



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

... WISCONSIN

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

Soil Survey Investigations Report No. 17

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

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September 1967

SOIL CONSERVATION SERVICE U.S. DEPARTMENT OF AGRICULTURE
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1. SAMPLE COLLECTION AND PREPARATION
 - A. Field sampling
 1. Site selection
 2. Soil sampling
 - a. Stony 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

tr(s): trace, detectable only by qualitative procedure more sensitive than quantitative procedure used

: analysis run but none detected

-(s): none detected by sensitive qualitative test

blank: analysis not run

nd: analysis not run

<: less than reported amount or none present
 3. PARTICLE-SIZE ANALYSES
 - A. <2-mm fraction (pipet method)
 1. Airdry samples
 - a. Carbonate and noncarbonate clay
 2. Moist samples
 - a. Carbonate and noncarbonate clay
 - B. >2-mm fraction
 1. 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
 2. Paraffin-coated clods
 - a. Ovendry
 3. Cores
 - a. Field moist
 4. Nonpolar-liquid-saturated clods
 - B. Water retention
 1. Pressure-plate extraction (1/3 or 1/10 bar)
 - a. Sieved samples
 - b. Soil pieces
 - c. Natural clods
 - d. Cores
 2. Pressure-membrane extraction (15 bars)
 3. Sand table absorption
 4. Field state
 5. Airdry
 - C. Water-retention difference
 1. 1/3 bar to 15 bars
 2. 1/10 bar to 15 bars
 - D. Coefficient of linear extensibility
 1. Dry to moist
 - E. Micromorphology
 1. Thin sections
 - a. Preparation
 - b. Interpretation
 - c. Moved-clay percentage
 5. ION-EXCHANGE PROPERTIES
 - A. Cation-exchange capacity
 1. NH_4OAc , pH 7.0
 - a. Direct distillation
 - b. Displacement, distillation
 - 5A. Cation-exchange capacity (cont.)
 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
 4. KOAc , pH 7.0
 5. BaCl_2 , pH 8.2
 - a. Barium by flame photometry
 - B. Extractable bases
 1. NH_4OAc extraction
 - a. Uncorrected
 - b. Corrected (exchangeable)
 2. KCl -TEA extraction, pH 8.2
 - C. Base saturation
 1. NH_4OAc , pH 7.0
 2. NaOAc , pH 8.2
 3. Sum of cations
 - D. Sodium saturation (exchangeable Na pct.)
 1. NaOAc , pH 8.2
 2. NH_4OAc , pH 7.0
 - E. Sodium adsorption ratio
6. CHEMICAL ANALYSES
 - A. Organic carbon
 1. Acid dichromate digestion
 - a. FeSO_4 titration
 - b. CO_2 evolution, gravimetric
 2. Dry combustion
 - a. CO_2 evolution I
 - b. CO_2 evolution II
 3. Peroxide digestion
 - a. Weight loss
 - B. Nitrogen
 1. Kjeldahl digestion
 - a. Ammonia distillation
 2. Semimicro Kjeldahl
 - a. Ammonia distillation
 - C. Iron
 1. Dithionite extraction
 - a. Dichromate titration
 - b. EDTA titration
 2. Dithionite-citrate extraction
 - a. Orthophenanthroline colorimetry
 3. Dithionite-citrate-bicarbonate extraction
 - a. Potassium-thiocyanate colorimetry
 4. Pyrophosphate-dithionite extraction
 - D. Manganese
 1. Dithionite extraction
 - a. Permanganate colorimetry
 - E. Calcium carbonate
 1. HCl treatment
 - a. Gas volumetric
 - b. Manometric
 - c. Weight loss
 - d. Weight gain
 - e. Titrimetric
 2. Sensitive qualitative method
 - a. Visual, gas bubbles
 - F. Gypsum
 1. Water extract
 - a. Precipitation in acetone
 - G. Aluminum
 1. KCl extraction I, 30 min
 - a. Aluminon I
 - b. Aluminon II
 - c. Aluminon III
 - d. Fluoride titration
 2. KCl extraction II, overnight
 - a. Aluminon I
 3. NH_4OAc extraction
 - a. Aluminon III
 4. NaOAc extraction
 - a. Aluminon III
 - H. Extractable acidity
 1. BaCl_2 -triethanolamine I
 - a. Back-titration with HCl
 2. BaCl_2 -triethanolamine II
 - a. Back-titration with HCl
 3. KCl -triethanolamine
 - a. Back-titration with NaOH
 - I. Carbonate
 1. Saturation extract
 - a. Acid titration
6. CHEMICAL ANALYSES (cont.)
 - 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
 2. NH_4OAc extraction
 - a. Gravimetric, BaSO_4
 - M. Nitrate
 1. Saturation extract
 - a. PDS acid colorimetry
 - N. Calcium
 1. Saturation extract
 - a. EDTA titration
 2. NH_4OAc extraction
 - a. EDTA-alcohol separation
 - b. Oxalate-permanganate I
 - c. Oxalate-permanganate II
 - Fe, Al, and Mn removed
 - d. Oxalate-cerate
 3. NH_4Cl -EtOH extraction
 - a. EDTA titration
 4. KCl -TEA extraction
 - a. Oxalate-permanganate
 - O. Magnesium
 1. Saturation extract
 - a. EDTA titration
 2. NH_4OAc extraction
 - a. EDTA-alcohol separation
 - b. Phosphate titration
 - c. Gravimetric, $\text{Mg}_2\text{P}_2\text{O}_7$
 3. NH_4Cl -EtOH extraction
 - a. EDTA titration
 - P. Sodium
 1. Saturation extract
 - a. Flame photometry
 2. NH_4OAc extraction
 - a. Flame photometry
 - Q. Potassium
 1. Saturation extract
 - a. Flame photometry
 2. NH_4OAc extraction
 - a. Flame photometry
 - R. Sulfur
 1. NaHCO_3 extraction, pH 8.5
 - a. Methylene blue
 - 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
 2. X-ray diffraction
 3. Differential thermal analysis
 - B. Optical analysis
 1. Grain studies
 - C. Total analysis
 1. Chemical
 2. X-ray emission spectrography
 - D. Surface area
 1. Glycerol retention
8. MISCELLANEOUS
 - A. Saturated paste, mixed
 1. Saturation extract
 - a. Conductivity
 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. Ratios
 1. To total clay
 2. To noncarbonate clay
 3. Ca to Mg (extractable)

PREFACE

This publication is one in a new U.S. Department of Agriculture series established to preserve and make available technical information resulting from soil survey investigations. These investigations have been going on for about two decades. Data from them have been distributed in unpublished form to those immediately concerned. Some of the data and descriptions have appeared in technical journals, in regional bulletins, in USDA technical bulletins, and in the text of published soil surveys. But most were not available to all who might use them.

We intend to publish in this series all data from the soil survey laboratories that form reasonably complete characterizations of soils. Already-assembled data and descriptions will be published just as rapidly as they can be prepared for printing. Fragmentary data collected as reference points for specific soil surveys will not be included.

While these data were being assembled, there were many changes in laboratory methods. Some were improved and some new ones were devised. Consequently, laboratory data for different soils cannot always be directly compared without allowance for the method.

The method used is indicated by symbol in the column headings of the data table. These symbols are identified in the code sheet on the opposite page. Each method is described in the first number of this series, "Soil Survey Laboratory Methods and Procedures for Collecting Soil Samples," SSIR No. 1.

Ways of describing soils have also changed. Soil descriptions have become explicit on more and more features. The systems for designating horizons and for classifying soils have been changed.

The soil descriptions published here were prepared as working documents to meet a specific need of a soil survey at the time the soil samples were collected. The soil scientists who wrote them had no idea they would be published. Editing has been limited for the most part to that necessary for conformance to the "Soil Survey Manual." Field textural estimates have been retained, even though some are at variance with the laboratory data, because the field estimates themselves are important data.

There were several reasons for sampling these soils. Some were sampled to study soil genesis, some to facilitate classification, and some to obtain data to permit more useful interpretations. Those sampled for genesis or classification studies do not always fit neatly into our present concepts of soil series. Partly because of these studies, our concepts of some soil series have been modified. As a consequence, the soil series name assigned a soil at the time of sampling is not always the name that would be assigned today. Soil series names in this publication follow 1965 series definitions.

*Soil Survey
Soil Conservation Service*

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Soil Series	County	Soil Survey No.	Page	Soil Series	County	Soil Survey No.	Page
Adolph	Barron	47Wis-3-29	3	Norden	Richland	48Wis-52-2	117
	Taylor	S61Wis-60-2	5	Omega	Marathon	S57Wis-37-1	119
	Taylor	S61Wis-60-3	7		Marathon	S57Wis-37-2	121
Almena	Barron	47Wis-3-17	9	Onamia	Barron	47Wis-3-7	123
	Taylor	S60Wis-60-1	11	Onaway	Oconto	S59Wis-42-2	125
	Taylor	S60Wis-60-2	13		Outagamie	S59Wis-44-1	127
Arland	Barron	47Wis-3-23	15		Outagamie	S59Wis-44-2	129
Ashkum	Kenosha	S58Wis-30-1	17	*Oshkosh	Winnebago	S59Wis-70-2	131
	Kenosha	S58Wis-30-2	19		Winnebago	S60Wis-70-1	133
Auburndale	Taylor	S61Wis-60-1	21	Otterholt	Barron	47Wis-3-16	135
	Taylor	S61Wis-60-4	23		Pierce	S60Wis-47-1	137
Boone	Jackson	S57Wis-27-1	25		Pierce	S60Wis-47-2	139
	Jackson	S57Wis-27-2	27		Pierce	S60Wis-47-3	141
Calamus	Dodge	S2Wis-14-20	29		St. Croix	S60Wis-55-1	143
	Dodge	S2Wis-14-27	31	*Ozaukee	Ozaukee	S58Wis-45-1	145
Campia	Barron	47Wis-3-14	33		Washington	S58Wis-66-1	147
*Cassel	Marathon	S61Wis-37-1	35	Palsgrove	Richland	48Wis-52-21	149
	Marathon	S61Wis-37-2	37	*Pardeeville	Columbia	S62Wis-11-4	151
*Dodge	Columbia	S62Wis-11-1	39		Columbia	S62Wis-11-5	153
	Dane	S62Wis-13-1	41	*Peebles	Fond du Lac	S59Wis-20-1	155
Elba	Dodge	S3Wis-14-16	43		Fond du Lac	S59Wis-20-3	157
	Dodge	S4Wis-14-22	45	Plainfield	Adams	S57Wis-1-1	159
Emmet	Oconto	S59Wis-42-1	47		Adams	S57Wis-1-2	161
Fayette	Grant	3 ^a	49		Waushara	S57Wis-69-1	163
	Grant	4 ^a	51		Waushara	S57Wis-69-2	165
	Grant	5 ^a	53		Waushara	S57Wis-69-4	167
	Richland	2 ^a	55	Flano	Columbia	S62Wis-11-2	169
	Richland	48Wis-52-20	57		Dane	S62Wis-13-2	171
*Kellner	Portage	S57Wis-49-1	59	Port Byron	La Crosse	S56Wis-32-1	173
	Portage	S57Wis-49-2	61		La Crosse	S57Wis-32-1	175
Kewaunee	Calumet	S59Wis-8-1	63		La Crosse	S57Wis-32-2	177
	Fond du Lac	S59Wis-20-2	65		La Crosse	S57Wis-32-3	179
Kewaunee (Podzolized)	Manitowoc	S60Wis-36-1	67	*Foy	Winnebago	S57Wis-70-1	181
Keyser	Manitowoc	S60Wis-36-2	69	Poygan	Calumet	S57Wis-8-1	183
	Dodge	S4Wis-14-21	71		Winnebago	S57Wis-70-3	185
	Dodge	S3Wis-14-22	73	*Richford	Waushara	S57Wis-69-3	187
*Lafont	Taylor	S60Wis-60-3	75	Richwood	La Crosse	S56Wis-32-3	189
	Taylor	S60Wis-60-4	77		La Crosse	S56Wis-32-4	191
*Manawa	Calumet	S60Wis-8-1	79	Ringwood	Columbia	S62Wis-11-3	193
	Fond du Lac	S59Wis-20-4	81		Columbia	S62Wis-11-6	195
Markesan	Dodge	S4Wis-14-20	83	Santiago	Barron	47Wis-3-5	197
	Dodge	S3Wis-14-23	85		St. Croix	S60Wis-55-2	199
*Marshfield	Wood	S61Wis-71-2	87		St. Croix	S60Wis-55-3	201
	Wood	S61Wis-71-3	89	Seaton	La Crosse	S56Wis-32-5	203
McHenry	Dodge	S2Wis-14-24	91		La Crosse	S56Wis-32-6	205
	Dodge	S4Wis-14-19	93		La Crosse	10 ^a	207
	Dodge	S4Wis-14-23	95		Pierce	S60Wis-47-4	209
*Mecan	Green Lake	S62Wis-24-1	97		Pierce	S60Wis-47-5	211
	Green Lake	S62Wis-24-2	99	Sparta	La Crosse	S57Wis-32-4	213
Meridian	Richland	S54Wis-52-1	101		La Crosse	S57Wis-32-5	215
	Richland	S54Wis-52-2	103	Spencer	Barron	47Wis-3-28	217
	Trempealeau	S54Wis-61-1	105	Varna	Racine	S58Wis-51-1	219
	Trempealeau	S54Wis-61-2	107		Racine	S58Wis-51-2	221
Miami	Dodge	S3Wis-14-21	109	*Withee	Marathon	S61Wis-37-3	223
Milaca	Barron	47Wis-3-12	111		Wood	S61Wis-71-1	225
Morley	Kenosha	S58Wis-30-3	113				
	Racine	S58Wis-51-4	115				

