0.81					4.2	5.0	0.5		32.9	84A	126A				7.6	8.2		
022-40	0.64					6.6	10.3	0.7		32.4	86A	121A				7.1	8.1		
040-55	0.29					5.5	11.7	0.8		31.3	94A	117A				7.1	7.8		
055-72	0.17					5.0	11.7	0.9		29.5	99A	129A				9.2	7.8		

DEPTH	SATURATED PASTE 8E1 REST OHM-CM	8C1B PH	8A H2O	NA 5D2 FSP	NA 5E SAR	SALT 8D5 TOTL SOLU PPM	GYP 6F1A	SATURATION EXTRACT 8A1 8A1A EC MMHOS/CM	6N1B CA	6O1B MG	6P1A NA	6Q1A K	6I1A CO3	6J1A HCO3	6K1B CL	6L1A SO4	6M1A NO3	ATTERBERG 4F1 LQID LMIT	4F2 PLST INDX
IN			PCT	PCT			PCT				MEQ / LITER							PCT	
000-11					4			0.67	2.2	0.5	4.4	0.2	0.9	4.5	1.0	1.3			
011-22			85	13	10	470		0.81	0.9	0.2	7.5	0.1	0.9	3.9	1.2	2.7			
022-40			99	24	18	1900		3.20	3.1	1.0	26.1	0.3	0.8	2.6	15.3	12.3			
040-55			72	20	17	5300		12.90	31.8	6.7	76.4	0.7	0.0	1.3	44.6	64.8			
055-72			70	20	19	5300		13.70	28.8	7.1	81.0	1.0	0.0	1.1	52.8	66.4			

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S55TX-13-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-11	QZ1	QZ1 FD3		QZ1 KK3 FD3 MI3	MT1 KK3 MI3
11-22	QZ1	QZ1 FD3		QZ1 FD3 KK3 MI3	MT1
22-40	QZ1	QZ1 FD3 MI3		QZ1 FD3 KK3 MI3	MT1
40-55	QZ1	QZ1 FD3		QZ1 FD3 KK3 MI3	MT1
55-72+	QZ1	QZ1 FD3		QZ1 FD3 KK3 MI3	MT1

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT. 2 = 10 - 40 PCT. 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.
(B) SEE METHODS SECTION FOR ETHYLENE GLYCOL RETENTION METHOD.

Soil classification: Typic Pellustert; fine, montmorillonitic, hyperthermic.
Soil: Series not designated.
Soil Nos.: S55TX-13-90; K378-382.
Location: Bee County, Texas; 1.8 miles northwest of Tynan. Cover: Cultivated area.
Topography: Nearly level. Pedon was described in the thick portion of the A horizon. (Described in micro-pit that was obliterated by cultivation).
Sampled by: Harvey Oakes, August 1955.
Described by: Harvey Oakes.

Ap K378 0 to 11 inches. Very dark gray (10YR 3.5/1; 3/1, moist) clay; weak fine granular in the 4 inch plowed layer; moderate medium granular below; crumbly and friable moist, extremely hard dry; calcareous; gradual boundary.

A12 K379 11 to 22 inches. Clay of same color as above; compound moderate fine and medium subangular and angular blocky structure; firm; peds extremely hard dry; few fine pores; calcareous; gradual wavy boundary.

A13 K380 22 to 40 inches. Dark gray (10YR 4/1; 3/1) clay; structure similar to above but weaker; intersecting slickensides; consistence similar; very few very fine pores; calcareous; clear wavy boundary.

ACca K381 40 to 55 inches. Distinct and coarsely mottled dark gray (10YR 4/1, dry) and light gray (10YR 6/1, dry) clay; weak blocky; intersecting slickensides; firm; no visible pores; calcareous; contains a few fine soft lumps of $CaCO_3$; clear wavy boundary.

Cca K382 55 to 72 inches. Light gray (10YR 7/2; 6/2) calcareous clay containing an estimated 1 to 2 percent by volume of small soft lumps of $CaCO_3$ ranging up to 3 mm in diameter.

Remarks: Pedon was sampled as Victoria clay. It differs from the Victoria series in having less than the lower range of percent clay in the 10 - 40 inch control section.

SOIL CLASSIFICATION Typic Pellustert; very fine, montmorillonitic, hyperthermic

SOIL Series not designated — LOCATION Nueces County, Texas

SOIL NOS. S56TX-178-1 — LAB. NOS. 5018-5024

SOIL SURVEY LABORATORY Lincoln, Nebraska — DATE April 2, 1958

GENERAL METHODS 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in m.m.) (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	Ap	0.2	0.3	0.4	4.4	9.5	28.3	56.9	23.5	18.1	-	c
5-11	A12	0.3a	0.2a	0.3a	3.8a	8.3a	25.8	61.3	20.5	16.9	-	c
11-19	A13	0.1a	0.3a	0.3a	3.9a	8.3a	25.5	61.6	20.5	16.6	-	c
19-28	A14	0.2	0.2	0.3	3.6	8.1	26.6	61.0	20.7	16.9	-	c
28-40	A15	0.2	0.2	0.2	3.0	7.4	26.5	62.5	19.2	17.2	-	c
40-51	AC	0.1	0.1	0.2	2.6	6.9	26.5	63.6	18.1	17.5	-	c
51-67	C	0.1	0.1	0.1	1.9	5.9	27.0	64.9	16.3	18.2	-	c

DEPTH INCHES	pH 8C1a 1:1	1:5	1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	8A2 EST% SALT (PUREAU CUP)	ELECTRICAL CONDUCTIVITY EC x 10^3 MILLIMHOS PER CM. 8A1a	6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
0-5	7.9	8.1	8.4	1.19	.085	14	<0.20	0.7	5				23.8
5-11	7.9	8.2	8.4	1.08	.093	12	<0.20	0.9	5				17.5
11-19	7.9	8.3	8.6	1.01	.068	15	<0.20	1.2	5				26.4
19-28	7.8	8.4	8.7	0.93	.060	16	0.22	2.2	7				28.5
28-40	7.8	8.5	8.7	0.71			0.39	4.5	7				29.2
40-51	7.6	8.4	8.6	0.40			0.55	6.8	8				29.8
51-67	7.6	8.0	8.2	0.12			0.86	12.0	10				27.9

DEPTH INCHES	5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 5B1a Ca	6G2b Mg	6H1a H	6P2a Na	6Q2a K	5D2 EXCH. Na %	8A1 SATURATION EXTRACT SOLUBLE 6P1a Na	6Q1a K	6J1a HCO_3	6K1a Cl	6L1a SO_4	8A MOISTURE AT SATURATION %
	← milliequivalents per 100g. soil →							← milliequivalents per liter →					
0-5	42.9		6.2	-	1.8	1.9	3	4.0	0.1				74.0
5-11	43.0		6.7	-	3.2	1.5	6	6.3	0.1				83.9
11-19	42.8		7.2	-	4.8	1.4	10	8.4	0.1				88.8
19-28	42.3		7.6	-	8.0	1.4	15	16.9	0.1				96.7
28-40	41.5		7.5	-	12.8	1.6	21	37.5	0.1	3.5	29.2	9.3	112.7
40-51	40.3		7.2	-	15.0	1.8	24	50.0	0.2				107.2
51-67	39.5		7.4	-	15.5	1.7	17	87.5	0.3	1.9	60.9	67.2	101.4

a. Few shell fragments

Soil classification: Typic Pellustert; very fine, montmorillonitic, hyperthermic.
Soil: Series not designated.
Soil Nos.: S56TX-178-1; 5018-5024 .
Location: West of junction of alternate Highway 44 and Highway 44 2.3 miles, west edge of Tobstown on Highway 44; thence 1 mile north on county road and 150 yards west in cultivated field.
Area: Nueces County, Texas.
Cover: None; plowed after crop of current year.
Parent material: Pale yellow calcareous clay of Pleistocene age (Beaumont clay).
Topography: Nearly level; gradient of less than 0.5 percent.
Landscape: Flat plain (Coastal terrace).
Moisture when sampled: Dry through the A13; only slightly moist below.
Collected by: J. S. Allen, J. R. Coover, R. E. Daniell, H. C. Dean, G. Darby, G. E. Franki and H. Oakes.
Described by: H. Oakes, November 7, 1956.

Ap 5018 0 to 5 inches. Very dark gray (3.5/0, 3/0 moist) clay; moderate medium and fine granular; nearly massive when wet and very sticky; separates naturally to a mass of very hard peds on drying after wetting; calcareous; abrupt smooth boundary.

A12 5019 5 to 11 inches. Very dark gray (3.5/0 dry) clay; moderate fine and very fine angular blocky structure; the mass is crumbly but peds are firm when moist and extremely hard dry; very sticky and plastic wet; calcareous; gradual wavy boundary.

A13 5020 11 to 19 inches. Very dark gray (3.5/0 dry) clay; structure and consistence similar to horizon above; few very fine pores; peds have glossy surfaces; calcareous; slickensides in lower part; gradual wavy boundary.

A14 5021 19 to 28 inches. Dark gray (4/0, 3/9 moist) clay; moderate medium angular blocky with few moderate medium subangular blocks; all with glossy surfaces; firm; very sticky and plastic wet; few very fine pores; few roots through and between peds; calcareous; pronounced slickensides; gradual wavy boundary.

A15 5022 28 to 40 inches. Coarsely mottled dark gray (4/0, dry) and gray (2.5Y 5/1, dry) clay; weak blocky; firm; few fine pores; few roots between and through peds; highly calcareous; pronounced slickensides; gradual wavy boundary.

AC 5023 40 to 51 inches. Pale yellow (2.5Y 7/3, 6/3) clay; crumbly and friable when moist; contains an estimated 2 percent by volume of soft lumps of gypsum crystals; few vertical streaks or tongues 1/2-inch wide of dark gray that appear to fill root channels or cracks; distinct slickensides; calcareous; gradual wavy boundary.

C 5024 51 to 67 inches. Pale yellow (2.5Y 7/3 dry) highly calcareous clay with few fine faint mottles of yellow; consistence as above; contains an estimated 3 percent by volume of soft lumps of gypsum crystals; weak or faint slickensides.

Remarks: This pedon was sampled as Victoria, and the site was mapped Victoria in soil survey for Nueces County, Texas, issued June 1965. The Victoria series is in the fine, montmorillonitic, hyperthermic family of Typic Pellusterts.

SOIL CLASSIFICATION-UDIC PELLUSTERT
FINE, MONTMORILLONITIC, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION

SERIES - - - - - - -BRANYON

COLLEGE STATION, TEXAS

SOIL NO - - - - - - S54TX-75-90 COUNTY - - - FAYETTE

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K160-165

DEPTH	HORIZON	(- - - - - PARTICLE SIZE ANALYSIS 3A1 - - - - -)								PARTICLE SIZE ANALYSIS (A) (ETHYLENE GLYCOL)						BULK
		(- - - - - - SAND - - - - - -)											CRSE CLAY	FINE CLAY	RETAINED			DEN
		SAND 2- .05 MM	SILT .05- .002 MM	CLAY LT .002 MM	VCOS 2- 1 MM	CORS 1- .5 MM	MEDS .5- .25 MM	FNES .25- .10 MM	VFNS .10- .05 MM	SAND 2- .05 MM	SILT .05- .002 MM	CLAY LT .002 MM	.002- .0002 MM	LT .0002 MM	2 MM	.002 MM	.0002 MM	4A3A
IN		(- - - - - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - - - - -)								(PCT LT.002)					(- - MG/G - -)			G/CC
000-20	A11	19.6	29.8	50.7														
020-42	A12	21.0	29.2	49.9														
042-60	AC1	13.5	30.3	56.2														
060-71	AC2	7.4	32.1	60.6														
071-84	C1	3.3	22.0	74.7														
084-108	C2	2.9	19.0	78.2														

DEPTH	(ORGANIC MATTER)			IRON	PHOS	(- -EXTRACTABLE BASES 5B1A- -)				CAT EXC CAP 5A2A)			BASE SAT	RATIO CA	CARB	(- - - PH - - -)		
	6A1A ORGN CARB	6B1A NITG	C/N	6C3 EXT FE	6S1A TOTL	6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	LT 2 MM	LT .002 MM	LT .0002 MM	5C2	8D3 CA TO MG	CARB EQ 6E1E	8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	(- - - - - - - - MEQ / 100G - - - - - - - -)								PCT		PCT			
000-20	1.77					1.5	0.6	0.5		59.2	96A	104A				14.0	7.8		
020-42	0.75					1.1	2.5	0.4		50.1						19.0	8.1		
042-60	0.41					1.4	5.3	0.5		51.9						24.0	8.0		
060-71	0.15					1.7	7.1	0.6		56.2						25.0	8.0		
071-84	0.08					2.3	9.6	0.6		64.4						20.0	7.9		
084-108	0.05					2.9	10.5	0.6		74.3	92A	102A				17.0	7.8		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A1) S54TX-75-90

DEPTH	SAND	SILT	CLAY	COARSE CLAY	FINE CLAY
INCHES	2 - 0.05MM	0.05 - 0.002MM	LESS THAN 0.002MM	0.002 - 0.0002MM	LT 0.0002MM
0-20		QZ1 FD3 CA3		MT1 KK2 QZ3	MT1
20-42		QZ1 FD3 CA3	MT1 KK3 QZ3		
42-60		QZ1 CA2 FD3	MT1 KK3 QZ3		
60-71		QZ1 CA2 FD3	MT1 KK3 QZ3		
71-84		QZ1 CA2 FD3	MT1 KK3 QZ3		
84-108		QZ1 CA3 FD3		MT1 KK2 QZ3	MT1

RELATIVE ABUNDANCE, 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, CA=CALCITE.

(A) BY CENTRIFUGATION (METHOD 3A1A). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Udic Pellustert; fine, montmorillonitic, thermic.
Soil: Branyon clay .
Soil Nos.: S54TX-75-90; K160-165 .
Location: Fayette County, Texas. South 7.4 miles from intersection of U.S. Highway 77 and State Highway 71 in LaGrange along U.S. Highway 77, at intersection of county crossroad; 100 feet north and 80 feet west from the intersection. Cover: Native area covered by Andropogon grasses.
Parent material: Lagarto clay (Lower Pilocene).
Topography: Weak convex slope with 1 percent gradient. Surface has distinct gilgai microrelief. Sample taken from microdepression.
Sampled by: I. C. Mowery, April 1954.
Described by: I. C. Mowery .

A11 K160 0 to 20 inches. Very dark gray (11Y 3/0.5; 2/0.5 when moist) clay; moderate medium granular, slightly stronger granulation in upper 9 inches; very firm, very hard, extremely sticky and plastic; calcareous; earthworms active; especially in upper part; grass roots abundant; gradual wavy boundary.

A12 K161 20 to 42 inches. Dark gray (10YR 4/0.5; 3/0.5 when moist) clay; weak coarse angular blocky; very firm, very hard, extremely sticky and plastic; distinct intersecting slickensides; the darker upper soil has fallen down cracks making darker streaks in the horizon; calcareous; roots present but less abundant; gradual wavy boundary.

AC1 K162 42 to 60 inches. Gray (10YR 5/0.5; 4/0.5 when moist) clay; weak coarse blocky; very firm, very hard, very sticky; distinct slickensides; dark streaks continue from horizon above; calcareous; few small hard $CaCO_3$ concretions present; gradual smooth boundary.

AC2 K163 60 to 71 inches. Light brownish gray (10YR 6/1.5; 5/1.5 when moist) clay; faintly mottled with pale brown; weak very coarse blocky; very firm, very hard, very sticky; slickensides distinct; small hard $CaCO_3$ concretions more numerous, but not abundant; smooth abrupt boundary.

C1 K164 and C2 K165 71 to 108 inches plus. White (10YR 8/2; 7/2 when moist) clay with common small distinct light reddish brown mottles in upper 12 inches and few below; slightly sticky; very firm; calcareous. Sampled in two increments.

Remarks: This pedon was sampled as Houston Black series. The soil is slightly outside the range of the Houston Black series and is within the range of the Branyon series in that the dark A horizon extends to more than 38 inch depth.

SOIL CLASSIFICATION-UDIC PELLUSTERT
FINE, MONTMORILLONITIC, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SERIES - - - - - - -BRANYON

SOIL NO - - - - - - S54TX-155-90 COUNTY - - - MC LENNAN

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K172-176

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1									PARTICLE SIZE ANALYSIS (A) (ETHYLENE GLYCOL)						BULK
		SAND	SILT	CLAY	SAND						SAND	SILT	CLAY	CRSE CLAY	FINE CLAY	RETAINED	DEN
		2-.05	.05-.002	LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05		2-.05	.05-.002	LT .002	.002-.0002	LT .0002	2 LT MM	.002 LT MM	.0002 LT MM	AA3A
IN		(- - - - - - - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - - - - - - -)									(PCT LT.002)					(- - MG/G - -)			G/CC
000-17	A11																		
017-39	A12	3.5	41.0	55.6															
039-60	A13	4.2	40.8	55.1															
060-70	AC	6.0	41.2	52.9															
070-102	C	8.9	51.4	39.8															

DEPTH	ORGANIC MATTER			IRON	PHOS	(- -EXTRACTABLE BASES 5B1A- -)				(CAT EXC CAP 5A2A)			BASE	RATIO	CA	(- - - PH - - -)		
	6A1A ORGN CARB	6B1A NITG	C/N	6C3 EXT FE	6S1A TOTL	6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	LT 2 MM	LT .002 MM	LT .0002 MM	SAT 5C2	8D3 CA TO MG	CARB FG 6E1E	8C1A 1/1 H20	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	(- - - - - - - - - - MEQ / 100G - - - - - - - - - -)								PCT		PCT			
000-17	2.57						1.6	0.3	0.7		62.7	93A	100A			28.0	7.8		
017-39	1.28						1.1	0.4	0.5		59.6					32.0	7.9		
039-60	0.69						0.6	0.5	0.5		58.6					29.0	7.9		
060-70	0.40						0.5	0.4	0.6		57.1					29.0	7.9		
070-102	0.10						0.3	0.3	0.3		25.2	61A	101A			70.0	8.2		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A10 AND 7A2A) S54TX-155-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-17		QZ1 CA2 FD3		MT1 KK2 MI2 QZ2	MT1
17-39		QZ1 CA2 FD3	MT1 KK3 QZ3 CA3		
39-60		QZ1 CA2 FD3	MT1 KK3 QZ3 CA3		
60-70		QZ1 CA2 FD3	MT1 KK3 QZ3 CA3		
70-102		CA1 QZ2		MT2 KK2 MI2 QZ2	MT1

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT. 2 = 10 - 40 PCT. 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, CA=CALCITE.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Udic Pellustert; fine, montmorillonitic, thermic.
Soil: Branyon silty clay.
Soil Nos.: S54TX-155-90; K172-176.
Location: McLennan County, Texas. On north side of U.S. Highway 84; 1.7 miles west of intersection with State Highway 6 in southwest Waco; 175 feet north of highway and 100 feet east of channel of small branch. Cover: Bermudagrass (pasture).
Parent material: Austin chalk (Cretaceous).
Topography: Concave surface with gradient of 2 percent in upland. Austin soils lie further up the slope.
Sampled by: I. C. Mowery, April 1954.
Described by: I. C. Mowery.

A11 K172 0 to 17 inches. Very dark gray (10YR 3/1; 2/1 when moist) silty clay; strong medium granular; very firm, very hard, extremely sticky; calcareous; slowly permeable; grass roots abundant; much earthworm activity and wormcasts in horizon; gradual smooth boundary.

A12 K173 17 to 39 inches. Dark gray (10YR 4/1; 3/1 when moist) silty clay; weak medium granular and moderate coarse blocky to prismatic; consistence same as above; intersecting slickensides; strongly calcareous; few small $CaCO_3$ concretions; numerous roots, but less abundant than above; gradual smooth boundary.

A13 K174 39 to 60 inches. Dark gray (10YR 4/1; 3/1 when moist) silty clay; moderate coarse blocky; consistence same as above; moderately numerous small hard $CaCO_3$ concretions, few fragments of snail shells; calcareous; a few grass roots present; intersecting slickensides; gradual wavy boundary.

AC K175 60 to 70 inches. Gray (10YR 4.5/1; 3/1 when moist) silty clay with fine specks of yellow material throughout and becoming more numerous in lower part; weak very coarse blocky; consistence same; slickenside surfaces more pronounced; numerous small $CaCO_3$ concretions; occasional roots; clear wavy boundary.

C K176 70 to 102 inches. Mottled white, pale yellow, and yellow silty clay loam; massive; firm, hard, slightly sticky; calcareous; moderately numerous small soft lumps of $CaCO_3$. Hard layer, probably hard chalk, prevented deeper sampling.

Remarks: 1. This pedon was sampled as Houston Black series. The soil is outside the range of the Houston Black series and is within the range of the Branyon series in that the dark A horizon extends to more 38 inches.

2. Textures above agree with laboratory data. Field textures where different are given below:

A11 - clay
A12 - clay
A13 - clay
AC - clay
C - silty clay

SOIL CLASSIFICATION-UDIC PELLUSTERT
FINE, MONTMORILLONITIC, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SERIES - - - - - - -BRAZYON (A)

SOIL NO - - - - - - S57TX-155-90 COUNTY - - - MC LENNAN

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K1526-1532

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (- - SAND - -) SAND 2-.05	SILT .05-.002	CLAY LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	PARTICLE SIZE ANALYSIS (B) SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	(ETHYLENE GLYCOL) RETAINED LT 2 MM	LT .002 MM	( ) LT .0002 MM	BULK DEN 4A3A
		(- - - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - - -)											(PCT LT.002)		(- - MG/G - - -)			G/CC
000-6	AP	7.9	48.0	44.7	0.6	1.1	0.5	3.1	1.8				24	76				
006-13	A11	7.6	44.4	48.0														
013-29	A12	7.4	43.8	48.8														
029-44	A13	5.9	40.1	54.0									16	84				
044-54	A14	8.3	40.8	50.9														
054-64	AC1	8.2	40.7	51.1														
064-72	AC2	5.5	43.9	50.6	0.8	0.9	0.3	2.0	1.2				39	61				

DEPTH IN	6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	6C3 EXT FE PCT	6S1A TOT PCT	6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A LT 2 MM (- - - - - MEQ / 100G - - - - -)	LT .002 MM	LT .0002 MM	BASE SAT SC2 PCT	8D3 CA TO MG	CARB EQ 6E1E PCT	8C1A 1/1 H20	8C1C 1/2 KCL	8C1E 1/2 CACL (- - - PH - - -)
000-6	2.00					1.3	0.2	0.8			53.6	106B	113B			6.0	7.6		
006-13	1.90					1.1	0.3	0.6			52.6					7.0	7.6		
013-29	1.00					1.0	0.7	0.6			54.3					7.0	7.8		
029-44	0.80					1.0	2.7	0.6			52.7	103B	111B			7.0	7.8		
044-54	0.60					1.2	4.3	0.6			54.9					9.0	8.0		
054-64	0.40					1.1	5.3	0.5			42.9					13.0	8.0		
064-72	0.30					1.1	5.3	0.5			43.5	99B	107B			36.0	8.1		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1B AND 2A2A1 S57TX-155-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-6		QZ1 KK3 FD3		MT1 MI2 KK2 QZ3	MT1 KK3
6-13		QZ1 FD3			
13-29		QZ1 MI3 KK3 VR3 FD3			
29-44		QZ1 MI3 KK3 FD3		MT1 MI2 KK2 QZ3	MT1 KK3
44-54		QZ1 MI3 KK3 FD3			
54-64		QZ1 MI3 KK3 FD3			
64-72		QZ1 MI3 KK3 VR3 VM3 FD3		MT1 MM2 MI2 KK2 QZ3	MT1 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT. 2 = 10 - 40 PCT. 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, VR=VERMICULITE, VM=VERMICULITE-ILLITE OR ILLITE-VERMICULITE INTERSTRATIFIED. MM=ILLITE-MONTMORILLONITE INTERSTRATIFIED.

(A) DATA FROM MS THESIS BY LARRY A NELSON - CHEMICAL, MINERALOGICAL AND PHYSICAL PROPERTIES OF THE SAN SABA CLAY, TEXAS A AND M UNIVERSITY, AUGUST 1958.

(B) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Udic Pellustert; fine, montmorillonitic, thermic.
Soil: Branyon silty clay.
Soil Nos.: S57TX-155-90; K1526-1532.
Location: McLennan County, Texas. McGregor Livestock and Forage Research Center, 0.3 mile east of Neff Park Road, along east-west road on south end of farm. Cover: Cultivated; in cotton.
Topography: Nearly level upland, surface slightly convex, less than 1 percent gradient.
Sampled by: L. A. Nelson, C. L. Godfrey, August 7, 1957.
Described by: L. A. Nelson, C. L. Godfrey.

Ap K1526 0 to 6 inches. Dark gray (2.5Y 4/0, moist) silty clay; strong fine granular structure; friable when moist, hard when dry, plastic and sticky when wet; calcareous; numerous roots; occasional small $CaCO_3$ concretions and small chert particles; gradual smooth boundary.

A11 K1527 6 to 13 inches. Very dark gray (2.5Y 3/0, moist) silty clay; moderate fine subangular blocky structure; firm when moist, hard when dry, plastic and sticky when wet; numerous roots; occasional small $CaCO_3$ concretions and small chert particles; gradual smooth boundary.

A12 K1528 13 to 29 inches. Very dark gray (2.5Y 3/0, moist) silty clay; moderate fine angular blocky structure; firm when moist, hard when dry, plastic and sticky when wet; calcareous; occasional roots; occasional small chert particles; gradual wavy boundary.

A13 K1529 29 to 44 inches. Dark gray (2.5Y 4/0, moist) silty clay, moderate medium angular blocky structure; intersecting slickensides; firm, hard, plastic and slightly sticky; calcareous; roots less numerous than in above horizon; occasional small $CaCO_3$ concretions and small chert particles; gradual wavy boundary.

A14 K1530 44 to 54 inches. Dark gray (2.5Y 4/0, moist) silty clay; weak medium angular blocky structure; intersecting slickensides; firm, hard, plastic and sticky; calcareous; numerous $CaCO_3$ spotches and chert particles; gradual wavy boundary.

AC1 K1531 54 to 64 inches. Dark gray (5Y 4/1, moist) silty clay, with common dark brown (10YR 4/3 moist) to brown (10YR 5/3 moist) mottles; weak coarse angular blocky structure; intersecting slickensides; firm, hard, plastic and slightly sticky; calcareous; occasional ferromanganese concretions; diffuse wavy boundary.

AC2 K1532 64 to 72 inches. Yellowish brown (10YR 5/4, moist) to dark grayish brown (10YR 4/2, moist) marly silty clay; weak coarse angular blocky structure; firm, hard, plastic and nonsticky; numerous soft lumps and splotches of $CaCO_3$; occasional black ferromanganese concretions; very dark gray (10YR 3/1, moist); krotovina and partially filled cracks with materials from horizons above.

Remarks: 1. Pedon was sampled as San Saba series. The soil is outside the range of the San Saba series in lacking rock within 40 inch depth. Low chromas of the soil matrix extend to a 64 inch depth, and there are not mottles with chromas of 2 within 54 inches, and is outside the range of the Houston Black series.