* Soil series names preceded by an asterisk are names of tentative series.

^a Part of Project Z-1-2-8

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County	Soil Series	Soil Survey No.	Page	County	Soil Series	Soil Survey No.	Page
Adams	Plainfield	S57Wis-1-1	159	La Crosse	Seaton	S56Wis-32-6	205
	Plainfield	S57Wis-1-2	161		Sparta	S57Wis-32-4	213
Barron	Adolph	47Wis-3-29	3		Sparta	S57Wis-32-5	215
	Almena	47Wis-3-17	9	Manitowoc	Kewaunee	S60Wis-36-1	67
	Arland	47Wis-3-23	15		(Podzolized)		
	Campia	47Wis-3-14	33		Kewaunee	S60Wis-36-2	69
	Milaca	47Wis-3-12	111		(Podzolized)		
	Onamia	47Wis-3-7	123	Marathon	*Cassel	S61Wis-37-1	35
	Otterholt	47Wis-3-16	135		*Cassel	S61Wis-37-2	37
	Santiago	47Wis-3-5	197		Omega	S57Wis-37-1	119
	Spencer	47Wis-3-28	217		Omega	S57Wis-37-2	121
Calumet	Kewaunee	S59Wis-8-1	63		*Withee	S61Wis-37-3	223
	*Manawa	S60Wis-8-1	79	Oconto	Emmet	S59Wis-42-1	47
	Poygan	S57Wis-8-1	183		Onaway	S59Wis-42-2	125
Columbia	*Dodge	S62Wis-11-1	39	Outagamie	Onaway	S59Wis-44-1	127
	*Pardeesville	S62Wis-11-4	151		Onaway	S59Wis-44-2	129
	*Pardeesville	S62Wis-11-5	153	Ozaukee	*Ozaukee	S58Wis-45-1	145
	Plano	S62Wis-11-2	169	Pierce	Otterholt	S60Wis-47-1	137
	Ringwood	S62Wis-11-3	193		Otterholt	S60Wis-47-2	139
	Ringwood	S62Wis-11-6	195		Otterholt	S60Wis-47-3	141
Dane	*Dodge	S62Wis-13-1	41		Seaton	S60Wis-47-4	209
	Plano	S62Wis-13-2	171		Seaton	S60Wis-47-5	211
Dodge	Calamus	52Wis-14-20	29	Portage	*Kellner	S57Wis-49-1	59
	Calamus	52Wis-14-27	31		*Kellner	S57Wis-49-2	61
	Elba	53Wis-14-16	43	Racine	Morley	S58Wis-51-4	115
	Elba	54Wis-14-22	45		Varna	S58Wis-51-1	219
	Keyser	53Wis-14-22	73		Varna	S58Wis-51-2	221
	Keyser	54Wis-14-21	71	Richland	Fayette	2 ^a	55
	Markesan	54Wis-14-20	83		Fayette	48Wis-52-20	57
	Markesan	53Wis-14-23	85		Meridian	S54Wis-52-1	101
	McHenry	52Wis-14-24	91		Meridian	S54Wis-52-2	103
	McHenry	54Wis-14-19	93		Norden	48Wis-52-2	117
	McHenry	54Wis-14-23	95		Palsgrove	48Wis-52-21	149
	Miami	53Wis-14-21	109	St. Croix	Otterholt	S60Wis-55-1	143
Fond du Lac	Kewaunee	S59Wis-20-2	65		Santiago	S60Wis-55-2	199
	*Manawa	S59Wis-20-4	81		Santiago	S60Wis-55-3	201
	*Peebles	S59Wis-20-1	155	Taylor	Adolph	S61Wis-60-2	5
	*Peebles	S59Wis-20-3	157		Adolph	S61Wis-60-3	7
Grant	Fayette	3 ^a	49		Almena	S60Wis-60-1	11
	Fayette	4 ^a	51		Almena	S60Wis-60-2	13
	Fayette	5 ^a	53		Auburndale	S61Wis-60-1	21
Green Lake	*Mecan	S62Wis-24-1	97		Auburndale	S61Wis-60-4	23
	*Mecan	S62Wis-24-2	99		*Lafont	S60Wis-60-3	75
Jackson	Boone	S57Wis-27-1	25		*Lafont	S60Wis-60-4	77
	Boone	S57Wis-27-2	27	Trempealeau	Meridian	S54Wis-61-1	105
Kenosha	Ashkum	S58Wis-30-1	17		Meridian	S54Wis-61-2	107
	Ashkum	S58Wis-30-2	19	Washington	*Ozaukee	S58Wis-66-1	147
	Morley	S58Wis-30-3	113	Waushara	Plainfield	S57Wis-69-1	163
La Crosse	Port Byron	S56Wis-32-1	173		Plainfield	S57Wis-69-2	165
	Port Byron	S57Wis-32-1	175		Plainfield	S57Wis-69-4	167
	Port Byron	S57Wis-32-2	177		*Richford	S57Wis-69-3	187
	Port Byron	S57Wis-32-3	179	Winnebago	*Oshkosh	S59Wis-70-2	131
	Richwood	S55Wis-32-3	189		*Oshkosh	S60Wis-70-1	133
	Richwood	S56Wis-32-4	191		*Poy	S57Wis-70-1	181
	Seaton	10 ^a	207		Poygan	S57Wis-70-3	185
	Seaton	S56Wis-32-5	203	Wood	*Marshfield	S61Wis-71-2	87
					*Marshfield	S61Wis-71-3	89
					*Withee	S61Wis-71-1	225

* Soil series names preceded by an asterisk are names of tentative series.
^a Part of Project Z-1-2-8

SOIL Adolph silt loam SOIL Nos. 471404-3-29 LOCATION Barron County, Wisconsin

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 471404-471408

Depth (in.)	Horizon	181b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments		
		Total			Sand				Silt					2A2 > 2	2-19	19-76
		Sand (2-0.05)	Silt (0.05-0.002)	Clay (= 0.002)	Vary coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Int. III (0.02-0.002)	Int. II (0.2-0.02)	(2-0.1)				
Pct of < 2 mm												Pct of < 76mm				
0-2	All	9.1	69.3	21.6	0.2	1.4	1.5	1.4	4.6	40.9	28.4	46.1	4.5	tr.		
2-8	A12															
8-18	ABg	12.0	69.6	18.4	0.2	2.3	2.2	1.7	5.4	43.1	26.5	49.3	6.4	tr.		
18-36	Bg	6.2	70.0	23.8	0.1	0.6	0.6	0.7	4.2	42.3	27.7	47.0	2.0	0		
36+	Cg															

Depth (in.)	6A1a Organic carbon Pct	Nitrogen Pct.	C/N	Matter by H2O2 Pct	Carbonate as CaCO3 Pct.	Ext. iron as Fe Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH	
							4A1e 1/2 bar g/cc	4A1h Oven dry g/cc	4A1i g/cc		4B1c 1/2 bar Pct.	4B2 15 bar Pct.	4C1c (1.1) KCl		4C1a (1.1) H2O	
0-2	13.72															5.2
2-8	6.24															4.9
8-18				1.7												4.7
18-36				0.7												5.1
36+				0.1												5.0

Depth (in.)	Extractable bases 5B1a					6H2a Ext acidity	CEC		6G1d Ext Al	Ratios to clay			8D3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	Ext		CEC Sum	Ext. iron	15-bar water		5C3 Sum cations Pct	5C1 NH4OAc Pct.
0-2	8.5	2.3	0.4	0.2		37.4	18.8						23		
2-8	3.5	1.6	0.1	0.1		15.8	21.1						25		
8-18	5.4	2.7	0.1	tr.		9.3	17.5						47		
18-36	8.4	4.4	0.2	0.2		1.8	15.0						88		
36+															

Depth (in.)	Clay Fraction Analysis 7Atb-d							
	Mt	Chl	Vm.	Mi	Int	Qtz.	Kl	Gibbsite
	7A2 X ray				7A3			

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 type: Adolph silt loam
Soil No.: 47Wis-3-29
Location: Barron County, Wisconsin. East center NW 1/4 of NW 1/4 section 3, township 34N., range 12W.
Collected by: G. H. Robinson

Horizon and
Beltsville
Lab. Nos.

A11 0 to 2 inches. Black organic loam.
471404

A12 2 to 8 inches. Very dark gray silt loam which has a granular structure.
471405

ABg 8 to 18 inches. Dark gray slightly mottled with dark yellowish brown heavy silt loam which
471406 has a granular structure.

Bg 18 to 36 inches. Gray mottled with yellowish brown silty clay loam with darker material
471407 penetrating into old root channels. Massive structure.