2. Textures above agree with laboratory data. Field textures of all horizons were given as clay.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Udic Pellustert; fine, montmorillonitic, thermic

SOIL Burleson clay SOIL Nos. S62TX-43-3 LOCATION Collin County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 17746-17752 May 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1 — Total: Sand (2–0.05) a	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 Clay to Clay f	Fine Clay to Clay f	Coarse fragments 2A2: 3B1 ≥ 2	2 – 19	19 – 76
		Pct. of < 2 mm												Pct.	Pct.	Pct.	Pct. of < 76 mm	
0-6	Ap	23.1	40.7	36.2	tr	0.1	0.2	7.9	14.9	21.3	19.4	43.5	8.2	29	71	-		
6-22	A11	16.9	39.0	44.1	tr	tr	0.2	5.9	10.8	17.3	21.7	33.5	6.1	32	68	-		
22-33	A12	16.1	39.3	44.6	tr	tr	0.2	5.7	10.2	16.5	22.8	31.9	5.9	35	65	-		
33-49	AC1	15.6	38.7	45.7	tr	tr	0.2	5.4	10.0	16.3	22.4	31.3	5.6	29	71	-		
49-64	AC2	14.1	37.6	48.3	tr	0.1	0.1	5.0	8.9	17.9	19.7	31.4	5.2	32	68	tr		
64-78	AC3	14.8	35.5	49.7	0.3	0.3	0.2	4.8	9.2	15.4	20.1	29.0	5.6	32	68	2		
78-96	C1	17.1	33.5	49.4	0.6	0.5	0.3	5.7	10.0	18.9	14.6	34.0	7.1	30	70	7		

Depth (in.)	6A1a Organic carbon b	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe	Carbonate as $CaCO_3$: 6E1b 6E2a < 2mm	3A1a <0.002 mm	Bulk density: 4A1a Field-State	4A1d 1/3-Bar	4A1b Air-Dry	4D1 COLE	Water content: 4B4 Field-State	4B1c 1/3-Bar	4B2 15-Bar	4C1 1/3-to 15-Bar	pH: 8C1b Sat. Paste	8C1a 1:1	8C1a 1:10
	Pct.	Pct.		Pct.	Pct.	Pct.	g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	in./in.			
0-6	1.05	0.079	13	0.5			1.56	1.46	1.79	0.068	16.6	23.3	14.0	0.14	6.0	6.4	6.4
6-22	0.87	0.059	15	0.4			1.56	1.43	1.91	0.101	20.8	26.9	17.8	0.13	5.8	6.3	6.7
22-33	0.83	0.053	16	0.4	tr(s)			1.4c					18.4		6.6	6.6	7.4
33-49	0.61	0.036	17	0.4	tr(s)		1.71	1.42	1.92	0.106	15.8	28.7	18.9	0.14	7.5	7.7	7.8
49-64	0.34	0.020	17	0.5	1	-		1.4c					19.6		7.5	7.6	8.3
64-78	0.18	0.014	13	0.6	1	-		1.4c					19.8		7.6	7.7	8.4
78-96	0.10			1.0	4	-	1.63	1.42	1.92	0.106	19.6	29.5	19.6	0.14	7.7	7.8	8.5

Depth (in.)	Extractable bases 5B1a: 6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum	6H1a Ext. Acidity	Cat. Exch. Cap.: 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	6L1a SO_4	8A1a Electrical conductivity
	meq/100 g								meq/liter								mmho/cm
0-6	23.0	4.3	0.3	0.8	28.4	4.5	26.6	27.4	1.6	0.3	1.0	0.1	-	1.5	0.2	0.3	0.34
6-22	27.0	4.6	1.4	0.6	33.6	4.7	34.8	31.7	1.1	0.1	2.9	tr	-	2.8	-	0.3	0.44
22-33	28.4	4.7	2.6	0.6	36.3	3.6	35.3	32.6	1.2	0.1	4.5	tr	-	2.5	0.7	1.6	0.65
33-49	25.2d	4.3e	3.7	0.7	33.9	1.4	35.3	32.4	3.9	0.5	10.6	0.1	-	3.0	1.5	9.8	1.59
49-64	26.4d	4.2e	4.2	0.8	35.6		35.4	32.5	5.0	0.6	13.7	0.1	-	2.8	2.5	14.9	2.00
64-78	26.2d	4.1e	4.5	0.8	35.6		34.6	31.3	6.1	0.6	15.8	0.1	-	3.0	3.2	18.0	2.23
78-96	24.9d	3.6e	4.5	0.7	33.7		31.2	28.2	6.4	0.7	16.4	0.1	-	2.0	3.7	18.8	2.34

Depth (in.)	8A Water at Saturation	5D1 Exchangeable Na	5C1 Base Sat. NH_4OAc CEC	6F1a Gypsum	Ratios to clay 8D1: NH_4OAc CEC	Ext. Iron	15-Bar Water
	Pct.	Pct.	Pct.	Pct.			
0-6	47.6	1	104		0.76	0.01	0.39
6-22	54.6	3	106		0.72	0.01	0.40
22-33	57.0	6			0.73	0.01	0.41
33-49	62.6	8			0.71	0.01	0.41
49-64	67.5	9			0.67	0.01	0.40
64-78	67.6	10			0.63	0.01	0.40
78-96	64.3	11		tr	0.57	0.02	0.40

a. Fe-Mn nodules comprise more than 50 percent of the very coarse and coarse sand above 64 inches. Below 64 inches carbonate comprises more than 50 percent of the very coarse and coarse sand and 1 to 5 percent of the finer than coarse sand.
b. 16 kg/m^2 to 60 inches (Method 6A).
c. Estimated.
d. KCl-TEA extraction (Method 6N4b).
e. KCl-TEA extraction (Method 6O4b).
f. Soil treated for removal of $CaCO_3$ if present.

Soil classification: Udic Pellustert; fine, montmorillonitic, thermic.
Soil: Burleson clay.
Soil Nos.: S62TX-43-3; 17746-17752.
Location: South 1.3 miles of the northeast corner of Collin County, 1.7 miles east and 100 yards south in cultivated field.
Area: Collin County, Texas.
Cover: Cultivated, cotton.
Parent material: Alluvial clays of Pleistocene Age.
Topography: Broad level plain having less than 1 percent gradient and mostly plane surfaces on an undissected old alluvial plain having upland slopes adjacent and at a higher elevation.
Moisture at sampling: Estimated 75 percent field capacity in upper pedon and becoming drier with depth.
Collected by: J. A. DeMent and R. L. Juve, September 18, 1962.
Described by: M. Stout and W. R. Elder.

Ap 17746 0 to 6 inches. Dark gray (10YR 4/1) clay loam, very dark gray (10YR 3/1) moist; having a crust of light gray (10YR 6/1) light silty clay loam, gray (10YR 5/1) moist, approximately 1/8-to 1/4-inch thick with about 1/2-inch porous material appended to the platy crust; weak blocky structure, mostly cloddy; very hard; very firm; abrupt smooth lower boundary.

A11 17747 6 to 22 inches. Gray (1Y 5/1) clay, nearly black (10YR 2.5/1) moist; weak fine and very fine angular blocky structure, moist; peds are shiny; extremely hard; extremely firm; common to few fine pores; medium acid, pH 6.0; diffuse lower boundary.

A12 17748 22 to 33 inches. Gray (1Y 5/1) clay, nearly black (10YR 2.5/1) moist; moderate fine and medium angular blocky structure with strong intersecting slickensides; peds are shiny, extremely hard; extremely firm; neutral, pH 7.0; diffuse lower boundary.

AC1 17749 33 to 49 inches. Gray (10YR 5/1) clay, dark gray (10YR 4/1) moist; common faint fine yellowish brown mottles; weak to moderate medium and fine angular blocky structure; strong intersecting slickensides of large size; ped surfaces not shiny; extremely hard; extremely firm; about 4 to 8 percent hard grayish $CaCO_3$ concretions, 1/2 to 2 inches in diameter; few filled wormholes; moderately alkaline, noncalcareous in soil matrix, pH 8.0; diffuse lower boundary.

AC2 17750 49 to 64 inches. Grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; with common fine faint olive brown; moderate fine and medium angular blocky structure; moderate intersecting slickensides; extremely hard; extremely firm; common fine and medium $CaCO_3$ concretions and many very fine calcareous grains less than 1 mm; moderately alkaline, noncalcareous in soil matrix, pH 8.0; diffuse lower boundary.

AC3 17751 64 to 78 inches. Light olive brown (2.5Y 5/4) clay, moist and dry; common faint fine mottling of dark grayish brown and brighter light olive brown; moderate medium blocky structure; many ped faces are very shiny; many moderate to strong intersecting coarse slickensides; few gray wormcasts and filled cracks of gray (10YR 5/1); extremely hard; extremely firm; common fine $CaCO_3$ concretions; moderately alkaline, mass mostly noncalcareous; diffuse lower boundary.

C1 17752 78 to 96 inches. Much mottled dark grayish brown (2.5Y 4/2) brownish yellow (10YR 6/6) clay; have other grays, browns, and yellow; strong medium and fine blocky structure; very shiny ped surfaces; occasional coarse slickensides; extremely hard; extremely firm; gray wormcasts and filled wormholes and cracks are distinct and few to common; common $CaCO_3$ concretions and soft masses with many calcareous very fine sand-size particles; moderately alkaline, mass noncalcareous but spots effervesce freely; diffuse boundary.

C2 96 to 120 inches. Much mottled sandy clay or light clay, yellowish browns, yellows, and grays; common gray and white masses of $CaCO_3$; augered.

Remarks: Sample is from the part of pedon where the A horizon is thick (microdepression obliterated by cultivation).

Textures above agree with laboratory data. Field textures where different are given below:

Ap - light clay

Mineralogy Data (Methods 7A1a through 7A1d and 7A2a) S62Tex-43-3

Depth Inches	Sand 2-0.05 mm	Silt 0.05-0.002 mm	Coarse clay 0.002-0.0002 mm	Fine clay < 0.0002 mm
0-6	QZ1	QZ1 MI3 FD3	MT2 MI2 KK2 QZ3	MT1 MI3 KK3
6-22	QZ1	QZ1 MI3 FD3	MT2 MI2 KK2 QZ3	MT1 MI3 KK3
22-33	QZ1 FD3	QZ1 MI3 FD3	MT1 MI2 KK2 QZ3	MT1 MI3 KK3
33-49	QZ1 FD3	QZ1 MI3 KK3 FD3	MT1 MI2 KK2 QZ3 FD3	MT1 MI3 KK3
49-64	QZ1 FD3	QZ1 MI3 KK3 FD3	MT2 MI2 KK2 QZ3 FD3	MT1 MI3 KK3
64-78	QZ1	QZ1 MI2 KK3 FD3	MT1 MI2 KK2 QZ3 FD3	MT1 MI3 KK3
78-96	QZ1	QZ1 MI2 KK3 FD3	MT1 MI2 KK2 QZ3	MT1 MI3 KK3

Relative abundance: 1 = > 40 percent, 2 = 10-40 percent, 3 = < 10 percent.
Mineral code: FD = feldspar, MI = mica or illite, KK = kaolinite, MT = montmorillonite, QZ = quartz.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL CLASSIFICATION: Udic Pellustert; fine, montmorillonitic, thermic

SOIL Burleson clay SOIL Nos. S62TX-43-4 LOCATION Collin County, Texas

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 17753-17759 May 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (In.)	Horizon	Size class and particle diameter (mm) 3A1 — Total Sand (2–0.05) [a]	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: 3B1 ≥ 2 Pct.	2 – 19 Pct. of < 2 mm	19 – 76 Pct. of < 76 mm
		Pct. of < 2 mm																
0-6	Ap	17.6	39.3	43.1	-	0.1	0.2	6.1	11.2	18.0	21.3	34.7	6.4			-		
6-23	A11	15.7	37.5	46.8	-	0.1	0.2	5.6	9.8	16.4	21.1	31.2	5.9			-		
23-38	A12	15.2	35.7	49.1	0.1	tr	0.2	5.2	9.7	15.7	20.0	30.1	5.5			-		
38-49	A13	13.6	34.9	51.5	tr	tr	0.1	4.6	8.9	15.0	19.9	28.1	4.7			-		
49-63	AC1	14.2	34.7	51.1	tr	0.1	0.1	4.7	9.3	14.6	20.1	28.2	4.9			tr		
63-75	AC2	16.2	34.0	49.8	0.1	0.3	0.2	5.6	10.0	14.3	19.7	29.4	6.2			tr		
75-95	C1	16.4	32.6	51.0	tr	0.1	0.2	5.8	10.3	14.1	18.5	29.7	6.1			-		

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N		6E2a Carbonate as $CaCO_3$ Pct		Bulk density g/cc				Water content: Pct.	Water content: Pct.	4B2 15-Bar Pct.			pH: 8C1b Sat. Paste	pH: 8C1a 1:1	pH: 8C1a 1:10
0-6	1.03	0.076	14										16.9			4.9	5.4	5.7
6-23	0.75	0.046	16		-(s)								19.4			5.4	5.9	6.5
23-38	0.66	0.041	16		-(s)								20.0			6.8	6.9	7.1
38-49	0.46	0.027	17		tr(s)								20.5			7.5	7.6	8.0
49-63	0.33	0.017	19		tr(s)								20.0			7.4	7.4	7.5
63-75	0.17	0.012	14		tr(s)								20.3			7.4	7.4	7.6
75-95	0.10				tr(s)								20.2			7.3	7.3	7.3

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 meq/100 g	6H1a Ext. Acidity meq/100 g	Cat. Exch. Cap. 5A2a NaOAc meq/100 g	5A1a 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	6L1a SO_4 meq/liter	8A1a Electrical conductivity mmho/cm
0-6	22.2	7.2	0.7	0.8	30.9	7.6	35.4	30.6	0.7	0.1	1.2	0.1	-	0.5	-	0.7	0.30
6-23	26.9	7.9	1.9	0.5	37.2	5.2	39.1	33.8	0.7	0.1	2.8	tr	-	2.0	-	0.5	0.42
23-38	26.3b	7.4c	3.0	0.6	37.3	2.6	40.0	35.1	3.2	1.3	7.3	tr	-	3.0	0.5	8.3	1.27
38-49		7.6c	3.3	0.7			39.6	35.6	6.2	1.6	11.1	0.1	-	2.5	1.0	15.4	1.80
49-63		7.4c	3.5	0.8			36.4	34.6	23.8	6.2	17.2	0.1	-	2.8	1.5	47.2	3.65
63-75			3.5	0.8			35.1	32.4	25.2	6.3	18.5	0.1	-	2.0	2.7	48.6	3.92
75-95		6.4c	3.5	0.9			34.2	32.3	22.7	5.6	17.8	0.1	-	2.3	2.7	44.7	3.63

Depth (In.)	8A Water at Saturation Pct.	5D1 Exchangeable Na Pct.	5C1 Base Sat. NH_4OAc CEC Pct.	6F1a Gypsum Pct.	Ratios to clay 8D1: NH_4OAc CEC		15-Bar Water
0-6	51.8	2	101		0.71		0.39
6-23	60.0	4	110		0.72		0.41
23-38	66.3	6	106	-	0.71		0.41
38-49	64.9	6		tr	0.69		0.40
49-63	63.9	6		0.2	0.68		0.39
63-75	64.2	6		0.8	0.65		0.41
75-95	67.2	7		0.1	0.63		0.40

a. Fe-Mn nodules comprise a major portion of the very coarse, coarse, and medium sand.
b. KCl-TEA extraction (Method 6N4b).
c. KCl-TEA extraction (Method 6O4b).