Cg 36+ inches. Light brownish gray highly mottled with yellowish brown silty clay loam to silt
471408 loam. Massive structure.

SOIL TYPE Adolph LOCATION Taylor County, Wisconsin
silt loam

SOIL NOS. S61Wis60-2 LAB. NOS. 15973-15979

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS	
		1B1a	3A1							2A2			
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY			> 2		
		2-1	1-0.5	0.5-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.02	0.02-0.002	< 19mm		
0-4	A11	1.3a	2.3a	2.9	6.0	3.6	46.6	37.3	28.4	24.5	Tr.	sic1	
4-8	A12	1.0	2.3	3.5	8.6	5.1	48.5	31.0	33.6	24.2	Tr.	sic/cl	
8-16	A13g	1.8	2.5	3.6	9.7	5.7	55.5	21.2	39.0	27.0	Tr.	sil	
16-22	C1g	0.3	0.8	1.4	4.0	3.7	68.1	21.7	39.4	34.4	Tr.	sil	
22-29	C2g	0.6	1.0	2.2	8.4	7.4	61.9	18.5	49.4	24.6	Tr.	sil	
29-47	IIC3g	7.0	8.6	9.3	19.9	9.6	35.1	10.5	39.0	15.3	5	fsl	
47-57	IIC4g	8.6	9.9	9.9	20.0	11.7	30.6	9.3	37.0	15.5	2	fsl	
8C1a		6E2a ORGANIC MATTER			BULK DENSITY				WATER RETENTION				
pH	CaCO ₃ equiv- alent	6A1a O.C.	6B1a N	C/N	Field State 4B4 Water	30-Cm. 4A1a g/cc	4B3 Water	4A1c g/cc	A.D. 4A1b g/cc	4B1b 1/3-Bar Pieces	4B2 15-Bar Sieved		
	1:1 %	%	%		%	g/cc	%	g/cc	g/cc	%	%		
6.4b	-(s)	17.32	0.920	19	153.1	0.45					39.9		
6.6	-(s)	4.14	0.266	16	48.8	1.10	30.3	1.32	1.61	31.4	18.4		
6.9	-(s)	0.63	0.078	8						19.6	10.2		
7.0	-(s)	0.19	0.027		24.5	1.54	25.1	1.52	1.70	21.3	9.9		
7.1	-(s)	0.10	0.018							21.3	8.1		
7.3	-(s)	0.09									4.3		
7.6	-(s)	0.03									3.3		
5A1a		EXTRACTABLE CATIONS				5B1a	5C1	5C3	5B1a	8D1	8D3	6C1a	
CATION EXCHANGE CAPACITY NH ₄ OAc	6N2b	6O2b	6H1a	6P2a	6Q2a	Base Sat. % NH ₄ OAc	Base Sat. % on Sum Cations	Sum Ext. Bases me/100g	CEC d 100g Clay	Ext. Ca/Mg	Free Irons Fe ₂ O ₃		
	milliequivalents per 100g. soil										%		
55.8	47.4	13.9	21.2	0.2	0.6	111	74	62.1	150	3.4	0.8		
36.2	27.7	10.3	8.7	0.1	0.3	106	82	38.4	117	2.7	0.6		
19.8	14.4	6.3	2.1	0.1	0.3	106	91	21.1	93	2.3	0.4		
18.7	12.9	6.6	1.2	0.1	0.5	107	94	20.1	86	2.0	0.6		
15.4	10.7	5.5	0.9	0.1	0.4	108	95	16.7	83	1.9	0.8		
8.9	6.2	3.0	0.5	0.1	0.2	107	95	9.5	85	2.1	1.2		
7.0	5.0	2.3	0.5	Tr.	0.2	107	94	7.5	75	2.2	1.5		

- a. Many organic matter fragments.
- b. 1:5 soil-water ratio because of high organic matter content.
- c. 14.7 Kg/M² to 22 inches (Method 6A).
- d. Derivative, calculated ratio.

Soil type: Adolph silt loam

Soil Nos.: SK1Wis-60-2

Location: Taylor County, Wisconsin; center of northwest quarter of Section 32, T31N, R3W in pasture area 400 feet west of Highway 73 on edge of black ash grove.

Vegetation and use: Needs canarygrass, reedtop, sedges, and black ash cover; area is being lightly grazed by livestock.

Slope and land form: Slight depression in glacial till plain with less than 1 percent concave slope.

Drainage and permeability: Very poorly drained with very slow surface runoff to ponded conditions; internal drainage and permeability are both slow to very slow.

Parent material: Moderate to deep silt mantle overlying loamy glacial drift.

Collected by: Gerald Post, R. B. Grossman, G. B. Lee, Gordon Wing, and A. J. Klingelhoets, September 21, 1961.
Described by: G. B. Lee and A. J. Klingelhoets.

Horizon and

Lincoln

Lab. Number

- A11
15973 0 to 4 inches. Black (10YR 2/1) and very dark brown (10YR 2/2) mucky silt loam with moderate fine and medium granular structure; very friable; abundance of fibrous roots from grasses and sedges; neutral; abrupt wavy boundary.
- A12
15974 4 to 8 inches. Black (10YR 2/0) silty clay loam with moderate medium subangular blocky structure; slightly hard when dry, slightly plastic when wet, firm when moist; roots plentiful; neutral; clear wavy boundary.
- A13g
15975 8 to 16 inches. Black (10YR 2/1) and very dark gray (10YR 3/1) light silty clay loam with pockets of gray (5Y 5/1); moderate medium subangular blocky structure; slightly hard when dry, firm when moist, slightly plastic when wet; roots plentiful; neutral; gradual wavy boundary.
- C1g
15976 16 to 22 inches. Gray (5Y 6/1) light silty clay loam with weak medium subangular blocky structure breaking down to moderate fine subangular blocks; firm when moist, slightly hard when dry, and slightly plastic when wet; some organic stains of dark gray (5Y 4/1) on ped faces; many very fine distinct mottles of dark brown (7.5YR 4/4); few sedge roots and old root channels; mildly alkaline; gradual wavy boundary.
- C2g
15977 22 to 29 inches. Gray (5Y 6/1) to light olive gray (5Y 6/2) light silty clay loam with moderate medium and fine subangular blocky structure; slightly hard when dry and firm when moist; clay fillings in worm and sedge root cavities; organic stains of very dark gray (10YR 3/1) on clay films; few fine distinct mottles of dark brown and light olive brown; few sedge roots; mildly alkaline; clear wavy boundary.
- IIC3g
15978 29 to 47 inches. Reddish brown (5YR 4/4) and dark grayish brown (10YR 4/2) loam with pockets of silt, sandy loam, and gravelly loam; massive; slightly hard when dry and friable when moist; many fine distinct mottles of olive brown (2.5Y 4/4) and light olive brown (2.5Y 5/6); few sedge roots in upper part; mildly alkaline; gradual irregular boundary, 15 to 20 inches thick.
- IIC4g
15979 47 to 57 inches. Dark reddish brown (5YR 3/4) loam till; massive; slightly hard when dry and friable when moist; moderately alkaline; many feet thick.

Remarks: All colors given are for moist conditions. Thin (0-to 12-inch) layer of organic material often occurs on the surface. Lower story materials range from sandy loam to light clay loam in texture but loam predominates. Pockets of sand, gravel, silts and other stratified materials are commonly found at contact between the upper and lower story materials.

Mineralogy: (Method 7B1) The very fine sand from the particle-size analysis was examined under the petrographic microscope. Quartz is the most common mineral. A substantial percentage of feldspar is present. Highly altered feldspar is common; a portion of the altered grains is essentially aggregates of clay minerals. Some of the feldspar grains appear quite fresh. Pyroxene is an important accessory mineral.

SOIL TYPE Adolph LOCATION Taylor County, Wisconsin
 silt loam

SOIL NOS. S61W1s60-3 LAB. NOS. 15980-15986

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS	
		1B1a					3A1						2A2
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY					> 2
		2-1	1-0.5	0.5-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.02	0.02-0.002	(< 0.075 mm)		
0-3	Al1	0.5a	1.2a	0.4a	0.8a	1.4	40.2	55.5	17.1	24.9	Tr.	sic/c	
3-8	Al2	<0.1	0.3a	0.2a	0.7	1.7	46.7	50.4	23.6	25.2	Tr.	sic	
8-15	Al3g	<0.1	0.1b	0.2b	0.7b	3.3	71.0	24.7	39.8	34.9	Tr.	sil	
15-21	Clg	<0.1	<0.1	<0.1	0.3	3.3	74.4	22.0	42.6	35.3	Tr.	sil	
21-28	C2g	<0.1	<0.1	<0.1	0.3	4.3	75.4	20.0	48.5	31.4	Tr.	sil	
28-37	C3g	<0.1	<0.1	0.1	0.5	4.7	75.9	18.8	50.4	30.5	Tr.	sil	
37-50	IIC4g	<0.1	0.1	0.2	1.2	9.2	73.8	15.5	60.6	23.2	-	sil	
8C1a	6E2a	ORGANIC MATTER				BULK DENSITY				WATER RETENTION			
pH	CaCO ₃ equivalent	6A1a	6B1a	C/N	Field	State	30-Cm.		A. D.	4B1b	4B2		
		O.C.	N		4B4	4A1a	4B3	4A1c	4A1b	1/3-Bar		15-Bar	
1:1	%	%	%	%	%	g/cc	%	g/cc	g/cc	%	%		
5.3c		18.10	1.093	16	78.7	0.67					50.6		
5.1		5.65	0.442	13						37.0	27.2		
5.3		1.46	0.145	10						21.8	12.1		
5.4		0.33	0.036	9						24.2	10.0		
6.0		0.22	0.027							23.3	9.5		
6.2		0.22								24.2	9.0		
6.6	-(s)	0.21								22.2	6.8		
5A1a	EXTRACTABLE CATIONS					5C1	5C3	5B1a	8D1	8D3	6G1a		
CATION EXCHANGE CAPACITY NH ₄ OAc	6N2b	6O2b	6H1a	6P2a	6Q2a	Base Sat. %	Base Sat. %	Sum Ext.	CEC d 100g	Ext.	Al KCl Ext.		
	Ca	Mg	H	Na	K	NH ₄ OAc	on Sum Cations	Bases me/100g	Clay	Ca/Mg	me/100g		
58.5	34.6	14.1	33.8	0.3	1.1	86	60	50.1	105	2.4	-		
43.5	22.5	11.2	29.3	0.3	0.7	80	54	34.7	86	2.0	0.4		
21.2	11.9	5.6	11.4	0.2	0.3	85	61	18.0	86	2.1	0.2		
17.1	10.2	5.4	4.5	0.3	0.3	95	78	16.2	78	1.9	0.2		
16.9	10.4	5.6	2.8	0.3	0.3	98	86	16.6	84	1.8	-		
16.3	10.1	5.4	2.4	0.2	0.3	98	87	16.0	87	1.9	-		
12.3	8.2	4.5	1.6	0.1	0.3	106	89	13.1	79	1.8	-		
a. Many organic matter fragments. b. Common Fe-Mn nodules. c. 1:5 soil-water ratio because of high organic matter content d. Derivative, calculated ratio.													

Soil type: Adolph silt loam

Soil Nos.: S61Wis-60-3

Location: Taylor County, Wisconsin; northeast of southeast of southeast quarter of Section 6, T31N, R3W in a pasture area 200 feet west of Highway 73 on edge of black ash grove bordering an organic marsh.

Vegetation and use: Black ash, sedges, raspberries, redbud, red and gray dogwood, and alder cover; area is being used for limited livestock pasture.

Slope and land form: Slight depression in glacial till plain with small drainage way going through it; slope is less than 1 percent concave and facing west.

Drainage and permeability: Very poorly drained; very slow surface runoff to ponded; internal drainage and permeability are both slow to very slow.

Parent material: Moderate to deep silt mantle overlying loamy glacial drift.

Collected by: Gerald Post, R. B. Grossman, Gordon Wing, G. B. Lee, and A. J. Klingelhoets, September 21, 1961.

Described by: G. B. Lee and A. J. Klingelhoets.

Horizon and

Lincoln

Lab. Number

A11 15980	0 to 3 inches. Black (10YR 2/1) mucky silt loam with moderate fine subangular blocks which break down to moderate medium granular structure; friable; abundance of fine roots; medium acid; abrupt wavy boundary.
A12 15981	3 to 8 inches. Black (10YR 2/0 to 2/1) heavy silty clay loam with moderate fine subangular and angular blocky structure; hard when dry, firm when moist, plastic when wet; roots plentiful; strongly acid; clear wavy boundary.
A13g 15982	8 to 15 inches. Black (10YR 2/1) and very dark gray (10YR 3/1) silty clay loam with moderate fine subangular and angular blocky structure; slightly hard when dry, firm when moist, slightly plastic when wet; roots plentiful; strongly acid; clear wavy boundary.
C1g 15983	15 to 21 inches. Gray (5Y 6/1) heavy silt loam with moderate medium subangular blocky structure; slightly hard when dry, firm when moist; many medium and fine mottles of dark brown (7.5YR 4/4) and strong brown (7.5YR 5/8); few sedge roots; medium acid; gradual wavy boundary.
C2g 15984	21 to 28 inches. Gray (5Y 5/1) silt loam with weak medium and fine subangular blocky structure; friable; many small sedge root channels which have clay films on inside; many fine and medium distinct mottles of yellowish brown (10YR 5/6) and yellowish red (5YR 4/6); few sedge roots; slightly acid; gradual irregular boundary.
C3g 15985	28 to 37 inches. Light brownish gray (2.5Y 6/2) silt loam with weak medium subangular blocky structure; friable; some spots and streaks of greenish gray (5G 5/1) in lower part; many fine distinct mottles of yellowish red (5YR 4/6 to 5/8) along old wormholes and root channels; few fine sedge roots; slightly acid; abrupt wavy boundary.
IIC4g 15986	37 to 50 inches. Dark greenish gray (5G to 5GY 4/1) coarse silt; massive; friable; strong brown (7.5YR 5/6 to 5/8) iron stains around old sedge root holes; mildly alkaline; grades into loam materials below 60 inches.

Remarks: Colors given are for moist conditions. Up to 12 inches of organic material on the surface may be found on this soil. Depth to loamy lower story materials ranges from 30 to 60 inches but is generally from 3 to 4 feet.

Mineralogy: The very fine sand from the particle-size analysis was examined under the petrographic microscope. Quartz is the most common mineral. A substantial percentage of feldspar is present. Highly altered feldspar is common; a portion of the altered grains is essentially aggregates of clay minerals. Some of the feldspar grains appear quite fresh. Quartz increases towards the soil surface mainly at the expense of the highly altered feldspar. (Method 7B1)

SOIL Almena silt loam SOIL Nos. 47Wis-3-17 LOCATION Barron County, Wisconsin

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos 471440-471444

Depth (in)	Horizon	181b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments		
		Total		Sand					Silt					2A2 > 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)				
Pct of < 2 mm													Pct of < 76mm			
0-3	A1	10.5	68.6	20.9	-	1.0	1.7	2.6	5.2	38.0	30.6	44.6	5.3	0		
3-6 1/2	A2	11.7	75.3	13.0	0.2	1.5	2.1	2.2	5.7	43.1	32.2	50.1	6.0	0		
6 1/2-14	A2-B1	9.7	79.4	10.9	0.1	1.1	1.3	1.3	5.9	46.6	32.8	53.1	3.8	0		
14-30	B2tg	14.3	68.2	17.5	0.4	2.0	2.4	2.2	7.3	46.1	22.1	54.4	7.0	1		
30-36	IIC	25.0	60.3	14.7	1.2	4.4	5.1	5.0	9.3	42.4	17.9	53.9	15.7	2		
Depth (in)	6A1e Organic carbon	Nitrogen	C/N	Carbonate as CaCO ₃	Ext iron as Fe	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH		
						4A1e 1/2 bar g/cc	4A1h Oven dry g/cc	4B1 15 bar g/cc		4B1c 1/2 bar Pct	4B2 15 bar Pct	8C1c (1.1) KCl		8C1a (1.1) H ₂ O		
															Pct	Pct
0-3	3.96															5.4
3-6 1/2	1.35															5.1
6 1/2-14	0.17															5.0
14-30	0.15															4.9
30-36	0.11															5.1
Depth (in)	Extractable bases 5B1a					6H2a Ext. acidity	CEC		6G1d Ext Al	Ratios to clay			8D3 Ca/Mg	Base saturation		
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	Ext Al		CEC Sum	Ext. Iron	15-bar water		Sum cations Pct	5C1 NH ₄ OAc Pct	
	meq/100 g															
0-3	10.7	2.7	0.2	0.4		18.0	32.0								44	
3-6 1/2	3.1	1.0	0.1	0.2		10.3	14.7								30	
6 1/2-14	2.0	0.8	0.1	0.1		6.5	9.5								32	
14-30	4.3	2.3	0.1	0.2		8.4	15.3								45	
30-36	5.4	3.0	0.2	0.2		7.3	16.1								55	
Depth (in)	Clay Fraction Analysis 7A1b-d															
	Mt	Chl	Vm	Mi	Int.	Qtz.	Kl.	Gibbsite								
	7A2 X-ray				7A3											

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 type: Almota silt loam

Soil No.: 47Wis-3-17

Location: Barron County, Wisconsin. NW corner SE 1/4 of NW 1/4 Section 3, township 35N., Range 12W.

Horizon and
Beltsville
Lab. Nos.

A1 0 to 3 inches. Dark gray medium granular silt loam.
471440

A2 3 to 6 1/2 inches. Grayish brown medium platy silt loam.
471441

A2 & B1 6 1/2 to 14 inches. Pale brown mottled yellowish brown platy silt loam.
471442

B2tg 14 to 30 inches. Light yellowish brown mottled strong brown and light gray blocky silty
471443 clay loam.

IIC 30 to 36 inches. Yellowish brown silt loam which has a massive structure and is underlain
471444 by reddish brown glacial till.

Soil type: Almena silt loam

Soil No.: S60Wis-60-1

Location: Taylor County, Wisconsin; southwest quarter, southwest quarter, Section 1, T33N, R4W, McKinley Township.

Position and relief: Nearly level ground moraine; approximately 1 percent concave slope.

Drainage and permeability: Somewhat poorly drained; moderately permeable; ground water beyond the 5-foot observed depth.

Parent material: Loess over loam to sandy clay loam glacial till of Cary age and Patrician source.

Vegetation: Basswood, alder, aspen, maple; understory of ferns.

Erosion: None.

Stoniness: None.

Sampled by: Paul H. Carroll, William DeYoung, Robert Grossman and Jerry Post, July 22, 1960.

Described by: Paul H. Carroll.

Horizon and

Lincoln

Lab. Number

- A1
13589 0 to 4 inches. Very dark brown (10YR 2/2) silt loam with weak very fine granular structure; very friable; abundant fibrous and coarse roots; strongly acid; clear smooth boundary.
- A21
13590 4 to 9 inches. Grayish brown (10YR 5/2) silt loam with a dry color of light gray (10YR 7/2); weak very thin platy structure; very friable; many small manganese or iron aggregates and discolorations; few medium faint mottles of brown (10YR 5/3) color; few fibrous roots; strongly acid; gradual smooth boundary.
- A22
13591 9 to 14 inches. Grayish brown (10YR 5/2) silt loam with a dry color of light gray (10YR 7/2); weak thin platy structure; friable; many small manganese or iron aggregates and discolorations; many medium faint mottles of brown (10YR 5/3) color; few coarse roots; very strongly acid; clear irregular boundary.
- A and B
13592 14 to 19 inches. Dark yellowish brown (10YR 4/4) silt loam with moderate coarse prismatic structure that breaks on disturbance to weak medium subangular blocks that, in turn, display weak medium platiness; horizon is an intermingling of A2 and B2; tongues of grayish brown (10YR 5/2) bleached silt that have thicknesses of 5 to 15-mm. penetrate this horizon from the A22 above; upper part of the horizon contains isolated remnants of undegraded B-horizon material; in addition to the presence of A2 tongues, the subangular blocky peds as well as the vertical cleavage planes of the prismatic structural forms display bleached silt coatings 1-mm. or more in thickness; friable; few manganese or iron aggregates and discolorations; many medium faint to distinct mottles of dark brown (10YR 4/3 to 7.5YR 4/4) color; very strongly acid; clear irregular boundary.
- B2
13593 19 to 25 inches. Grayish brown (10YR 5/2) silty clay loam; moderate coarse prismatic structure which breaks readily on disturbance to moderate medium angular blocks that, in turn, display weak medium platiness; thick continuous brown (7.5YR 5/2) clay films on blocky ped faces, being thickest (2 to 7 mm.) along prism faces; very firm; many medium prominent mottles of dark brown (7.5YR 4/4) occupy approximately 50 percent of the horizon body; very strongly acid; gradual smooth boundary.
- B31
13594 25 to 32 inches. Grayish brown (10YR 5/2) heavy silt loam; moderate medium and coarse prismatic structure which breaks under pressure to weak coarse subangular blocks that, in turn, display generally weak medium platiness; thin continuous clay films along vertical cleavage plane and in small soil pores; clay films thin and patchy on the lateral faces of structural peds; firm; many fine prominent mottles of dark yellowish brown (10YR 4/4) occupy approximately 50 percent of the horizon body; very strongly acid; gradual smooth boundary.
- B32
13595 32 to 41 inches. Brown (10YR 5/3) silt loam; moderate coarse prismatic structure breaks under pressure to weak coarse subangular blocks that, in turn, display generally weak medium platiness; thin patchy to continuous clay films on plate faces, in soil pores, and along primary vertical cleavage planes; friable; many medium prominent mottles of reddish brown (5YR 4/3); very strongly acid; abrupt smooth boundary.
- IIc1
13596 41 to 53 inches. Reddish brown (5YR 4/3) and brown (7.5YR 5/2) loam to sandy clay loam glacial till; contains approximately 15 percent materials coarser than 3/4-inch size; weak thin platy structure; thin patchy clay films on plate surfaces; weakly cemented; medium to strongly acid; gradual smooth boundary.
- IIc2
13597 53 to 65 inches. Reddish brown (5YR 4/3) sandy loam to loam glacial till; contains approximately 15 percent materials coarser than 3/4-inch size; weak thin to medium platy structure; thin patchy clay films on plate surfaces; friable to very weakly cemented; medium acid.
- B2
13598 19 to 25 inches. Special sample of clay films.