Soil classification: Udic Pellustert; fine, montmorillonitic, thermic.
Soil: Burleson clay.
Soil Nos.: S62TX-43-4; 17753-17759.
Location: South 1.3 miles of the northeast corner of Collin County, Texas, 0.5 mile east along gravel road, 75 yards south in cultivated field. Cover: Cultivated, cotton.
Parent material: Alluvial clays of Pleistocene Age.
Topography: Broad level alluvial plain having less than 1 percent gradient and most plane surfaces on an old undissected alluvial plain having upland slope adjacent and at higher elevation.
Moisture at sampling: Upper 36 inches about 75 percent field capacity; lower pedon moist to dry.
Sampled by: J. A. DeMent and R. L. Juve, September 18, 1962.
Described by: M. Stout, W. R. Elder, and H. Oakes.

Ap 17753 0 to 6 inches. Gray (10YR 5/1) clay, very dark gray (10YR 3/1) moist; having a gray (10YR 6/1) crust 1/4 to 3/4 inch thick - thinly laminated in upper 1/4 inch and porous, vesicular pendulent masses beneath; structureless; massive, in places breaking to clods and weak, very fine blocky structure; very hard; very firm; common thin lenses of lighter colored silty and sandy earths; neutral; abrupt lower boundary.

A11 17754 6 to 23 inches. Very dark gray (1Y 3.5/1) clay, nearly black (1Y 2.5/1) moist; moderate fine and medium angular blocky structure; shiny ped surfaces; moderate intersecting slickensides in lower 6 inches; extremely firm; few fine pores; fine to common filled root channels of very dark gray; moderately alkaline, noncalcareous; diffuse lower boundary.

A12 17755 23 to 38 inches. Dark gray (1Y 4/1) clay, very dark gray (1Y 3/1) moist; moderate fine and medium angular blocky structure; shiny ped surfaces; strong intersecting slickensides; extremely hard; extremely firm; common filled cracks, root channels, and wormholes; moderately alkaline; noncalcareous; diffuse lower boundary.

A13 17756 38 to 49 inches. Gray (2.5Y 5/1) clay, dark gray (2.5Y 4/1) moist; moderate and fine angular blocky structure; shiny ped surfaces; intersecting slickensides evident; extremely hard; extremely firm; few to common fine $CaCO_3$ concretions and about 2 to 5 percent fine gypsum crystals; filled cracks and channels as above; moderately alkaline, mass noncalcareous; diffuse lower boundary.

AC1 17757 49 to 63 inches. Grayish brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; common fine faint mottles of olive brown; moderate to strong very fine and medium angular blocky structure; intersecting slickensides evident but less strong; extremely hard; extremely firm; common gypsum crystals as masses and ped coatings; filled cracks are dark gray and more distinct than above; moderately alkaline; noncalcareous; diffuse lower boundary.

AC2 17758 63 to 75 inches. Mottled grayish brown (2.5Y 5/2), olive brown (2.5Y 4/4), and dark grayish brown (2.5Y 4/2) clay; strong fine and medium angular blocky structure; ped surfaces shiny; many moderate coarse slickensides; extremely hard; extremely firm; common to few fine $CaCO_3$ concretions; about 5 to 8 percent gypsum crystals; moderately alkaline, noncalcareous mass; diffuse lower boundary.

C1 17759 75 to 95 inches. Light brownish gray (2.5Y 6/2) clay with about 40 percent coarse distinct mottles of yellowish brown (10YR 5/8); strong medium and fine blocky structure; intersecting slickensides continue; extremely hard; extremely firm; few medium masses of $CaCO_3$; common fine gypsum crystals; moderately alkaline, mostly noncalcareous mass; diffuse lower boundary.

C2 95 to 140 inches. Mottled gray and yellowish brown clay grading to sandy clay; gypsum crystals and $CaCO_3$ concretions and masses continue. Augered.

Remarks: Sample is from part of pedon where A horizon is thick (microdepression obliterated by cultivation).

SOIL CLASSIFICATION-UDIC PELLUSTERT
FINE, MONTMORILLONITIC, THERMIC

SERIES - - - - - - -BURLESON

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S63TX-26-90 COUNTY - - - BURLESON

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K1439-1444

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (- SAND -)								PARTICLE SIZE ANALYSIS (A)			(ETHYLENE GLYCOL) RETAINED			BULK DEN
		2-.05	.05-.002	LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	2 MM	.002 MM	.0002 MM	4A3A
IN		(- - - - - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - - - - -)								(PCT LT.002)			(- - MG/G - - -)				G/CC
000-23	A11	8.8	49.3	41.9									29	71				
023-38	A12	9.0	46.3	44.7									30	70				
038-48	A13	7.6	48.1	44.2									30	70				
048-59	AC	8.1	46.2	45.6									27	73				
059-69	C1	6.3	44.7	49.0									30	70				
069-90	2C2	1.1	32.9	66.1									30	70				

DEPTH	ORGANIC MATTER 6A1A ORGN CARB	6B1A MITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	EXTRACTABLE BASES 5B1A (6N2E) CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A LT 2 MM	LT .002	LT .0002 MM	BASE SAT 5C2	RATIO 8D3 CA TO MG	CA CARB EQ 6E1E	PH 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	(- - - - - - - - - MEQ / 100G - - - - - - - - -)								PCT		PCT			
000-23	1.80					33.8	7.3	0.6	1.6	43.3	54.6	92A	111A	79	4.6		7.0		
023-38	1.30					34.1	8.1	0.6	0.7	43.5	50.9	92A	114A	85	4.2		7.3		
038-48	1.00						8.9	4.1	0.7		56.7	99A	111A			2.0	7.6		
048-59	0.50						9.3	4.6	0.7		56.8	93A	112A			3.0	7.8		
059-69	0.30						9.6	5.2	0.8		52.4	88A	106A			5.0	8.0		
069-90	0.10						9.1	5.3	1.0		49.8	79A	91A			14.0	8.1		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1O AND 7A2A) S63TX-26-90

DEPTH	SAND	SILT	CLAY	COARSE CLAY	FINE CLAY
INCHES	2 - 0.05MM	0.05 - 0.002MM	LESS THAN 0.002MM	0.002 - 0.0002MM	LT 0.0002MM
0-23	QZ1 FD3	QZ1 MI3 FD3		MI1 KK2 MT2 QZ2 FD3	MT1 KK3
23-38	QZ1 FD3	QZ1 MI3 KK3 FD3		MI1 KK2 MT2 QZ2 FD3	MT1
38-48	QZ1 FD3	QZ1 MI3 KK3 FD3		MI1 KK2 MT2 QZ2 FD3	MT1 KK3
48-59	QZ1 FD3	QZ1 MI3 KK3 FD3		MI1 KK2 MT2 QZ2 FD3	MT1 KK3
59-69	QZ1 FD3	QZ1 MI3 KK3 FD3		MI1 KK2 MT2 QZ2 FD3	MT1 KK3
69-90		QZ1 MI2 VR3 KK3 FD3		MI1 KK2 MT2 QZ3	MT1 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, VR=VERMICULITE.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Udic Pellustert; fine, montmorillonitic, thermic.
Soil: Burleson silty clay.
Soil Nos.: S63TX-26-90; K1439-1444.
Location: Burleson County, Texas. East 100 yards of Snook High School building and approximately 50 feet southeast from south corner of yard fence.
Cover: Buffalograss, Texas wintergrass, broomweed.
Topography: Highest and nearly level terrace of the Brazos River; about 0.1 percent gradient; strong gilgai relief.
Drainage: Very slow surface and internal drainage.
Sampled by: Hayward A. Moncrief, June 28, 1963.
Described by: Hayward A. Moncrief.

A11 K1439 0 to 23 inches. Very dark gray (2.5Y 3/1) silty clay; black (2.5Y 2/1) when moist; thin weak platy crust 2 to 3 mm thick on surface; weak granular and strong very fine subangular blocky to 2 inches depth but moderate very fine and fine angular blocky structure below; extremely hard, very plastic and sticky; many fine roots; slightly acid. Diffuse boundary.

A12 K1440 23 to 38 inches. Very dark gray (2.5Y 3/1) silty clay; weak coarse angular blocky structure separating to weak medium angular blocky; few very fine pores; few grass roots; distinct slickensides and evident shear planes; extremely hard; about neutral. Diffuse boundary.

A13 K1441 38 to 48 inches. Dark gray (2.5Y 4/1) silty clay; very dark gray (2.5Y 3/1) when moist; weak coarse angular blocky structure; distinct slickensides; extremely hard; extremely firm; few small $CaCO_3$ concretions in lower part; noncalcareous. Gradual wavy boundary.

AC K1442 48 to 59 inches. Dark gray (2.5Y 4/1) silty clay; no apparent structure; distinct slickensides; extremely hard; few yellowish red mottles in lower part; calcareous; few small $CaCO_3$ concretions. Gradual wavy boundary.

C1 K1443 59 to 69 inches. Olive gray (5Y 5/1) silty clay; dark gray (5Y 4/1) when moist, common medium prominent red mottles; distinct slickensides; extremely hard; calcareous; few small $CaCO_3$ concretions. Gradual boundary.

IIC2 K1444 69 to 90 inches plus. Yellowish red (5YR 4/8) calcareous clay; massive; contains some 2 to 3 percent by volume of small concretions of $CaCO_3$. This is old alluvium much like that underlying Miller clay in the adjacent flood plain.

Remarks: Textures above agree with laboratory data. Field textures where different are given below:

A11 - clay
A12 - clay
A13 - clay
AC - clay
C1 - clay

SOIL CLASSIFICATION-UDIC PELLUSTERT
FINE, MONTMORILLONITIC, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SERIES - - - - - - -HOUSTON BLACK (A)

SOIL NO - - - - - - S53TX-70-1 COUNTY - - - ELLIS

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K140-144

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (- SAND -)								PARTICLE SIZE ANALYSIS (B)					(ETHYLENE GLYCOL)		BULK
		SAND	SILT	CLAY	VCOS	CORS	MEDS	FNES	VFNS	SAND	SILT	CLAY	CRSE CLAY	FINE CLAY	RETAINED		DEN
		2- .05	.05- .002	LT .002	2- 1	1- .5	.5- .25	.25- .10	.10- .05	2- .05	.05- .002	LT .002	.002- .0002	LT .0002	2 MM	.002 MM	.0002 MM	4A3A
IN		PCT LT 2MM								(PCT LT.002)					MG/G		G/CC
000-18	A11	3.9	40.3	55.8	0.4	0.4	0.4	1.0	1.7				22	78			
018-38	A12	3.3	39.3	57.4	0.2	0.4	0.3	0.9	1.5								
038-54	AC1	4.8	39.1	56.1	1.1	1.2	0.5	0.8	1.2								
054-84	AC2	1.6	35.8	62.6	0.1	0.2	0.2	0.4	0.7								
084-180	C1	1.0	35.4	63.6	0.0	0.1	0.1	0.3	0.5				47	53			

DEPTH	(ORGANIC MATTER) 6A1A ORGN CARB	6B1A NITG	C/N	IRON 6C3 EXT FE	PHOS 6S1A TOTL	(- EXTRACTABLE BASES 5B1A -) 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	CAT EXC CAP 5A2A(B) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 CA	RATIO 8D3 CA TO MG	CA CARB EQ 6E1E	(- - - PH - - -) 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	(- - - - - - - - MEQ / 100G - - - - - - - - -)								PCT		PCT			
000-18	0.84	0.053	16								62.7	898	1028			6.0	7.8		
018-38	0.70	0.042	17								60.7					7.0	8.0		
038-54	0.45	0.034	13								56.4					9.0	8.2		
054-84	0.13	0.043	3								39.9					13.0	7.7		
084-180	0.11	0.027	4								38.5	538	798			20.0	7.9		

DEPTH	(SATURATED PASTE) 8E1 REST OHM-CM	8C1B PH	8A H2O	NA 5D2 ESP	NA 5E SAR	SALT 8D5 TOTL SOLU PPM	GYP 6F1A EC MMHOS/CM	(- - - - - - - - - SATURATION EXTRACT 8A1 - - - - - - - - - -) 8A1A CA	6N1B MG	6O1B NA	6P1A K	6Q1A CO3	6I1A HCO3	6J1A CL	6K1B SO4	6L1A NO3	6M1A	AITERBERG 4F1 LQID LMIT	4F2 PLST INDX
IN			PCT	PCT			PCT	(- - - - - - - - - - MEQ / LITER - - - - - - - - - - -)										PCT	
000-18										4.2	0.9	0.8							
018-38										6.8	3.1	0.8							
038-54										9.0	5.5	0.8							
054-84										5.0	6.0	0.4							
084-180										7.8	2.5	0.7							

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S53TX-70-1

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-18		QZ1 FD3		MT2 KK2 MI2 QZ2	MT1
18-38		QZ1 FD3	MT1 QZ2 KK3		
38-54		QZ1 FD3	MT1 QZ2 KK2 MI3		
54-84		QZ1 FD3 MI3	MT1 KK2 QZ2 MI2		
84-180		QZ1 FD3 MI3 CA3		MT1 KK2 MI2 QZ2	MT1 KK3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, CA=CALCITE.

(A) DATA FURNISHED JOINTLY BY SOIL SURVEY INVESTIGATIONS UNIT - SCS, BELTSVILLE, MARYLAND AND TEXAS AGRICULTURAL EXPERIMENT STATION, COLLEGE STATION, TEXAS.

(B) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Udic Pellustert; fine, montmorillonitic, thermic .
Soil: Houston Black clay .
Soil Nos.: S53TX-70-1; K140-144 .
Location: Ellis County, Texas. Northeast edge of Ferris, Texas on the east side of the clay pits of the Ferris Brick Company in a field cultivated for 50 years or more. Cover: Originally tall prairie-grass.
Parent material: Taylor marl.
Topography: Plane; 1 percent gradient.
Sampled by: E.H. Templin and G. W. Kunze.
Described by: E.H. Templin and G. W. Kunze.