Remarks: Unless otherwise indicated, all colors shown in the soil profile description are moist colors.

MINERALOGY: The following mineralogical observations are for very fine sands; percentages are only rough approximations: 40 percent quartz, 40 percent feldspar, and 20 percent aggregates of altered feldspar. Albite, orthoclase, and microcline common in feldspar. Grain counts suggest that oligoclase is common. Accessories include hornblende, pyroxene, epidote, and garnet. More altered feldspar and augite in till than in loess.

SOIL Almeta silt loam SOIL Nos. S60W1s-60-2 LOCATION Taylor County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 13599-13607 May 1965

Depth (in.)	Horizon	IPLa												SAL												2A2 Coarse fragments		
		Total				Sand								Silt				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)	> 2	< 76µm													
0-5	A1	7.5	69.4	23.1	0.3a	1.3a	1.2a	2.0a	2.7a	29.8	39.6	33.5	4.8					Tr.	Tr.	-								
5-9	A21	4.7	87.3	8.0	0.3a	0.6a	0.3a	0.5a	3.0b	41.8	45.5	45.0	1.7					Tr.	Tr.	-								
9-13	A22	4.5	84.7	10.8	-	0.3a	0.3a	0.5a	3.4b	44.5	40.2	48.1	1.1					Tr.	Tr.	-								
13-18	A23	5.5	81.2	13.3	0.2a	0.3a	0.3a	0.6a	4.1b	47.5	33.7	51.9	1.4					Tr.	Tr.	-								
18-22	A and B	7.0	76.1	16.9	0.2a	0.6a	0.5a	0.9b	4.8b	47.9	28.2	53.1	2.2					Tr.	Tr.	-								
22-30	B2	12.0	64.1	23.9	1.2a	1.4a	1.3a	2.1c	6.0	41.0	23.1	47.9	6.0					4	4	-								
30-36	B3	21.4	59.6	19.0	2.5b	2.9	3.2	6.0	6.8	37.1	22.5	46.7	14.6					3	3	-								
36-48	IIC	67.9	23.7	8.4	10.7	13.1	12.4	21.1	10.6	13.3	10.4	33.3	57.3					18	18	-								
48-60	IIC2	69.4	23.4	7.2	7.8	13.5	13.7	23.3	11.1	12.7	10.7	34.0	58.3					18	18	-								

Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N	Carbonate as CaCO ₃	6C1a Ext. Iron as Fe ₂ O ₃ Pct.	Bulk density			4D1 COLE d	Water Content					pH	8C1a (1.1)
						4A1a Field State	4A1c 30-Cm.	4A1h Oven-Dry		4B4 Field State	4B3 30-Cm./3-Bar	4B1b 15-Bar	4B2 1/3 to 15-Bar	4C1 in. per in.		
0-5	6.22	0.545	11.8		1.8	1.3	1.51	1.51	1.52	0.003	14.2	22.6	42.2	20.1	0.28	5.2
5-9	0.42	0.051	8		1.3	1.62	1.62	1.64	0.003	12.8	20.6	21.8	5.7	0.26	5.0	
9-13	0.22	0.028			1.2	1.62	1.62	1.64	0.003	12.8	20.6	21.8	5.7	0.26	4.9	
13-18	0.17	0.025			1.5	1.53	1.50	1.54	0.010	11.6	23.9	22.4	7.6	0.22	4.9	
18-22	0.13	0.017			1.6	1.58	1.54	1.60	0.014	15.0	23.7	22.4	9.0	0.21	4.9	
22-30	0.12	0.018			1.6	1.58	1.53	1.64	0.024	18.4	24.9	23.9	12.2	0.17	4.7	
30-36	0.10				1.4								9.5		4.8	
36-48	0.02				1.4	1.94	1.91	1.95	0.003	6.1	10.8	8.6	3.7	0.08	5.2	
48-60	0.02				1.3								3.2		6.4	

Depth (in.)	Extractable bases 5B1a					6B1a Ext. Acidity	Cat. Sum	Reph. 5A1a Sum	6C2a Ext. Al	8D3 Ca/Mg	Base saturation	
	6M2b Ca	6O2b Mg	6P2a Na	6Q2a K	Sum						5C3 Sum	5C1 Sum
0-5	16.6	3.4	0.1	0.7	20.8	24.6	45.4	28.3	-	4.9	46	73
5-9	1.5	0.6	-	0.1	2.2	8.0	10.2	6.8	2.0		22	32
9-13	1.6	1.0	0.1	0.1	2.8	9.2	12.0	8.1	3.4	1.6	23	34
13-18	2.3	1.8	0.1	0.1	4.3	11.4	15.7	10.8	4.3	1.3	27	40
18-22	2.9	2.6	0.1	0.1	5.7	11.4	17.1	12.7	4.8	1.1	33	45
22-30	4.6	4.3	0.2	0.2	9.3	14.4	23.7	18.1	6.3	1.1	39	51
30-36	4.4	3.8	0.2	0.2	8.6	11.4	20.0	15.4	4.9	1.2	43	56
36-48	3.2	2.1	0.1	0.1	5.5	3.0	8.5	7.0	0.5	1.5	65	78
48-60	3.5	2.4	0.1	0.1	6.1	0.9	7.0	6.2	-	1.4	87	98

Depth (in.)	Ratios to Clay 8D1		
	NH ₄ OAc CEC	Ext. 15-Bar Iron	Water
0-5	1.22	0.06	0.87
5-9	0.85	0.11	0.56
9-13	0.75	0.07	0.53
13-18	0.81	0.08	0.57
18-22	0.75	0.06	0.53
22-30	0.76	0.05	0.51
30-36	0.81	0.05	0.50
36-48	0.83	0.12	0.44
48-60	0.86	0.12	0.44

a. > 50% Fe-Mn nodules.
b. 5-25% Fe-Mn nodules.
c. 25-50% Fe-Mn nodules.
d. Coefficient of Linear Extensibility.
Note: See descriptions for mineralogy.

Soil type: Almena silt loam
Soil Nos.: S60W1s-60-2

Location: Taylor County, Wisconsin; northeast quarter, northeast quarter, Section 6, T32N, R4W, Pershing Township.
Position and relief: Nearly level ground moraine; approximately 1 percent concave slope.

Drainage and permeability: Somewhat poorly drained; moderately permeable; ground water beyond the 5-foot observed depth.

Parent material: Loess over loam to sandy loam glacial till of Cary age and Patrician source.
Vegetation: Aspen, maple and basswood; understory of ferns.

Erosion: None. Stoniness: None.

Sampled by: Paul H. Carroll, William DeYoung, Robert Grossman and Jerry Post, July 20, 1960.

Described by: Paul H. Carroll.

Horizon and
Lincoln
Lab. Number

- Aoo 1 to 0 inch. Fresh leaves, twigs and plant remains.
- A1 0 to 5 inches. Very dark brown (10YR 2/2) silt loam with moderate very fine granular structure; evidence of intensive macro-fauna and meso-fauna mixing; friable; abundant fibrous and coarse roots; strongly acid; clear wavy boundary.
13599
- A21 5 to 9 inches. Grayish brown (10YR 5/2) silt loam having a dry color of light gray (10YR 7/2); weak very thin platy structure; very friable; many medium faint brown (10YR 5/3) mottles; few fibrous and coarse roots; strongly acid; clear wavy boundary.
13600
- A22 9 to 13 inches. Grayish brown (10YR 5/2) silt loam having a dry color of light gray (10YR 7/2); weak thin platy structure; friable; many medium faint brown (10YR 5/3) and prominent yellowish red (5YR 5/8) mottles; few manganese or iron aggregates and discolorations; few coarse roots; strongly acid; clear wavy boundary.
13601
- A23 13 to 18 inches. Grayish brown (10YR 5/2) silt loam having a dry color of light gray (10YR 7/2); weak thin to medium platy structure; friable; many medium faint brown (10YR 5/3) and prominent yellowish red (5YR 4/8) mottles; few manganese or iron aggregates and discolorations; very few coarse roots; very strongly acid; clear wavy boundary.
13602
- A and B 18 to 22 inches. Brown (10YR 5/3) silt loam; moderate coarse prismatic structure which breaks on disturbance to weak fine subangular blocks that in turn display weak thin platiness; friable to very friable; intermingling of A2 and B2 horizons; isolated B-horizon remnants found toward upper horizon boundary; light brownish gray (10YR 6/2) bleached silt tongues 5 to 30-mm. thick extend from the A23 through the A and B; many medium prominent yellowish red (5YR 4/8) mottles occupy approximately 50 percent of the B-horizon material; very strongly acid; clear smooth boundary.
13603
- B2 22 to 30 inches. Brown (10YR 5/3) light silty clay loam; weak medium prismatic structure which breaks readily on disturbance to moderate medium angular to subangular blocks that in turn show evidence of very weak medium platiness; firm; clay films are thin and patchy on lateral blocky ped faces; thin tongues of bleached silt in the upper portion of the horizon give way to thin, continuous clay films along prism faces in the remainder of the horizon; many medium prominent reddish brown (5YR 4/4) mottles occupy somewhat less than 50 percent of horizon body; very strongly acid; clear smooth boundary.
13604
- B3 30 to 36 inches. Dark brown (7.5YR 4/2) silt loam with weak coarse subangular blocky structure that shows evidence of weak medium platiness; friable; very few thin and patchy clay films on some blocky ped faces and in soil pores; many medium faint mottles of dark brown (7.5YR 4/4); very strongly acid; clear smooth boundary.
13605
- IIC 36 to 48 inches. Reddish brown (5YR 4/3) sandy loam to loam glacial till; weak coarse platy structure; thin patchy clay films on some plate faces and continuous in few soil pores; very weakly cemented; medium acid; diffuse smooth boundary.
13606
- IIC2 48 to 60 inches. Reddish brown (5YR 4/4) light sandy loam; weak coarse platy structure; friable; slightly to medium acid.
13607

Remarks: Unless otherwise indicated, all colors shown in the soil profile description are moist colors.

MINERALOGY: The following mineralogical observations are for very fine sands; percentages are only rough approximations: 40 percent quartz, 40 percent feldspar, and 20 percent aggregates of altered feldspar. Intergrowths of quartz and altered feldspar common. Hornblende and augite major accessories with epidote, garnet, chlorite, muscovite present. Loess contains a platy golden-colored grain, perhaps altered chlorite, as an accessory. A very few grains of apatite in the till. Coated grains and aggregates of altered feldspar somewhat more common in the till than in the loess. A count of 300 grains was made on lab. No. 13603: 33 percent quartz and 67 percent non-quartz, the latter including 15 percent intermediate calcium plagioclase.