A11 K140 0 to 18 inches. Very dark gray (2.5Y 3/1) clay; black (2.5Y 2/1) when moist; moderate fine and very fine angular blocky and granular in surface 4 inches grading to fine angular blocky below; soil mass crumbly, aggregates extremely firm, very sticky and plastic; when wet soil mass is without apparent structure, but crumbles to discrete fine aggregates on drying; moderately alkaline and calcareous; diffuse boundary.

A12 K141 18 to 38 inches. Very dark gray (2.5Y 3/1) clay black (2.5Y 2/1) when moist; moderate fine and medium blocky, crumbly, peds very sticky and plastic; few very fine pores; alkaline and calcareous; diffuse wavy boundary.

AC1 K142 38 to 54 inches. Dark gray (2.5Y 4/1) clay with common medium and coarse distinct mottles or spots of light olive brown and olive; weak coarse blocky; extremely firm; apparent slickensides; few fine pores and many fine to medium (0.2 to 5 mm) concretions of $CaCO_3$; mildly alkaline and calcareous; gradual wavy boundary.

AC2 K143 54 to 84 inches. Light yellowish brown (2.5Y 6/4) clay with many coarse distinct mottles of light brownish gray; weakly laminated or weak coarse platy; extremely firm; few fine concretions of $CaCO_3$; alkaline and calcareous; diffuse boundary.

C1 K144 84 to 180 inches. Coarsely mottled light brownish gray (2.5Y 6/2) and light olive brown (2.5Y 5/4) clay; somewhat shaly with tendency toward conchoidal breakage; some vertical joint planes; extremely hard; alkaline and calcareous. This is partly weathered Taylor marl. Diffuse boundary.

C2 180 to 420 inches. Light gray (2.5Y 7/1) shaly clay with few spots and coarse mottles of olive yellow; few dark threads and films that resemble ferromanganese; weakly laminated with distinct vertical joint planes; extremely hard; mildly alkaline and calcareous; abrupt boundary.

C3 420 to 600 inches. Gray (N5/0) shaly clay of alkaline and calcareous reaction. This is Taylor marl that appears to be unweathered and essentially impervious to water.

SOIL CLASSIFICATION-UDIC PELLUSTERT
FINE, MONTMORILLONITIC, THERMIC
SERIES - - - - - - -HOUSTON BLACK

TEXAS AGRICULTURAL
EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S54TX-14-90 COUNTY - - - BELL

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K177-181

DEPTH IN	HORIZON	(- - - - - PARTICLE SIZE ANALYSIS 3A1 - - - - -) SAND 2-.05	SILT .05-.002	CLAY LT .002	(- - - - - - SAND - - - - - -) VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	PARTICLE SIZE ANALYSIS (A) SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	(ETHYLENE RETAINED LT 2 MM	LT .002 MM	GLYCOL) ( ) LT .0002 MM	BULK DEN 4A3A
		(- - - - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - - -)											(PCT LT.002)		(- - MG/G - - -)			G/CC
000-16	A11	4.4	40.1	55.5														
016-42	A12	4.3	40.6	55.2														
042-66	AC1	4.1	39.4	56.6														
066-88	AC2	4.2	39.5	56.3														
088-110	C	3.3	35.7	61.1														

DEPTH IN	(ORGANIC MATTER 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON 6C3 EXT FE PCT	PHOS 6S1A TOTL PCT	(- -EXTRACTABLE BASES 5B1A- -) 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB	(CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO 8D3 CA TO MG	CA CARB EQ 6E1E PCT	(- - - PH - - -) 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
						(- - - - - - - - - MEQ / 100G - - - - - - - - - -)													
000-16	1.92						1.3	0.2	0.8		58.2	85A	88A			33.0	7.7		
016-42	0.91						0.9	0.4	0.6		52.3					36.0	7.9		
042-66	0.51						0.8	1.4	0.6		48.0					40.0	8.0		
066-88	0.27						0.9	1.8	0.5		40.1					49.0	8.0		
088-110	0.06						1.1	2.0	0.4		32.1	50A	78A			55.0	8.0		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S54TX-14-90

DEPTH INCHES	-----SAND------ 2 - 0.05MM	----------SILT---------- 0.05 - 0.002MM	----------CLAY---------- LESS THAN 0.002MM	-----COARSE CLAY------ 0.002 - 0.0002MM	---FINE CLAY--- LT 0.0002MM
0-16		QZ1 CA2 FD3		MT1 KK2 QZ3	MT1 KK3
16-42		QZ1 CA2 FD3	MT1 KK3 QZ3 CA3		
42-66		QZ1 CA1 FD3	MT1 KK3 QZ3 CA3		
66-88		CA1 QZ1 FD3	MT1 CA3 KK3 QZ3		
88-110+		CA1 QZ2		MT2 KK2 MI2 QZ3	MT1

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, CA=CALCITE.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Udic Pellustert; fine, montmorillonitic, thermic.
Soil: Houston Black clay.
Soil Nos.: S54TX-14-90; K177-181.
Location: Bell County, Texas; 12 miles east of Temple where State Highway 53 makes a right angle turn to the north; 250 feet north of county road and 225 feet east of highway. Cover: Native area covered by good stand of Andropogon grasses.
Parent material: Taylor marl (Cretaceous).
Topography: Upland; convex surface with about 1 percent gradient; distinct gilgai microrelief. Microdepression was sampled.
Sampled by: I. C. Mowery, April 1954.
Described by: I. C. Mowery.

A11 K177 0 to 16 inches. Dark gray (10YR 4/1; 3/1 when moist) clay; moderate to strong medium granular and moderate fine subangular blocky; very firm, very hard, extremely sticky; slowly permeable; calcareous; grass roots abundant; earthworms very active in upper part; gradual wavy boundary.

A12 K178 16 to 42 inches. Gray (10YR 5/1; 4/1 when moist) clay; moderate medium and fine angular blocky structure; consistence same as above; distinct intersecting slickensides; calcareous; fragments of snail shells scattered throughout horizon; grass roots numerous, but less abundant than above; gradual wavy boundary.

AC1 K179 42 to 66 inches. Gray (10YR 5/1; 4/1 when moist) clay with fine yellow specks of parent material scattered throughout the horizon, but are more numerous in lower part; weak very coarse blocky; consistence same as above; intersecting slickensides very distinct and occur at about 45 degree angles; calcareous; few fine $CaCO_3$ concretions and small fragments of snail shells; grass roots present, but much less abundant than above; gradual wavy boundary.

AC2 K180 66 to 88 inches. This is a transition layer, gradually changing from the gray clay layer in the upper part to the mottled gray and yellow marl horizon below, with the amount of unweathered marl increasing with depth in the horizon; calcareous; weak very coarse, angular blocky structure with distinct intersecting slickensides; gradual smooth boundary.

C K181 88 to 110 inches plus. Mottled white, pale yellow, and yellow marl; when exposed and dry it has moderate angular blocky structure; very firm, very hard, slightly sticky; calcareous.

SOIL CLASSIFICATION- UDIC PELLUSTERT
FINE, MONTMORILLONITIC, THERMIC

TEXAS AGRICULTURAL EXPERIMENT STATION

SERIES - - - - - - -SERIES NOT DESIGNATED

COLLEGE STATION, TEXAS

SOIL NO - - - - - - - S54TX-74-90 COUNTY - - - FANNIN

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K209-213

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (SAND)									PARTICLE SIZE ANALYSIS (A) (ETHYLENE GLYCOL)						BULK
		SAND 2-.05	SILT .05-.002	CLAY LT .002	VCOS 2-1	CORS 1-.5	MEDS .5-.25	FNES .25-.10	VFNS .10-.05	SAND 2-.05	SILT .05-.002	CLAY LT .002	CRSE CLAY .002-.0002	FINE CLAY LT .0002	RETAINED 2 MM	LT .002 MM	LT .0002 MM	DEN 4A3A
IN		(- - - - - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - - - - -)									(PCT LT.002)				(- - MG/G - - -)			G/CC
000-18	A11	2.0	30.1	68.0														
018-35	A12	3.0	28.9	68.1														
035-57	AC	4.6	34.5	61.0														
057-72	C1	5.0	36.3	58.8														
072-90	C2	3.8	36.1	60.2														

DEPTH	ORGANIC MATTER 6A1A ORGN CARB	6B1A NITG	C/N	IRON PHOS 6C3 EXT FE	6S1A TOTL	(- -EXTRACTABLE BASES 5B1A- -) CA	MG	NA	K	SUM EXTB	CAT EXC CAP 5A2A) LT 2 MM	LT .002 MM	LT .0002 MM	BASE RATIO SAT 5C2	CA TO MG	CARB EQ 6E1E	CA (- - - PH - - -) 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
IN	PCT	PCT		PCT	PCT	(- - - - - - - - - MEQ / 100G - - - - - - - - -)								%		PCT			
000-18	4.85					1.2	0.3	0.8			77.1	82A	83A			5.0	7.6		
018-35	2.57					0.7	0.4	0.6			68.5					8.0	7.7		
035-57	0.72					0.7	0.5	0.6			50.9					27.0	8.0		
057-72	0.24					0.8	0.6	0.6			40.8					44.0	8.0		
072-90	0.15					1.0	0.7	0.4			32.4	45A	74A			49.0	8.1		

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S54TX-74-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-18		QZ1 FD2 MI3 KK3		MT2 KK2 MI2 QZ2	MT1 KK2 QZ3
18-35		QZ1 FD2 MI3	MT1 KK2 QZ2		
35-57		QZ1 CA2 MI3 FD3 KK3	MT1 KK2 QZ2 MI3 CA3		
57-72		CA1 QZ1 MI3 FD3 KK3	MT1 KK2 CA2 QZ2		
72-90+		CA1 QZ2 MI3 KK3		MT2 KK2 MI2 QZ2	MT1 KK2 QZ3

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT. 2 = 10 - 40 PCT. 3 = LESS THAN 10 PCT.

MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, CA=CALCITE.

(A) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Udic Pellustert; fine, montmorillonitic; thermic .
Soil: Series not designated .
Soil Nos.: S54TX-74-90; K209-213 .
Location: Fannin County, Texas. East 18 miles of Bonham; 3 miles east of Honey Grove and 0.7 mile north of U.S. Highway 82; 100 feet west of county road and 50 feet south of field. Cover: Native area covered by good stand of Andropogon grasses.
Parent material: Taylor marl (Cretaceous).
Topography: Convex surface with gradient of 1 percent. Surface has distinct gilgai microrelief. Sample was taken from microdepression.
Sampled by: I. C. Mowery, April 1954 .
Described by: I. C. Mowery.

A11 K209 0 to 18 inches. Black (10YR 2/1; 2/0.5 when moist) clay; strong medium granular; very firm, very hard, extremely sticky; calcareous; numerous grass roots; some wormcasts; gradual smooth boundary.

A12 K210 18 to 35 inches. Black (10YR 2/1; 2/0.5 when moist) clay, consistence same as layer above; weak coarse granular to moderate coarse blocky; distinct intersecting slickensides; grass roots less abundant than above; calcareous; gradual wavy boundary.

AC K211 35 to 57 inches. Dark gray (5Y 4/1.5; 3/1.5 when moist) clay; same consistence as horizons above; coarse angular blocky; strongly calcareous; numerous fine, hard $CaCO_3$ concretions; slickensides are distinct; gradual wavy boundary.

C1 K212 57 to 72 inches. Mottled olive (5Y 5/3; 4/3 when moist) and light olive gray (5Y 6/2; 5/2 when moist) heavy clay mixed with pale yellow, white and yellow porous chalky clay which is more friable; massive; strongly calcareous; high percent of disseminated $CaCO_3$; gradual wavy boundary.

C2 K213 72 to 90 inches. Mottled yellow, pale yellow and white clay, containing some 40 percent of $CaCO_3$ disseminated and in soft lumps; massive; firm.

Remarks: Pedon was sampled as Houston Black series. The soil is outside the range of the Houston Black series in that the clay fraction is greater than 60 percent in the 10 to 40 inch control section.

Note : the high content of organic matter.

SOIL CLASSIFICATION Udic Pellustert: fine, montmorillonitic, thermic

SOIL Series not designated LOCATION Collin County, Texas

SOIL NOS. S56TX-43-1 LAB. NOS. 4965-4973

SOIL SURVEY LABORATORY Lincoln, Nebraska DATE April 1, 1958

GENERAL METHODS 1A, 1B1a, 2A1, 2B

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	
0-6	Ap	0.1	0.3	0.2	1.0	2.8	43.6	52.0	24.2	22.9	-	sic
6-14	A12	0.1	0.1	0.1	0.7	2.3	40.3	56.4	22.3	20.8	-	sic
14-24	A13	-	0.1	0.1	0.7	2.6	39.5	57.0	22.9	19.7	-	c
24-33	A14	0.1	0.4	0.3	1.0	3.0	41.1	54.1	24.1	20.7	-	sic
33-43	A15	0.3	0.4	0.2	1.1	2.9	41.2	53.9	23.8	21.1	-	sic
43-49	AC1ca	0.6	0.7	0.4	0.9	2.8	40.2	54.4	21.8	21.8	-	sic
49-55	AC2ca	0.7	0.6	0.3	0.8	1.7	46.3	49.6	9.9	38.7	-	sic
55-62	C1	0.1	0.2	0.2	0.8	2.3	46.6	49.8	9.5	40.0	-	sic
62-74+	C2	0.4	0.4	0.4	1.1	2.9	44.7	50.1	9.7	38.7	-	sic

	pH 8C1a		ORGANIC MATTER			8A2	ELECTRICAL CONDUCTIVITY 6E1a			MOISTURE TENSIONS		
			6A1a	6B1a		EST% SALT (BUREAU CUP)		CaCO3 equivalent	GYPSUM me./100g. SOIL	1/10 ATMOS.	1/3 ATMOS.	4B2 15 ATMOS.
1:1	1:5	1:10	ORGANIC CARBON %	NITROGEN %	C/N		EC x 10³ MILLIMHOS PER CM 8A1a	%		%	%	%
7.6	7.6	7.8	1.64	.110	15	<0.20	0.8	3				23.8
7.5	7.6	7.8	1.66	.104	16	<0.20	0.6	1				27.9
7.5	7.6	7.8	1.78	.102	17	<0.20	0.6	1				28.5
7.5	7.6	7.9	1.38			<0.20	0.6	2				28.6
7.5	7.7	7.9	1.24			<0.20	0.5	2				28.3
7.6	7.8	7.9	0.98			<0.20	0.5	5				26.9
7.7	8.0	8.2	0.29			<0.20	0.5	51				17.8
7.8	8.1	8.4	0.13			<0.20	0.5	59				16.8
8.1	8.1	8.4	0.10			<0.20	0.5	64				16.7