SOIL Arland silt loam SOIL Nos. 47W18-3-23 LOCATION Barron County, Wisconsin
SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 471445-471451

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments			
		1B1b Total		Sand					Silt					3B1 Pct.	2A2 > 2	19-75 Pct. of < 75mm	
		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)	Int. III (0.05-0.02)	Int. II (0.02-0.002)	(2-0.1)					
0-2	A1	Organic layer															
2-4	A21	22.9	68.4	8.7	0.2	1.8	4.7	10.7	5.8	36.5	31.9	47.4	17.4				
4-11	A22	23.1	67.1	9.8	0.3	2.2	4.9	10.2	5.5	37.3	29.8	48.1	17.6				
11-15	B1	20.1	71.6	8.3	0.3	1.3	4.0	8.7	5.8	41.8	29.8	52.1	14.3				
15-21	IIB21t	20.7	61.3	18.0	0.5	1.8	4.1	8.2	6.1	36.7	24.6	47.2	14.6				
21-36	IIB23t	64.9	17.8	17.3	2.8	8.2	18.3	28.1	7.5	10.5	7.3	31.1	57.4				
36+	IIC1	87.0	6.1	6.9	1.1	4.3	9.5	57.5	14.6	3.7	2.4	56.9	72.4				

Depth (in.)	6A1a Organic carbon Pct.	Nitrogen Pct.	C/N	Carbonate as CaCO ₃ Pct.	Ext. iron as Fe Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD m/m	pH	
						4A1a 1/2 bar g/cc	4A1h Oven dry g/cc	4B1c 1/2 bar Pct.		4B2 15 bar Pct.	8C1c (1:1) KCl	8C1e (1:1) H ₂ O			
														8C1e (1:1) H ₂ O	
0-2	19.07														
2-4	2.43														3.9
4-11	0.90														4.4
11-15	0.34														4.8
15-21	0.26														5.0
21-36	0.11														4.9
36+	0.08														5.1

Depth (in.)	Extractable bases 5B1a					6M2a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay			8U3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	Ext. iron		15-bar water	CEC Sum	5C3 Sum cations Pct.		5C1 NH ₄ OAc Pct.	
															meq/100 g
0-2															
2-4	1.8	0.5	0.1	0.2		12.4	15.0								18
4-11	0.4	0.4	tr.	0.2		9.4	10.4								10
11-15	0.4	0.5	tr.	0.1		5.5	6.5								15
15-21	2.7	1.9	0.1	0.2		7.8	12.7								39
21-36	3.0	1.8	0.1	0.2		6.1	11.2								46
36+	0.9	0.7	tr.	tr.		2.5	4.1								39

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt	Chl.	Vm.	Mi	Int	Qtz	Kl.	Gibbsite
	7A2 X ray				7A3			

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 type: Arland silt loam

Soil No.: 47Wis-3-23

Location: Barron County, Wisconsin. South center SW 1/4 of SE 1/4 Section 33, Township 33N., Range 11W.

Horizon and
Beltsville
Lab. Nos.

A1 471445	0 to 2 inches. Very dark brown organic loam.
A21 471446	2 to 4 inches. Gray to grayish brown silt loam which has a weak platy and granular structure.
A22 471447	4 to 11 inches. Grayish brown silt loam which has a weak platy and granular structure.
B1 471448	11 to 15 inches. Grayish brown weak blocky silt loam that has a tendency toward platy structure.
IIB21t 471449	15 to 21 inches. Brown silty clay loam that is somewhat gritty and has blocky structure. Some gray coatings on structural faces.
IIB23t 471450	21 to 36 inches. Yellowish red sandy clay loam glacial till which has massive structure.
IIC1 471451	36+ inches. Pink to yellowish red stratified rotten sandstone.

SOIL TYPE Ashkun LOCATION Kenosha County, Wisconsin
silt loam

SOIL NOS. S58Wis-30-1 LAB. NOS. 9326-9331

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS		
		1B1a								3A1			2A2	
		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 (9mm)			
0-8	Ap	0.5a	1.0a	1.8a	5.8a	3.9a	47.3	39.7	22.7	31.7	Tr.	sicl/sic		
8-16	B21g	0.4a	1.0a	1.6a	5.9a	3.7a	49.1	38.3	21.7	34.7	Tr.	sicl		
16-22	IIB22g	0.4b	0.8b	1.3a	5.6a	4.4a	49.7	37.8	24.7	33.0	Tr.	sicl		
22-32	IIB3g	0.4b	1.2b	1.7a	3.8a	3.0a	45.0	44.9	14.0	36.2	Tr.	sic		
32-44	IIC1g	0.6c	0.7c	1.3c	3.3c	2.9c	49.0	42.2	14.0	39.9	Tr.	sic		
44-60+	IIC2g	0.9c	1.2c	1.2c	2.7c	2.3c	50.6	41.1	13.0	41.5	Tr.	sic		
pH		ORGANIC MATTER				6C1a	ELECTRICAL CONDUCTIVITY EC-103 PER CM 25°C.	6E1a	MOISTURE TENSIONS					
8C1a		6A1a	6B1a		Free Iron Fe ₂ O ₃ %			CaCO ₃ equiv-olent %	GYPSSUM me./100g. SOIL	1/10 ATMOS.	1/3 ATMOS.	15 ATMOS.		
1:1		1:5	1:10	ORGANIC CARBON %	NITRO-GEN %	C/N						4B2		
6.9				3.66	0.322	11						16.3		
7.4				0.48	0.048	10						13.5		
7.5				0.40	0.048	8						14.4		
7.7				0.54	0.044	12						17.6		
7.8				0.56								16.4		
7.9				0.60								16.1		
5A1a		EXTRACTABLE CATIONS					5B1a	BASE SAT. % NH ₄ Ac EXCH.	5C3	5B1a	5A3a	8D3	4B4	4A1a
CATION EXCHANGE CAPACITY NH ₄ Ac		6M2b	6O2b	6H1a	6P2a	6Q2a		Base Sat. % on Sum Cations	Sum Bases	Sum Cations	Ca/Mg	Field State Water %	Vol. Wt. g/cc	
		Ca	Mg	H	Na	K			me/100g	me/100g				
		milliequivalents per 100g. soil												
33.2		27.7	9.4	4.5	0.1	0.4	113	89	37.6	42.1	2.9			
19.6		15.0	7.8	1.6	0.1	0.4	119	94	23.3	24.9	1.9	16.4	1.66	
16.9		12.8	6.8	1.2	0.1	0.4	119	94	20.1	21.3	1.9			
14.2					0.1	0.3								
13.0					0.1	0.3						19.0	1.72	
10.3					0.1	0.3								

a. Trace smooth to irregular black to dark brown concr. (Mn-Fe?)
 b. Common smooth to irregular black to dark brown concr. (Mn-Fe?)
 c. Trace smooth to irregular black to dark brown concr. (Mn-Fe?); few CaCO₃ concr.

Soil type: Ashkum silt loam
 Soil No.: S58Wis-30-1
 Location: NW of SW, Section 15, T2N, R22E, Kenosha County, Wisconsin.
 Vegetation: Prairie grasses, forbs, and sedges.
 Parent material: Thin loess over silty clay loam till.
 Physiographic position: Depressional area in upland.
 Topography: Nearly level to depressional.
 Slope: 1 percent slightly concave.
 Salt or alkali: None.
 Drainage: Poor.
 Described by: A. J. Klingelhoets, October 7, 1958.

Horizon and
 Lincoln
 Lab. Number

Ap 0 to 8 inches. Black (10YR 2/0) heavy silt loam which is massive due to compaction with tillage implements; breaks down into moderate to strong medium granules; firm when moist; developed in silts; abundance of plant roots, some earthworm holes and casts, and mildly alkaline in reaction; abrupt smooth boundary, 6 to 9 inches thick.

B21g 8 to 16 inches. Olive gray (5Y 5/2) heavy silty clay loam with moderate to strong fine angular blocky structure; hard when dry and plastic when wet; many fine distinct 7.5YR 4/4 and 5/6 mottles; some earthworm holes, root channels, and crayfish holes filled with surface soil; clay skins on surface of peds; some cracks with thick clay skins continuing down to 5 feet; organic stains, 10YR 2/1, on peds facing on these cracks; developed in loess; plant roots plentiful; mildly alkaline; clear wavy boundary, 6 to 10 inches thick.

IIB22g 16 to 22 inches. Olive gray (5Y 5/2) heavy silty clay loam with moderate medium prismatic structure which breaks down into moderate to strong fine angular blocks; many medium distinct 7.5YR 5/6 mottles; some earthworm holes, root channels and crayfish holes; clay skins on all peds; plant roots plentiful; mildly alkaline; gradual irregular boundary, 5 to 9 inches thick.

IIB3g 22 to 32 inches. Olive gray (5Y 5/2) and brown (10YR 5/3), approximately 50 percent each, silty clay loam till with moderate medium prismatic structure which breaks down into moderate medium angular blocks; few dolomitic pebbles and shale chips; many medium distinct 7.5YR 5/6 and 5/2 mottles; clay skins on vertical faces of peds; many old sedge root channels; few plant roots; slight effervescence; gradual irregular boundary, 8 to 15 inches thick.

IIC1g 32 to 44 inches. Olive gray (5Y 5/2) and yellowish brown (10YR 5/4), approximately 50 percent of each, silty clay loam till which is massive in place but breaks out into moderate medium prisms; many medium distinct mottles of 7.5YR 5/6; few manganese spots and streaks; gray (5Y 5/1) silty clay in large cracks extending down from the B21g above; few dolomitic pebbles and shale chips; many old sedge root channels; strong effervescence; gradual irregular boundary, 10 to 16 inches thick.

IIC2g 44 to 60 inches plus. Color and texture same as horizon above; massive in place but breaks into prismatic structure when disturbed; many medium distinct 7.5YR 5/6 mottles; many fine manganese spots and streaks; cracks with silty clay matrix carrying down to 60 inches; shale chips and dolomitic pebbles common; few old sedge root channels; strong effervescence; many feet thick.

Remarks: Soil has been tile-drained.