5A1a	EXTRACTABLE CATIONS 5B1a				5D2	8A1 SATURATION EXTRACT SOLUBLE					8A
CATION EXCHANGE CAPACITY NH_4Ac	6O2b	6H1a	6P2a	6Q2a		6P1a	6Q1a				MOISTURE AT SATURATION
	Ca	Mg	H	Na	K	EXCH. Na %	Na	K				
← milliequivalents per 100g. soil →						← milliequivalents per liter →						
53.8		1.8	0.4	0.1	1.3	-	0.2	0.1				84.5
57.0		1.4	-	0.1	1.1	-	0.2	-				96.4
56.5		1.0		0.1	1.1	-	0.2	-				96.0
55.7		0.9		0.1	1.1	-	0.2	-				95.0
54.9		0.8		0.1	1.1	-	0.2	-				97.2
53.6		0.6		0.1	1.0	-	0.2	-				89.3
31.7		0.2		0.1	0.6	-	0.3	-				74.3
26.5		0.4		0.1	0.4	-	0.3	-				74.1
24.4		0.3		0.1	0.4	-	0.4	-				75.3

Soil classification: Udic Pellustert; fine, montmorillonitic, thermic.
Soil: Series not designated.
Soil Nos.: S56TX-43-1; 4965-4973.
Location: West 9.1 miles of McKinney on Highway 24; thence 150 yards south on county road and 50 yards east of road in cultivated field.
Area: Collin County, Texas.
Cover: None; plowed; cropped to cotton, oats, corn, grain sorghums.
Parent material: Friable highly calcareous clay (commonly called chalky marl) containing some 20 percent by volume of soft lumps of segregated $CaCO_3$.
Topography: Plane, gentle slope with gradient of about 1.5 percent.
Landscape position: Gently sloping wide erosional divide in moderately dissected plain.
Moisture when sampled: Almost air dry in the upper 4 horizons and only very slightly moist below.
Collected by: J. S. Allen, J. R. Coover, R. E. Daniell, H. C. Dean, G. Darby, G. E. Franki, and H. Oakes.
Described by: H. Oakes, October 1956.

Ap 4965 0 to 6 inches. Very dark gray (10YR 3/1, 2/1 moist) silty clay; compound moderate fine subangular blocky and granular structure; crumbly and friable when slightly moist; separates naturally to a mass of fine very hard aggregates on drying; very sticky and plastic when wet; noncalcareous[1/] but pH 8.0 by field test.

A12 4966 6 to 14 inches. Very dark gray (10YR 2.5/1, 2/1) silty clay; moderate to strong fine and very fine angular blocky structure; the upper 2 inches is somewhat compacted due to tillage, and structure is weak angular blocky; very firm; extremely hard dry and very sticky and plastic wet; few fine pores; noncalcareous; pH 8.0 by field test.

A13 4967 14 to 24 inches. Same color clay as above; structure is strong fine and very fine angular blocky; peds have shiny (glossy) pressure surfaces; common fine pores; the mass as well as the fine peds is extremely hard dry; noncalcareous; pH 8.0 by field test.

A14 4968 24 to 33 inches. Same color silty clay as above; structure is compound moderate coarse blocky and fine angular blocky; common fine pores; very firm; very plastic; few soft lumps of $CaCO_3$ about 1/4 inch in diameter; noncalcareous in matrix.

A15 4969 33 to 43 inches. Very dark gray (10YR 2.5/1, 2/1) silty clay of same structure and consistence as above; common fine pores; weakly effervescent; contains soft lumps of $CaCO_3$ up to 1/2 inch in diameter that comprise an estimated 3 to 5 percent by volume of the soil mass.

AC1ca 4970 43 to 49 inches. Dark gray (10YR 3.5/1, 3/1) silty clay; compound coarse blocky and moderate fine and fine angular blocky structure; common fine pores; very firm; distinct large slickensides; strongly effervescent; contains an estimated 5 to 8 percent by volume of the soft lumps of $CaCO_3$. Slickensides probably occur in the overlying horizons and in the AC2 but are not apparent at this moisture content.

AC2ca 4971 49 to 55 inches. Dark grayish brown (2.5Y 3.5/2, 3/2) silty clay that grades to light brownish gray (2.5Y 6/2, 5/2) in lower part; moderate coarse and fine angular blocky structure; very firm; slickensides not apparent; strongly effervescent; contains an estimated 15 percent by volume of the soft lumps of $CaCO_3$. Remains of plant roots in all of the above horizons but none in the C1.

C1 4972 55 to 62 inches. Mottled light brownish gray (2.5Y 6/2 dry) and light yellowish brown (2.5Y 6/4 dry) light silty clay; friable; strongly effervescent; contains an estimated 20 percent or more by volume of soft lumps of $CaCO_3$.

C2 4973 62 to 74 inches plus. Thin bedded weakly indurated white chalk and light yellowish brown and light olive brown friable highly calcareous silty clay that appears to be sandy, due probably to the high content of fine particles of chalk.

1/ Same as noneffervescent with hydrochloric acid.

Remarks: Deep cracking when extremely dry, a surface mulch of fine granules and subangular to angular blocks, and natural slacking to fine very hard aggregates - mainly angular blocks - of all horizons after wetting and drying on exposure are characteristic. This pedon was sampled as Houston Black. The location appears as Houston Black on the soil map in the soil survey of Collin County, Texas, published in 1930.

Textures above agree with laboratory data. Field textures where different are given below:

Ap - clay
A12 - clay
A14 - clay
A15 - clay
AC1ca - clay
AC2ca - clay
C1 - clay
C2 - clay

SOIL CLASSIFICATION Udic Pellustert; fine, montmorillonitic, thermic

SOIL Series not designated LOCATION Collin County, Texas

SOIL NOS. S56TX-43-2 LAB. NOS. 4974-4981

SOIL SURVEY LABORATORY Lincoln, Nebraska DATE April 1, 1958

GENERAL METHODS 1A, 1B1a, 2A1, 2B

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 (<19mm.)	TEXTURAL CLASS
0-6	Ap	-	0.2	0.2	0.6	2.8	40.0	56.2	21.3	21.9	-	sic
6-13	A12	-	0.1	0.1	0.6	2.1	37.1	60.0	20.8	18.8	-	c
13-24	A13	-	0.1	0.1	0.6	2.1	35.9	61.2	19.3	19.1	-	c
24-32	A14	0.1	0.1	0.1	0.6	2.5	36.6	60.0	20.2	19.3	-	c
32-40	AC	0.3	0.4	0.2	0.9	2.5	36.9	58.8	20.1	19.9	-	c
40-45	ACca	0.1	0.2	0.1	0.6	2.3	37.4	59.3	16.5	23.6	-	c
45-50	C ca	0.1	0.2	0.1	0.9	4.2	50.7	43.8	14.3	41.3	67 a/	sic
50-62+	R	-	0.2	0.2	1.5	5.6	50.8	41.7	16.5	41.1	89 a/	sic

DEPTH INCHES	pH 8C1a 1:1	1:5	1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C'N	8A2 EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC x 10³ MILLIMHOS PER CM 8A1a	6E1a $CaCO_3$ equivalent %	GYPSUM m.e./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
0-6	7.7	7.7	7.8	1.79	.117	15	0.21	0.7	2				27.3
6-13	7.5	7.6	7.7	1.68	.098	17	<0.20	0.6	1				29.4
13-24	7.4	7.6	7.7	1.47	.093	16	<0.20	0.6	1				30.3
24-32	7.4	7.6	7.7	1.35			<0.20	0.5	1				30.2
32-40	7.4	7.7	7.9	1.22			<0.20	0.5	3				29.6
40-45	7.8	7.9	8.1	0.69			<0.20	0.5	22				24.5
45-50	7.9	8.0	8.3	0.31					60				15.0
50-62+	7.9	8.0	8.3	0.26					63				14.6

DEPTH INCHES	5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 5B1a Ca	6G2b Mg	6H1a H	6F2a Na	6G2a K	5D2 EXCH. Na %	8A1 SATURATION EXTRACT SOLUBLE 6P1a Na	6Q1a K	8A MOISTURE AT SATURATION %
	← milliequivalents per 100g. soil →							← milliequivalents per liter →		
0-6	56.8		1.8	2.0	0.1	1.4	-	0.2	0.1	88.2
6-13	58.0		1.2	1.2	0.1	1.3	-	0.2	0.1	96.1
13-24	57.2		1.9		0.1	1.3	-	0.2	0.1	99.3
24-32	57.1		1.8		0.1	1.3	-	0.2	0.1	100.5
32-40	55.0		1.6		0.1	1.3	-	0.2	0.1	98.8
40-45	44.7		1.5		0.1	1.0	-	0.2	0.1	89.4
45-50	23.1		0.7		0.1	0.5				
50-62+	20.4		0.9		0.1	0.4				

a/ Rock-like fragments slaked after soaking in H_2O. (>2?).

Soil classification: Udic Pellustert; fine, montmorillonitic, thermic.
Soil: Series not designated.
Soil Nos.: S56TX-43-2; 4974-4981.
Location: West 4.0 miles of the intersection of Highway 75 on Highway 24; thence 5.3 miles north and west on FM Road 1461 and 60 yards north of road in cultivated field. Photo DBK-3-89.
Area: Collin County, Texas.
Cover: None; plowed; cropped to corn during current year.
Parent material: White weakly indurated chalk (Austin chalk).
Topography: Nearly level; gradient of about 0.5 percent.
Landscape position: Flat divide in a wide erosional plain with moderate dissection. Sample from an area of some 100 acres or more with like topography.
Moisture when sampled: Almost air dry in upper 5 horizons and only slightly moist below.
Collected by: J. S. Allen, J. R. Coover, R. E. Daniell, H. C. Dean, G. Darby, G. E. Franki, and H. Oakes.
Described by: H. Oakes, October 1956.

Ap 4974 0 to 6 inches. Very dark gray (10YR 3/1, 2/1 moist) silty clay; moderate fine granular; crumbly and friable when slightly moist; very sticky and plastic wet; on drying after wetting, the soil separates naturally to a mass of fine very hard granules; weakly effervescent.

A12 4975 6 to 13 inches. Very dark gray (10YR 2.5/1, 2/1) clay; moderate fine angular blocky structure, the upper 2 inches are almost massive due to compaction by tillage; extremely hard dry; very sticky and plastic wet; noncalcareous but pH 8.0 by field test.

A13 4976 13 to 24 inches. Clay of same color as above; compound weak to moderate blocky and moderate to strong fine angular blocky; few fine pores; contains a few wormcasts; very firm; extremely hard dry; noncalcareous but pH 8.0 by field test.

A14 4977 24 to 32 inches. Very dark gray (10YR 2.5/1, 2/1) clay; compound moderate coarse blocky and moderate to strong fine angular blocky; same consistence as above; weakly effervescent in lower part; few fine soft lumps of $CaCO_3$.

AC 4978 32 to 40 inches. Dark gray (10YR 3.5/1, 3/1.5) clay; structure and consistence as above; contains an estimated 3 to 5 percent by volume of soft lumps of $CaCO_3$ up to 5 mm in diameter; strongly effervescent.

ACca 4979 40 to 45 inches. Very dark grayish brown (2.5Y 3/2, 2/2) clay; weak blocky with distinct large slickensides; more crumbly and less firm than above layer; contains an estimated 3 to 5 percent by volume of the soft lumps of $CaCO_3$; strongly effervescent. Few roots and partly decomposed remains of roots in all of above horizons.

Cca 4980 45 to 50 inches. Mottled pale olive (5Y 6/3 dry) and olive yellow (2.5Y 6/6 dry) soft friable chalky earth probably of silty clay texture; contains some 20 percent by volume of soft lumps of $CaCO_3$ ranging up to 2 inches in diameter.

R 4981 50 to 62 inches plus. White (2.5Y 8/2, 8/3 moist) weakly indurated chalk that is thin bedded in the upper part with very dark gray staining on parting planes.

Remarks: Pedon is from the microdepression of the original weak gilgai microrelief. On the opposite side of the pit from which sample was collected, the soil is calcareous from the surface down and is very dark grayish brown (10YR 3/2 dry) to a depth of 36 inches with a thin transition to the Cca horizon which begins at 40 inches. This pedon was sampled as Houston Black. The location appears as Houston Black on the soil survey for Collin County, Texas, published in 1930.

Textures above agree with laboratory data. Field textures where different are given below:

Ap - clay
Cca - clay

SOIL CLASSIFICATION Udic Pellustert; fine, montmorillonitic, thermic

SOIL Series not designated LOCATION Collin County, Texas

SOIL NOS. S56TX-43-4 LAB. NOS. 4989-4995

SOIL SURVEY LABORATORY Lincoln, Nebraska DATE April 2, 1958

GENERAL METHODS 1A, 1B1a, 2A1, 2B

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	TEXTURAL CLASS
0-5	Ap	0.3	0.4	0.2	0.6	1.5	40.5	56.5	16.8	25.6	-	sic
5-17	A12	0.1	0.4	0.2	0.5	1.3	37.6	59.9	15.0	24.2	-	c
17-27	A13	0.1	0.3	0.2	0.5	1.2	38.0	59.7	15.2	24.3	-	c
27-37	A14	0.1	0.3	0.2	0.5	1.3	38.4	59.2	15.0	25.0	-	c
37-50	A15ca	0.5	0.6	0.3	0.5	0.9	36.7	60.5	12.4	25.5	-	c
50-62	ACca	0.4	0.4	0.2	0.5	1.0	37.7	59.8	12.7	26.3	-	c
62-67	C	0.5	0.3	0.1	0.3	1.0	38.9	58.9	10.4	29.7	-	c

	pH 8C1a		ORGANIC MATTER 6A1a	6B1a		8A2	ELECTRICAL CONDUCTIVITY EC x 10³ MILLIMHOS PER CM 8A1a	6E1a		MOISTURE TENSIONS		4B2
1:1	1:5	1:10	ORGANIC CARBON %	NITROGEN %	C/N	EST% SALT (BUREAU CUP)		$CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
7.6	7.7	7.7	1.35	.094	14	<0.20	0.8	6				22.5
7.7	7.7	8.0	1.09	.068	16	<0.20	0.6	5				25.1
7.7	7.7	8.1	0.92	.057	16	<0.20	0.6	6				24.8
7.9	8.1	8.2	0.79			<0.20	0.6	8				24.2
7.9	8.2	8.4	0.48			<0.20	0.7	11				24.1
7.7	8.1	8.3	0.36			<0.20	1.3	10				23.9
7.5	7.7	7.9	0.18			0.36	3.7	18				22.0

5A1a	EXTRACTABLE CATIONS 5B1a					5D2	8A1 SATURATION EXTRACT SOLUBLE					8A
CATION EXCHANGE CAPACITY NH_4Ac	Ca	6G2b Mg	6H1a H	6P2a Na	6Q2a K	EXCH. Na %	6P1a Na	6Q1a K				MOISTURE AT SATURATION %
← milliequivalents per 100g. soil →							← milliequivalents per liter →					
47.4		2.0	-	0.1	1.4	-	0.4	0.2				77.5
50.1		1.5	-	0.3	1.1	-	0.7	0.1				86.2
48.4		1.7		0.9	1.0	1	1.8	0.1				92.7
47.7		2.0		1.7	1.0	3	3.0	-				88.0
47.6		2.6		2.5	0.9	4	3.9	-				89.8
46.5		2.9		3.5	0.9	6	7.2	0.1				88.1
38.8		2.5		3.6	0.8	6	15.8	0.1				88.4

Soil classification: Udic Pellustert; fine, montmorillonitic, thermic.
Soil: Series not designated.
Soil Nos.: S56TX-43-4; 4989-4995.
Location: South 1.7 miles of Princeton on blacktop road to curve from east to south; thence 250 yards north on field road and 20 yards east of fence.
Area: Collin County, Texas.
Cover: None; plowed after preceding crop of onions.
Parent material: Mottled olive yellow and pale olive calcareous clay (marl of the Upper Cretaceous).
Topography: Nearly level; gradient of less than 0.5 percent.
Landscape position: Near edge of a nearly level narrow erosional divide in a dissected plain. Sample from a nearly level area of several hundred acres.
Moisture when sampled: Nearly air dry; only slightly moist in the lower part.
Collected by: J. S. Allen, J. R. Coover, R. E. Daniell, H. C. Dean, G. Darby, G. E. Franki, and H. Oakes.
Described by: H. Oakes, October 1956.

Ap 4989 0 to 5 inches. Dark gray (5Y 4/1, 3/1 moist) silty clay; moderate fine granular and fine blocky; when dry the soil is a loose mass of very hard aggregates; very sticky and plastic wet; highly calcareous.

A12 4990 5 to 17 inches. Dark gray (N 4.5/0, 3/0) clay; moderate to strong fine angular blocky structure; the upper 3 inches is nearly massive due to the compaction by tillage; extremely hard dry; when slightly moist the soil is easily crumbled to a mass of fine firm peds; common very fine pores; highly calcareous.

A13 4991 17 to 27 inches. Dark gray (5Y 3.5/1, 3/1) clay; moderate coarse blocky; the larger peds readily separate to fine firm angular blocks with glossy surfaces when slightly moist; very sticky and plastic wet; few very fine pores; distinct slickensides; highly calcareous.

A14 4992 27 to 37 inches. Dark gray (5Y 3.5/1, 3/1) clay of similar, but weaker, structure to that above; very firm; few very fine pores; few small soft particles of $CaCO_3$ in lower part; calcareous; slickensides more pronounced than in horizon above.

A15ca 4993 37 to 50 inches. Dark gray (5Y 4/1, 3/1) clay with few fine prominent olive yellow mottles; compound moderate coarse blocky and moderate fine angular blocky structure; very firm; calcareous; contains an estimated 3 percent by volume of soft lumps of $CaCO_3$ ranging up to 1/2 inch in diameter.

ACca 4994 50 to 62 inches. Gray (5Y 5/1, 3.5/1) clay with many fine faint mottles of olive and few coarse prominent mottles of olive yellow; very firm; apparently weak blocky; few fine pores; highly calcareous; contains a few soft lumps of $CaCO_3$ and of salts, probably $CaSO_4$; distinct slickensides.

C 4995 62 to 67 inches. Mottled olive yellow (2.5Y 6/6 dry) and olive (5Y 5/3 dry) clay; highly calcareous with an occasional small soft lump of $CaCO_3$.

Remarks: A few fine dark shot-like concretions, probably of ferromanganese, occur in all horizons.

This pedon was sampled as Houston Black. The location appears as Houston Black on the soil map with the soil survey of Collin County, Texas, published in 1930.

Textures above agree with laboratory data. Field textures where different are given below:

Ap - clay

SOIL CLASSIFICATION Udic Pellustert; fine, montmorillonitic, thermic

SOIL Series not designated LOCATION Denton County, Texas

SOIL NOS. S56TX-61-1 LAB. NOS. 4996-5001

SOIL SURVEY LABORATORY Lincoln, Nebraska DATE April 2, 1958

GENERAL METHODS 1A, 1B1a, 2A1, 2B

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 (<19mm.)	TEXTURAL CLASS
0-6	Ap	0.8	0.5	0.4	2.0	3.7	34.8	57.8	20.2	19.7	1	c
6-18	A11	0.8	0.6	0.4	2.0	3.7	34.6	57.9	20.3	19.4	3	c
18-29	A12	0.9	0.6	0.4	1.9	3.6	33.8	58.8	19.6	19.1	3	c
29-39	AC	1.5	0.6	0.5	1.7	3.3	34.2	58.2	19.5	19.3	tr	c
39-46	ACcs	1.8	0.6	0.4	1.3	2.6	33.1	60.2	17.6	19.1	4	c
46-59	Ccs	2.2	0.5	0.3	1.1	2.7	33.5	59.7	17.9	19.2	4	c

	pH 8C1a		ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	8A2 EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC×10³ MILLIMHOS PER CM 8A1a	6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
1:1	1:5	1:10										
7.8	7.9	8.0	1.34	.091	14.7	<0.20	0.7	2				23.7
7.9	8.2	8.5	0.98	.066	14.8	<0.20	0.8	3				24.2
8.2	8.4	8.7	0.90	.059	15.2	<0.20	1.2	3				25.3
8.1	8.5	8.7	0.83			0.24	2.6	3				26.7
7.5	7.7	8.0	0.60			0.62	6.5	5				25.8
7.5	7.7	7.9	0.40			0.62	6.6	4				25.7

5A1a	EXTRACTABLE CATIONS 5B1a					5D2	8A1 SATURATION EXTRACT SOLUBLE					8A
CATION EXCHANGE CAPACITY NH_4Ac	Ca	6O2b Mg	6H1a H	6P1a Na	6Q1a K	EXCH. Na %	6P2a Na	6Q2a K	6J1a HCO_3	6K1a Cl	6L1a SO_4	MOISTURE AT SATURATION %
← milliequivalents per 100g. soil →							← milliequivalents per liter →					
49.2		3.2	-	1.3	1.3	2	2.5	0.1				83.0
47.0		3.9	-	3.2	0.9	6	4.9	-				78.6
46.3		4.0		7.4	0.9	14	8.6	-				86.4
45.4		4.5		11.3	0.8	21	18.8	-				98.7
43.6		4.8		11.5	0.9	17	44.2	0.1	2.6	5.6	72.6	95.8
39.9				10.9	0.8	17	45.8	0.1				87.8

Soil classification: Udic Pellustert; fine, montmorillonitic, thermic.
Soil: Series not designated.
Soil Nos.: S56TX-61-1; 4996-5001.
Location: West 0.4 mile of the Collin-Denton County line on Highway 24 and 20 yards north of road in field.
Area: Denton County, Texas.
Parent material: Mottled olive gray and olive slightly calcareous clay of Pleistocene or Cretaceous age.
Cover: None; plowed after preceding crop.
Topography: Nearly level; gradient of less than 0.5 percent.
Landscape position: Outer edge of a wide high old Pleistocene terrace that lies some 40 to 60 feet below the surrounding plain (Blackland Prairie).
Moisture when sampled: Almost air dry in the upper part and only slightly moist below.
Collected by: J. S. Allen, J. R. Coover, R. E. Daniell, H. C. Dean, G. Darby, G. E. Franki, and H. Oakes.
Described by: H. Oakes, October 1956.

Ap 4996 0 to 6 inches. Very dark gray (5Y 3/1, 2/1 moist) clay; thin gray surface crust when dry; moderate fine granular with few fine blocks; after wetting, the soil dries to a mass of small extremely hard angular peds composed of a mass of tightly held fine very hard granules; slightly calcareous.

A11 4997 6 to 18 inches. Very dark gray (5Y 3.5/1, 3/1) clay; moderate medium angular blocky with few fine blocks; very firm; extremely hard dry; few very fine pores; slightly calcareous; contains an estimated 1 to 2 percent by volume of smooth flat and rounded pebbles of cherty limestone ranging from 3 to 15 mm in diameter.

A12 4998 18 to 29 inches. Very dark gray (5Y 3.5/1, dry) clay; structure and consistence similar to above; very few very fine pores; slightly calcareous; few small soft lumps of $CaCO_3$ in lower part; pebbles of about same quantity and size as in horizon above; distinct slickensides at 45-degree angle to ground surface.

AC 4999 29 to 39 inches. Dark olive gray (5Y 3.5/2, 3/2) clay; moderate medium angular blocky; very firm; extremely hard dry; very few very fine pores; slightly calcareous; contains an estimated 2 to 3 percent by volume of soft lumps of $CaCO_3$ up to 10 mm in diameter and 1 to 2 percent by volume of cherty limestone pebbles; slickensides less pronounced than above.

ACcs 5000 39 to 46 inches. Olive gray (5Y 4/2, 3/2) clay with common fine distinct mottles of olive; apparently massive; very firm; no pores; slightly calcareous with an estimated 3 to 5 percent by volume of soft lumps of $CaCO_3$ and few gypsum crystals; pronounced slickensides.

Ccs 5001 46 to 59 inches. Finely mottled dark gray (5Y 4/1, dry) and olive (5Y 5/3, dry) clay; apparently massive; very firm; slightly calcareous; contains numerous soft lumps of salt crystals, probably gypsum.

SOIL CLASSIFICATION- UDIC PELLUSTERT
~~FINE, MONTMORILLONITIC, THERMIC~~
SERIES - - - - - - -SERIES NOT DESIGNATED (A)

TEXAS AGRICULTURAL EXPERIMENT STATION
COLLEGE STATION, TEXAS

SOIL NO - - - - - - S57TX-61-90 COUNTY - - - DENTON

GENERAL METHODS- - -1A2,1B1B,2A1,2B SAMPLE NOS. K1513-1519

DEPTH IN	HORIZON	PARTICLE SIZE ANALYSIS 3A1 (- - - - - - SAND - - - - - -) SAND 2- .05 MM	SILT .05- .002 MM	CLAY LT .002 MM	SAND VCOS 2- 1 MM	SAND CORS 1- .5 MM	SAND MEDS .5- .25 MM	SAND FNES .25- .10 MM	SAND VFNS .10- .05 MM	PARTICLE SIZE ANALYSIS (B) SAND 2- .05 MM	SILT .05- .002 MM	CLAY LT .002 MM	(ETHYLENE GLYCOL) CRSE CLAY .002- .0002 MM	FINE CLAY LT .0002 MM	RETAINED 2 MM	LT .002 MM	LT .0002 MM	BULK DEN 4A3A G/CC
		(- - - - - - - - - - - - - - - - PCT LT 2MM - - - - - - - - - - - - - - - -)											(PCT LT.002)		(- - MG/G - - -)			
000-5	AP	5.7	45.7	48.6	0.3	0.4	0.2	2.7	2.1				28	72				
005-15	A11	5.9	43.6	50.5														
015-28	A12	8.0	46.9	45.1														
028-35	AC1	7.9	42.5	49.6														
035-54	AC2	5.8	42.7	51.5									19	81				
054-64	AC3	12.1	50.4	37.5	2.7	2.3	0.7	3.0	2.4				31	69				
064-72	R																	

DEPTH IN	ORGANIC MATTER 6A1A ORGN CARB PCT	6B1A NITG PCT	C/N	IRON PHOS 6C3 EXT FE PCT	6S1A TOTL PCT	EXTRACTABLE BASES 5B1A- 6N2E CA	6O2D MG	6P1A NA	6Q2A K	SUM EXTB (- - - - - - - - MEQ / 100G - - - - - - - -)	CAT EXC CAP 5A2A1 LT 2 MM	LT .002 MM	LT .0002 MM	BASE SAT 5C2 PCT	RATIO CA TO MG	CARB EQ 6E1E PCT	CA (- - - PH - - -) 8C1A 1/1 H2O	8C1C 1/2 KCL	8C1E 1/2 CACL
000-5	1.60					3.2	0.8	0.7		46.9	81B	107B				3.0	7.2		
005-15	1.50					3.4	2.4	0.5		48.3						2.0	7.5		
015-28	1.20					3.6	5.9	0.6		47.7						3.0	7.8		
028-35	0.80					3.0	8.5	0.5		46.7						5.0	7.9		
035-54	0.60					3.1	11.5	0.6		46.5	80B	107B				8.0	8.0		
054-64	0.20					2.0	7.3	0.4		28.0	71B	77B				48.0	8.1		
064-72																			

MINERALOGY DATA - (METHODS 7A1A THROUGH 7A1D AND 7A2A) S57TX-61-90

DEPTH INCHES	SAND 2 - 0.05MM	SILT 0.05 - 0.002MM	CLAY LESS THAN 0.002MM	COARSE CLAY 0.002 - 0.0002MM	FINE CLAY LT 0.0002MM
0-5	QZ1	QZ1 MI3 KK3 FD3		MT2 KK2 MI2 QZ3	MT1 KK3 MI3
5-15	QZ1	QZ1 MI3 KK3 FD3			
15-28	QZ1 FD3	QZ1 FD3			
28-35	QZ1	QZ1 MI3 KK3 FD3			
35-54	QZ1 FD3	QZ1 MI3 KK3 FD3		MT2 KK2 MI2 QZ3 FD3	MT1 KK3 MI3
54-64	QZ1	QZ1 MI2 KK2 FD3		KK1 MT2 MI2 MN3 QZ3	MT1 KK2 MI3
64-72		QZ1 MI2 KK2 FD3			

RELATIVE ABUNDANCE. 1 = GREATER THAN 40 PCT, 2 = 10 - 40 PCT, 3 = LESS THAN 10 PCT.
MINERAL CODE. FD=FELDSPAR, MI=MICA OR ILLITE, KK=KAOLINITE, MT=MONTMORILLONITE, QZ=QUARTZ, MN=ILLITE-MONTMORILLONITE INTERSTRATIFIED.