SOIL SURVEY LABORATORY Lincoln, Nebr. May 1959

SOIL TYPE Ashkum LOCATION Kenosha County, Wisconsin
silt loam

SOIL NOS. S58Wis-30-2 LAB. NOS. 9332-9338

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS	
		1B1a		3A1						2A2			
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY	> 2				
2-1	1-0.5	0.5-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.02	0.02-0.002	(< 19mm)				
0-8	Ap	0.4a	1.5a	2.8a	4.5a	3.0a	48.1	39.7	21.8	31.7	Tr.	sicl/sid	
8-13	Alg	0.6a	1.5a	2.4a	3.8a	2.5a	46.2	43.0	17.5	33.2	Tr.	sic	
13-19	B2lg	0.4a	1.5a	2.4a	3.3a	2.2a	46.6	43.6	18.4	32.1	Tr.	sic	
19-24	IIB22g	0.8b	1.2b	1.4b	2.4b	2.1b	54.1	38.0	18.0	39.4	Tr.	sicl	
24-37	IIB3g	1.1b	1.5b	1.7b	3.7b	3.3b	52.1	36.6	18.7	38.7	Tr.	sicl	
37-47	IIC1g	2.4b	2.1c	2.1c	5.0c	4.8c	53.2	30.4	24.8	36.0	6.0	sicl	
47-58+	IIC2	2.6b	2.8c	3.4c	8.2c	6.9c	50.5	25.6	27.2	34.5	5.5	sil	
8C1a		ORGANIC MATTER					6C1a	ELECTRICAL CONDUCTIVITY EC x 10 ³ MILLIMHOS PER CM @ 25 C.		6E1a		MOISTURE TENSIONS	
pH		6A1a		6B1a		Free Iron Fe ₂ O ₃ %	CaCO ₃ equiv. acent		GYPSUM (me./100g SOIL)		1/10 ATMOS.	1/3 ATMOS.	15 ATMOS.
1:5		ORGANIC CARBON %		NITRO-GEN C/N %			%		%		%	%	%
7.4		5.68		0.518		11	< 1						19.2
7.5		1.81		0.182		10	< 1						15.9
7.6		0.38		0.096		9	< 1						15.8
7.8		0.53		0.053		10	8						15.4
8.0		0.59					26						14.7
8.0		0.76					26						12.6
8.0		0.52					29						10.0
5A1a		EXTRACTABLE CATIONS					5B1a	5C3	5B1a	5A3a	8D3	4B4	4A1a
CATION EXCHANGE CAPACITY (NH ₄) ₂ Ac		6N2b	6O2b	6H1a	6P2a	6Q2a	Base Sat. % (NH ₄) ₂ Ac EXCH.	Sum Sat. % on Sum Cations	Sum Bases	Sum Cations	Ca/Mg	Field State Water %	Vol Wt. g/cc
		Ca	Mg	H	Na	K		me/100g	me/100g				
		← milliequivalents per 100g. soil →											
39.2		36.3	11.3	3.7	0.1	0.5	123	93	48.2	51.9	3.2		
31.8		28.6	9.6	2.4	<0.1	0.3	121	94	38.5	40.9	3.0		
29.2		23.9	9.9	2.0	<0.1	0.3	117	94	34.1	36.1	2.4	18.9	
23.3					0.1	0.2						1.50	
13.4					0.1	0.2							
8.4					0.1	0.2					14.7	1.86	
6.5					0.1	0.2							

a. Trace smooth light brown to black concr. (Fe-Mn?)
b. Trace smooth light brown to black concr. (Fe-Mn?); few CaCO₃ concr.
c. Common smooth light brown to black concr. (Fe-Mn?); few CaCO₃ concr.

Soil type: Ashkum silt loam
 Soil Nos.: S58Wis-30-2
 Location: NW of NW, Section 8, T1N, R22E, Kenosha County, Wisconsin.
 Vegetation: Prairie grasses, forbs, and sedges.
 Parent material: Thin loess over silty clay loam till.
 Physiographic position: Depressional area in upland.
 Topography: Nearly level to depressional.
 Slope: 1 percent concave.
 Salt or alkali: None.
 Drainage: Poor.
 Described by: A. J. Klingelhoets, October 7, 1958.

Horizon and
 Lincoln
 Lab. Number

Ap
 9332 0 to 8 inches. Black (10YR 2/0) silt loam which is massive due to tillage implements compacting it; breaks down into moderate to strong medium granular structure; slightly hard when dry and friable when moist; plant roots plentiful; some earthworm holes and casts; developed in loess; mildly alkaline in reaction; abrupt smooth boundary, 7 to 9 inches thick.

Alg
 9333 8 to 13 inches. Black (10YR 2/0) silt loam; moderate medium granular structure; friable, moist; abundance of plant roots; earthworm holes and casts plentiful; few faint fine mottles, 7.5YR 5/6; developed in loess; mildly alkaline; clear wavy boundary, 3 to 6 inches thick.

B2lg
 9334 13 to 19 inches. Dark grayish brown (2.5Y 4/2) heavy silty clay loam developed in loess; weak medium prismatic structure which breaks down into moderate to strong fine angular blocks; hard when dry and plastic when wet; many fine distinct 7.5YR 5/6 mottles; clay skins on peds; plant roots plentiful; few old root channels and crayfish holes; large cracks with black (5Y 2/1) silty clay matrix and black (10YR 2/0) organic stains start in this horizon and continue down to about 5 feet; mildly alkaline; clear wavy boundary, 5 to 8 inches thick.

IIB22g
 9335 19 to 24 inches. Olive gray (5Y 5/2) heavy silty clay loam with moderate medium prismatic structure which breaks down into moderate to strong medium angular blocks; plant roots plentiful; few old sedge root channels and crayfish holes; many medium distinct 7.5YR 4/4 and 5/6 mottles; clay skins on peds; developed in loess with some till; slight effervescence; gradual irregular boundary, 4 to 7 inches thick.

IIB3g
 9336 24 to 37 inches. Olive gray (5Y 5/2) silty clay loam till with moderate medium prismatic structure which breaks down into moderate medium angular blocks; hard when dry and slightly plastic when wet; few plant roots, many old sedge root channels, and few crayfish holes; many medium distinct 7.5YR 4/4 and 5/6 mottles; clay skins on vertical faces of peds; a 2-inch pebble band (dolomitic) lies at the contact between this horizon and the one above--may be an old eroded surface; few soft lime concretions; dolomitic pebbles and shale chips; strong effervescence; gradual irregular boundary 10 to 16 inches thick.

IIC1g
 9337 37 to 47 inches. Gray (5Y 5/1) and yellowish brown (10YR 5/6), approximately 50 percent of each, silty clay loam, massive in place but breaks out into weak coarse prisms; hard when dry and slightly plastic when wet; mottled same as horizon above; few crayfish holes and many old sedge root channels; few shale chips and dolomitic pebbles; strong effervescence; gradual irregular boundary, 8 to 16 inches thick.

IIC2
 9338 47 to 58 inches plus. Differs from horizon above only in being a light silty clay loam which is more massive and is many feet thick.

Remarks: Soil has been tile-drained; also some evidence of thin deposition on surface resulting in thicker A horizon than normal for series.

SOIL TYPE Auburndale LOCATION Taylor County, Wisconsin
silt loam

SOIL NOS. S61Wis60-1 LAB. NOS. 15963-15972

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)								3A1		TEXTURAL CLASS
		1B1a		PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)				3A1		2A2		
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY	0.2-0.02	0.02-0.002	> 2	
		2-1	1-0.5	0.5-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.02	0.02-0.002	(<19mm)	
0-2 1/2	A11&A12	1.5a	2.0a	2.0	2.9	2.4	65.5	23.7	31.3	37.9	Tr.	sil
2 1/2-6	A21	1.4b	2.3b	2.4c	4.3c	4.1	69.0	16.5	42.0	32.9	Tr.	sil
6-10	A22	1.2b	2.6b	2.7c	5.2c	5.3	65.6	17.4	45.3	27.8	Tr.	sil
10-15	B1g	2.1c	3.7c	4.4c	9.6	6.0	54.6	19.6	42.7	22.1	Tr.	sil
15-24	B21g	2.1c	5.2	7.3	17.4	7.4	45.0	15.6	43.4	16.9	Tr.	l
24-33	B22g	2.7c	6.1	7.5	15.3	7.2	47.9	13.3	43.6	18.3	2	l
33-41	IIB3g	4.2	8.2	9.9	21.1	10.1	35.5	11.0	42.1	14.1	4	fsl
41-52	IIC1	9.6	14.2	16.6	30.9	9.7	14.3	4.7	32.0	5.8	18	ls
52-62	IIC2	7.1	13.1	16.0	29.0	11.8	17.6	5.4	35.1	7.8	17	ls
2-2 1/2	d	1.2a	2.4a	1.8a	2.8a	2.4a	57.6	31.8	26.2	35.0	Tr.	sic1
8C1a	6E2a	ORGANIC MATTER				BULK DENSITY				WATER RETENTION		
pH	CaCO ₃ equiv. alent	6A1a	6B1a	Field State		30-Cn.		A. D.		4B1b	4B2	
		O.C.	N	C/N	4B4	4A1a	4B3	4A1c	4A1b	1/3-Bar Pieces		15-Bar Sieved
ml	%	%	%	%	%	g/cc	%	g/cc	g/cc	%	%	
5.4 e		20.19	1.422	14	88.1	0.52					40.3	
5.5		2.11	0.136	16	15.4	1.56	21.3	1.53	1.56	20.2	8.7	
5.4		0.67	0.060	11						20.6	8.5	
5.5		0.32	0.037		12.8	1.60	22.8	1.52	1.64	18.6	9.1	
6.2	-(s)	0.16	0.020		15.0	1.70	19.8	1.63	1.76	14.9	7.3	
6.5	-(s)	0.11	0.016		16.7	1.78	18.4	1.72	1.83	14.4	6.1	
6.8	-(s)	0.07								14.3	4.9	
7.1	-(s)	0.02									1.8	
7.4	-(s)	0.02									2.1	
5.4 e		16.75	0.936	18							36.7	
5A1a	6N2b	EXTRACTABLE CATIONS				5B1a	5C1	5C3	5B1a	8D1	8D3	6G1a
CATION EXCHANGE CAPACITY NH ₄ OAc	Ca	Mg	H	Na	K	Base	Base	Base	Sum	CEC g	Ext.	KCl-Ext.
						Sat. %	Sat. %	Ext.	100g	me/100g		
	milliequivalents per 100g. soil					NEH ₄ OAc	on Sum	Cations	Bases	Clay	Ca/Mg	
51.9	19.8	4.9	30.8	0.1	0.6	49	45	25.4	219	4.0		0.1
16.5	8.8	3.4	9.6	0.1	0.2	76	56	12.5	100	2.6		0.1
15.9	7.8	4.2	7.5	0.1	0.2	77	62	12.3	91	1.8		0.4
18.0	10.0	6.0	5.2	0.1	0.3	91	76	16.4	92	1.7		0.1
14.1	8.1	5.0	2.4	0.1	0.2	95	73	13.4	90	1.6		-
11.8	7.3	4.2	2.1	0.1	0.2	100	85	11.8	89	1.7		-
9.5	6.2	3.4	1.4	0.1	0.2	104	88	9.9	86	1.8		-
4.2	2.8	1.4	0.5	Tr.	0.1	102	90	4.3	89	2.0		-
4.6	3.1	1.4	0.5	Tr.	0.1	100	90	4.6	85	2.2		-
46.0	30.4	7.9	33.5	0.1	0.5	84	54	38.9	145	3.8		-

- a. Many organic matter fragments.
- b. Many Fe-Mn? nodules.
- c. Few Fe-Mn? nodules.
- d. See profile description.
- e. 1:5 soil-water ratio because of high organic matter content.
- f. 12 Kg/M² to 33 inches (Method 6A).
- g. Derivative, calculated ratio.

Soil type: Auburndale silt loam

Soil Nos.: S61Wis-60-1

Location: Taylor County, Wisconsin; center of northwest quarter of Section 32, T31N, R3W, in small grove of aspen 150 feet east of Highway 73.

Vegetation and use: Reeds canarygrass, sedges, reedtop, willow, aspen, red and gray dogwood make up vegetation; area is being used for livestock pasture.

Slope and land form: Nearly level ground moraine with 1 percent slope to east.

Drainage and permeability: Poorly drained with slow runoff, internal drainage, and permeability.

Parent material: Moderately deep silt mantle overlying acid sandy loam to loam glacial till.

Collected by: Gerald Post, R. B. Grossman, G. B. Lee, Gordon Wing, and A. J. Klingelhoets, September 21, 1961.