(A) DATA FROM MS THESIS BY LARRY A NELSON - CHEMICAL, MINERALOGICAL AND PHYSICAL PROTERTIES OF THE SAN SABA CLAY, TEXAS A AND M UNIVERSITY, AUGUST 1958.
(B) BY CENTRIFUGATION (METHOD 3A1B). CARBONATES REMOVED PRIOR TO ANALYSIS.

Soil classification: Udic Pellustert; fine, montmorillonitic, thermic.
Soil: Series not designated.
Soil Nos.: S57TX-61-90; K1513-1519.
Location: Denton County, Texas. West 3.2 miles of railroad overpass in State Highway 24 (the overpass is 2.8 miles west of Denton); approximately 40 feet north from line of telephone poles on south side of field. Cover: Cultivated; plowed oat stubble.
Topography: Nearly level upland, 1 to 2 percent gradient.
Sampled by: L. A. Nelson, C. L. Godfrey, August 6, 1957.
Described by: L. A. Nelson, C. L. Godfrey.

Ap K1513 0 to 5 inches. Dark gray (2.5Y 4/1) silty clay; very dark gray (2.5Y 3/1) when moist; moderate very fine irregular angular blocky and granular structure; crumbly; peds extremely hard; very plastic when wet; moderately alkaline and calcareous; few small $CaCO_3$ concretions; abrupt smooth boundary.

A11 K1514 5 to 15 inches. Very dark gray (2.5Y 3/1) silty clay; black (2.5Y 2/1) when moist; moderate very fine blocky; crumbly, very plastic and nearly massive when wet; alkaline and calcareous; few small $CaCO_3$ concretions; diffuse smooth boundary.

A12 K1515 15 to 28 inches. Very dark gray (2.5Y 3/1) silty clay; moderate fine angular blocky in upper part but grading to weak coarse blocky in lower part; intersecting slickensides; extremely firm, very plastic; calcareous; few small $CaCO_3$ concretions; diffuse wavy boundary.

AC1 K1516 28 to 35 inches. Dark gray (5YR 4/1) silty clay with few fine faint mottles of olive; very dark gray (5Y 3/1) when moist; coarse angular blocky parting to weak medium angular blocky; cracks evident; intersecting slickensides; extremely hard and extremely firm; calcareous; common small concretions of $CaCO_3$ in lower part; diffuse wavy boundary.

AC2 K1517 35 to 54 inches. Gray (5Y 5/1) silty clay with common medium distinct mottles of pale olive; weak coarse blocky; evident shear planes and intersecting slickensides; extremely hard; calcareous; numerous small concretions of $CaCO_3$ and few fine particles of limestone; gradual wavy boundary.

AC3 K1518 54 to 64 inches. Yellowish brown (2.5Y 5/4) silty clay loam mottled with olive yellow and pale olive, mottles comprise some 20 to 30 percent of the mass; thin partly weathered platy fragments of limestone that becomes more numerous with depth; few weakly to strongly cemented concretions of ferromanganese; calcareous; numerous small particles of limestone and $CaCO_3$ concretions throughout; abrupt wavy boundary.

R K1519 64 inches plus. Not sampled: Thin-bedded limestone--the upper or surface 1/4-inch is soft and chalky but is crystalline and unweathered below.

Remarks: 1. Pedon was sampled as San Saba series. The soil is outside the range of the San Saba series being deeper than 40 inches over the limestone. There is no known series for this soil. (It differs from Houston Black series in having limestone at 64 inch depth. The Houston Black series in underlain by clayey marl.)

2. Textures above agree with laboratory data. Field textures where different are given below:

Ap - clay
A11 - clay
A12 - clay
AC1 - clay
AC2 - clay
AC3 - clay

SOIL CLASSIFICATION Udic Pellustert; very fine, montmorillonitic, thermic

SOIL Series not designated LOCATION Collin County, Texas

SOIL NOS. S56TX-43-3 LAB. NOS. 4982-4988

SOIL SURVEY LABORATORY Lincoln, Nebraska DATE April 2, 1958

GENERAL METHODS 1A, 1B1a, 2A1, 2B

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in m.m.) (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	Ap	0.2	0.3	0.2	0.5	0.9	36.6	61.3	12.1	25.7	-	c
5-11	A12	0.2	0.3	0.2	0.2	0.9	33.5	64.7	9.3	25.2	-	c
11-19	A13	0.1	0.3	0.2	0.2	0.9	33.3	65.0	8.7	25.6	-	c
19-31	A14	0.2	0,3	0.2	0.2	1.0	32.6	65.5	8.6	25.1	-	c
31-43	AC1	0.2	0.4	0.2	0.2	0.9	32.6	65.5	8.6	25.0	-	c
43-53	AC2	0.4	0.4	0.2	0.I	1.0	32.9	65.0	8.3	25.6	-	c
53-65	AC3	0.6	0.5	0.2	0.3	0.9	33.9	63.6	9.0	26.0	-	c

pH 8C1a 1:1	pH 1:5	8C1a 1:10	ORGANIC MATTER 6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N	8A2 EST% SALT (BUREAU CUP)	ELECTRICAL CONDUCTIVITY EC x10³ MILLIMHOS PER CM @ 25°C	6E1a $CaCO_3$ equivalent %	GYPSUM me./100g. SOIL	MOISTURE TENSIONS 1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
7.6	7.8	8.0	1.50	.097	16	<0.20	0.8	11				22.9
7.6	7.8	8.0	1.15	.077	15	<0.20	0.5	12				25.2
7.6	7.9	8.1	0.96	.056	17	<0.20	0.5	14				24.8
7.6	7.9	8.1	0.79	.050	16	<0.20	0,5	16				24.5
7.7	7.7	8.2	0.71			<0.20	0.6	17				24.2
7.6	7.9	8.1	0.67			<0.20	0.7	19				23.6
7.7	8.0	8.3	0.54			<0.20	0.7	19				23.0

5A1a CATION EXCHANGE CAPACITY NH_4Ac	EXTRACTABLE CATIONS 5B1a Ca	6G2b Mg	6H1a H	6P2a Na	6Q2a K	5D2 EXCH. Na %	8A1 SATURATION EXTRACT SOLUBLE 6P1a Na	6Q1a K	8A MOISTURE AT SATURATION %
← milliequivalents per 100g. soil →							← milliequivalents per liter →		
48.4		2.4	-	0.1	1.7	-	0.3	0.2	84.7
49.3		1.8	-	0.1	1.4	-	0.3	0.1	91.7
47.5		1.3		0.2	1.0	-	0.4	0.1	88.8
46.4		1.8		0.3	1.1	-	0.8	0.1	84.2
45.8		1.6		0.7	1.0	1	1.5	0.1	85.4
44.9		2.0		1.1	0.9	2	2.3	-	82.5
44.1		2.1		1.4	0.9	3	2.8	-	84.1

Soil classification: Udic Pellustert; very fine, montmorillonitic, thermic.
Soil: Series not designated.
Soil Nos.: S56TX-43-3; 4982-4988.
Location: East 0.6 mile of Princeton on Highway 24; thence 40 yards north of road in cultivated field.
Area: Collin County, Texas.
Cover: None; plowed after crop of current year.
Parent material: Mottled pale olive and olive calcareous clay (marl of Upper Cretaceous).
Topography: Nearly level, less than 0.5 percent gradient.
Landscape position: Near the edge of a wide erosional divide in a moderately dissected plain.
Moisture when sampled: Nearly air dry in upper part and only slightly moist in lower part.
Collected by: J. S. Allen, J. R. Coover, R. E. Daniell, H. C. Dean, G. Darby, G. E. Franki, and H. Oakes.
Described by: H. Oakes, October, 1956.

Ap 4982 0 to 5 inches. Dark gray (5Y 3.5/1, 3/1 moist) clay; moderate fine granular and fine blocky; this layer when dry is a mass of loose fine very hard aggregates; very sticky and plastic wet; highly calcareous.

A12 4983 5 to 11 inches. Dark gray (5Y 4/1, 3/1) clay; moderate to strong fine angular blocky structure; extremely hard dry; easily crumbled to a mass of fine firm aggregates when slightly moist; common fine and very fine pores; highly calcareous.

A13 4984 11 to 19 inches. Dark gray (5Y 4/1, 3/1) clay; strong fine angular blocky structure; very sticky and plastic; easily crumbled to a mass of fine firm aggregates with glossy surfaces when slightly moist; common fine and very fine pores; highly calcareous.

A14 4985 19 to 31 inches. Dark gray (5Y 4/1, 3/1) clay; compound moderate coarse blocky and fine angular blocky structure; very firm; numerous fine hard particles and soft lumps 2 to 3 mm in diameter of $CaCO_3$; distinct large slickensides; highly calcareous.

AC1 4986 31 to 43 inches. Very dark gray (5Y 3.5/1, 3/2) clay; same consistence as above; structure is similar but weaker; content of hard particles and soft lumps of $CaCO_3$ about same as above; slickensides are more distinct than above.

AC2 4987 43 to 53 inches. Mottled olive gray (5Y 4/2, 3.5/2) and olive (5Y 5/3, 4/3) clay; moderate medium and fine angular blocky structure; peds have glossy surface but apparently have no colloidal coating; very firm; highly calcareous; contains an estimated 1 to 2 percent by volume of soft lumps of $CaCO_3$ 2 to 4 mm in diameter; distinct slickensides.

AC3 4988 53 to 65 inches. Mottled olive gray and olive (5Y 4/2 dry and 5Y 5/3 dry) clay grading to olive mottled with gray in lower part; structure and consistence similar to that above; contains an estimated 2 to 3 percent by volume of the soft lumps of $CaCO_3$; distinct slickensides; highly calcareous. A few small shot-like concretions probably of ferromanganese occur in all horizons but are more numerous in the AC horizons.

C 68 inches. Mottled olive yellow (5Y 6/6 dry) and pale olive (5Y 6/3 dry); highly calcareous clay (marl).

Remarks: This pedon was sampled as Houston Black. The location appears as Houston Black on the soil map with the soil survey of Collin County, Texas, published in 1930.

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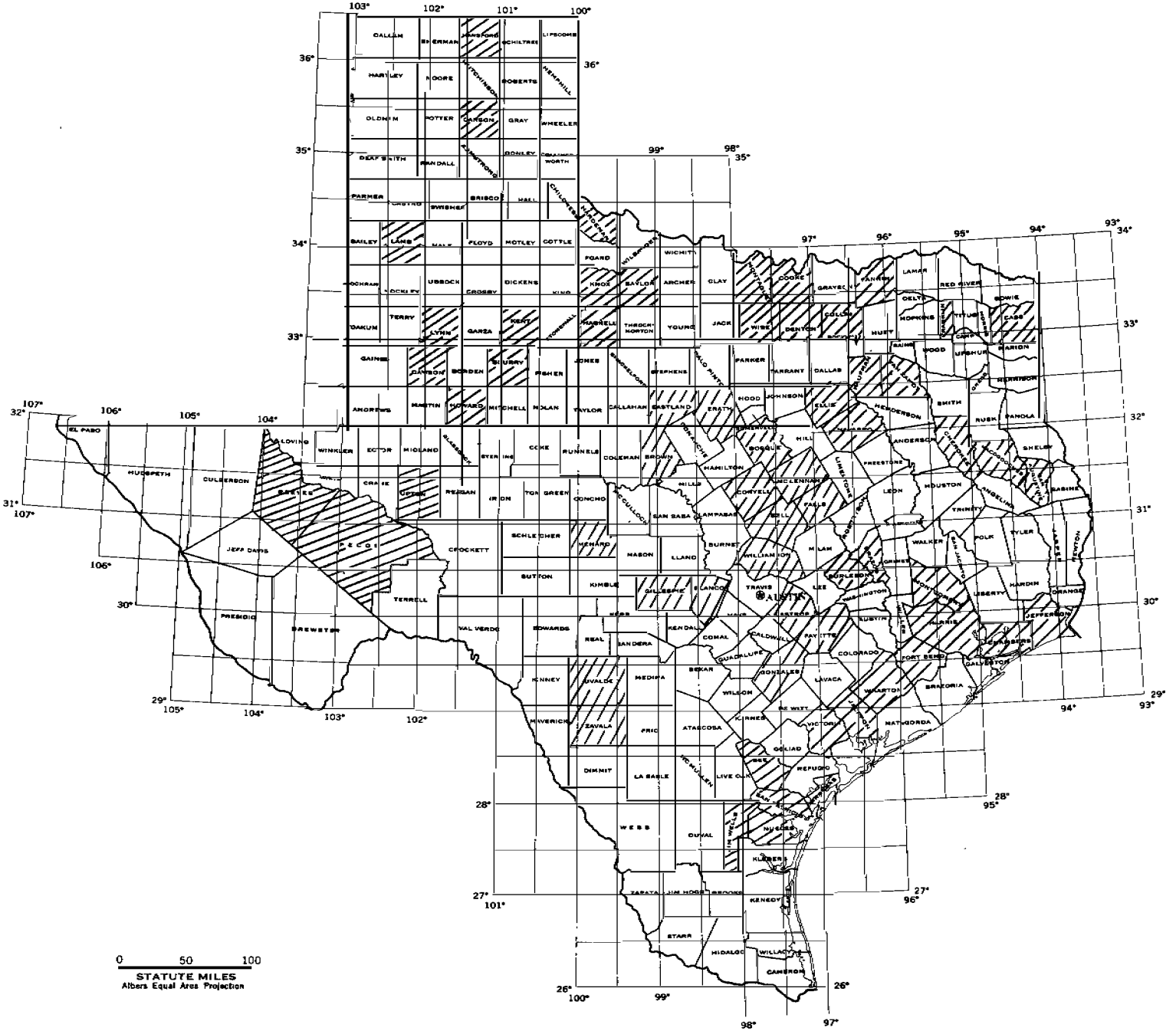
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