Described by: G. B. Lee and A. J. Klingelhoets.

Horizon and

Lincoln

Lab. Number

- A11 and A12 0 to 2½ inches. Black (10YR 2/1) to very dark brown (10YR 2/2) silt loam with moderate very fine granular structure; friable; roots plentiful; medium acid; abrupt wavy boundary.
15963
- A12 2 to 2½ inches. Black (10YR 2/1) to dark gray (10YR 4/1) silt loam with moderate very fine subangular blocks which break down to fine granules; friable; roots plentiful; strongly acid; abrupt wavy boundary.
15972
- A21 2½ to 6 inches. Grayish brown (10YR 5/2) and gray (10YR 6/1) silt loam with moderate thin platy structure; friable; roots plentiful; many very fine distinct mottles of yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4); medium acid; clear wavy boundary.
15964
- A22 6 to 10 inches. Gray (10YR 5/1) to grayish brown (10YR 5/2) silt loam with moderate medium plates; friable; slightly vesicular; few small black manganese spots; many fine distinct mottles of yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4); roots plentiful; strongly acid; gradual wavy boundary.
15965
- B1g 10 to 15 inches. Brown (10YR 5/3) silt loam with moderate thick plates which break down into moderate fine subangular blocks; friable; slightly vesicular; light brownish gray (10YR 6/2) silica coatings on faces of larger peds; many medium distinct mottles of yellowish brown (10YR 5/6 and 5/8); roots plentiful; strongly acid; clear wavy boundary.
15966
- B21g 15 to 24 inches. Grayish brown (10YR 5/2) heavy silt loam with moderate thick plates which break down to moderate fine subangular blocks; slightly hard when dry and firm when moist; slightly vesicular in upper part; many medium and large mottles of yellowish brown (10YR 5/6 and 5/8) and dark yellowish brown (10YR 4/4); few sedge roots; medium acid; gradual wavy boundary.
15967
- B22g 24 to 33 inches. Brown (7.5YR 5/2) gritty silt loam with moderate thick plates which break down to moderate fine subangular blocks; slightly hard when dry, friable when moist; many medium distinct mottles of strong brown (7.5YR 5/6), dark brown (7.5YR 4/4) and light brownish gray (10YR 6/2); few sedge roots and old root channels; slightly acid; clear wavy boundary.
15968
- I1B3g 33 to 41 inches. Brown (7.5YR 5/2) loam with weak to moderate medium subangular blocks; slightly hard when dry, friable when moist; many fine and medium mottles of dark brown (7.5YR 4/4) and strong brown (7.5YR 5/6); slightly acid; abrupt wavy boundary.
15969
- I1C1 41 to 52 inches. Reddish brown (5YR 4/4) sandy loam glacial till with weak coarse subangular blocky structure; very friable; some sand and gravel pockets at contact with horizon above; neutral; gradual wavy boundary.
15970
- I1C2 52 to 62 inches. Reddish brown (5YR 4/4) sandy loam till; massive; very friable; neutral; many feet thick.
15971

Remarks: All colors given are for moist conditions. Lenses of washed or sorted material often occur at the contact between the upper and lower story parent materials.

Mineralogy: (Method 7B1) The very fine sand from the particle-size analysis was examined under the petrographic microscope. Quartz is the most common mineral. A substantial percentage of feldspar is present. Highly altered feldspar is common; a portion of the altered grains is essentially aggregates of clay minerals. Some of the feldspar grains appear quite fresh. Pyroxene is an important accessory mineral. The highly organic surface horizon contains about 10 percent by volume plant opal in the silt fraction. Quartz and possibly fresh feldspar increase towards the surface.

SOIL TYPE Auburndale LOCATION Taylor County, Wisconsin
silt loam

SOIL NOS. S61W1s60-4 LAB. NOS. 15987-15994

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS	
		1B1a											
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY	2A2				
2.1	1-0.5	0.5-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.02	0.02-0.002	< 19mm	> 2			
0-3	A1	0.2a	1.5a	0.8a	1.9a	3.8	71.3	20.5	38.5	37.5	Tr.	sil	
3-6	A21	0.8b	0.7b	0.8	1.3	4.3	83.1	9.0	47.9	40.1	Tr.	si	
6-10	A22	0.8c	1.2c	1.0c	1.7b	5.9b	82.8	6.6	56.0	33.6	3	si	
10-14	B1g	1.4c	1.6b	1.7b	3.3b	7.9b	72.5	11.6	56.4	25.6	3	sil	
14-21	B21g	1.0b	1.6b	1.6b	3.1b	6.2b	67.2	19.3	48.2	26.7	3	sil	
21-29	B22g	1.6b	2.2b	2.0	3.8	5.8	65.6	19.0	45.8	27.4	10	sil	
29-43	I1B3g	5.6b	7.6	8.3	16.4	8.3	42.2	11.6	43.1	15.2	18	1	
43-53	I1C1	8.3	12.7	14.3	28.1	11.8	17.8	7.0	36.0	7.5	31	sl	
8C1a	ORGANIC MATTER			BULK DENSITY			WATER RETENTION						
pH	6A1a	6B1a	C/N	Field State		30-Cm.		A. D.	4B1b		4B2		
	O.C.	N		4B4	4A1a	4B3	4A1c	4A1b	1/3-Bar	15-Bar			
1:1	% d	%		Water %	g/cc	Water %	g/cc	g/cc	Pieces %	Sieved %			
5.2	7.20	0.507	14	48.9	0.92				39.6	17.0			
5.1	0.89	0.073	12						21.4	5.1			
5.1	0.30	0.032	9	21.4	1.57	24.4	1.54	1.56	21.0	4.0			
4.9	0.18	0.029							20.7	6.0			
4.9	0.14	0.025		22.7	1.56	25.2	1.52	1.64	23.5	9.4			
5.1	0.10	0.016							21.4	9.8			
5.9	0.04			19.0	1.76	21.2e	1.65e	1.82	15.5	6.1			
6.4	0.02									3.4			
5A1a	EXTRACTABLE CATIONS					5B1a	5C1	5C3	5B1a	8D1	8D3	6C1a	6G1a
CATION EXCHANGE CAPACITY NH4OAc	6N2b	6O2b	6H1a	6P2a	6Q2a	Base Sat. %	Base Sat. %	Sum	Ext. 100g	CEC f	Ext. Ironas	Free Fe2O3	Al KCl-Ext.
	Ca	Mg	H	No	K	NH4 OAc	on Sum	Bases	me/100g	Clay	Ca/Mg	%	me/100g
← milliequivalents per 100g. soil →													
25.8	13.4	3.6	17.9	0.1	0.6	69	50	17.7	126	3.7	0.9	0.1	
8.2	3.5	1.2	5.6	Tr.	0.1	58	46	4.8	91	2.9	0.6	0.8	
6.4	2.1	0.9	4.9	Tr.	Tr.	47	38	3.0	97		1.2	0.8	
9.8	4.0	2.3	5.6	0.1	0.1	66	54	6.5	84	1.7	1.4	1.0	
15.8	7.9	4.8	5.9	0.1	0.3	83	69	13.1	82	1.6	1.3	0.9	
17.4	9.8	6.0	4.2	0.1	0.3	93	79	16.2	92	1.6	1.3	0.3	
12.0	7.2	4.1	1.9	0.1	0.2	97	86	11.6	103	1.8	1.7	-	
9.6	5.0	4.0	0.7	0.1	0.1	96	93	9.2	137	1.2	1.8	-	

- a. Many organic matter fragments.
- b. Few Fe-Mn? nodules.
- c. Many Fe-Mn? nodules.
- d. 7.8 Kg/M² to 43 inches (Method 6A).
- e. One clod.
- f. Derivative, calculated ratio.

Soil type: Auburndale silt loam
 Soil Nos.: S61WMS-60-4
 Location: Taylor County, Wisconsin; northwest of southwest of Section 5, T31N, R3W in abandoned pasture, 200 feet east of Highway 73.
 Vegetation and use: Sedges, reedtop, bluegrass, willow, raspberries, and gray dogwood make up present vegetation; area was logged off and used for limited pasture but is now abandoned.
 Slope and land form: Nearly level ground moraine with 1 percent slope to west.
 Drainage and permeability: Poorly drained with slow runoff, internal drainage, and permeability.
 Parent material: Moderately deep silt mantle overlying acid sandy loam to loam glacial till.
 Collected by: Gerald Post, R. E. Grossman, G. B. Lee, Gordon Wing, and A. J. Klingelhoets, September 22, 1961.
 Described by: G. B. Lee and A. J. Klingelhoets.

Horizon and
 Lincoln
 Lab. Number

A1
 15987 0 to 3 inches. Black (10YR 2/1) and very dark brown (10YR 2/2) silt loam with very fine subangular blocky structure which breaks down to moderate fine granules; friable; roots plentiful; medium acid; abrupt smooth boundary.

A21
 15988 3 to 6 inches. Grayish brown (2.5Y 5/2) to light brownish gray (2.5Y 6/2) silt loam with moderate thin plates; friable; few fine distinct mottles of strong brown (7.5YR 5/6 to 5/8); slightly vesicular; roots plentiful; strongly acid; clear wavy boundary.

A22
 15989 6 to 10 inches. Light brownish gray (10YR 6/2) silt loam with moderate thin and medium plates; friable; slightly vesicular; many medium distinct mottles of yellowish brown (10YR 5/6), strong brown (7.5YR 5/6 to 5/8), and dark brown (7.5YR 4/4); roots plentiful; strongly acid; gradual irregular boundary.

R1g
 15990 10 to 14 inches. Grayish brown (10YR 5/2) silt loam with moderate thick platy structure; friable; tongues of light brownish gray (A22 horizon) extend down through this horizon; many large distinct mottles of yellowish brown (10YR 5/8) and strong brown (7.5YR 5/6 to 5/8); slightly vesicular; roots plentiful; strongly acid; gradual wavy boundary.

R21g
 15991 14 to 21 inches. Brown (10YR 5/3) heavy silt loam having moderate thick plates which break down to moderate fine subangular blocks; firm when moist, slightly hard when dry; some tongues of bleached gray (10YR 6/1) silts (horizon A22) extend into this horizon; many large prominent mottles of strong brown (7.5YR 5/6 to 5/8) and dark brown (7.5YR 4/4); slightly vesicular; few sedge roots; strongly acid; gradual wavy boundary.

R22g
 15992 21 to 29 inches. Brown (7.5YR 5/2) heavy silt loam with moderate thick plates which break into moderate fine subangular blocks; slightly hard when dry, firm when moist; many large distinct mottles of strong brown (7.5YR 5/6 to 5/8), gray (N 5/0), reddish brown (5YR 4/4), and yellowish red (5YR 5/6); few sedge roots and old root channels; few fine black manganese spots; strongly acid; clear wavy boundary.

I1B3g
 15993 29 to 43 inches. Brown (7.5YR 5/2) gritty silt loam with weak to moderate thick plates which break down to weak fine subangular blocks; slightly hard when dry and firm when moist; many large distinct mottles of strong brown (7.5YR 5/6 to 5/8), light gray (N 6/0), reddish brown (5YR 4/4), and yellowish red (5YR 5/6); clay films line old root and wormholes; medium acid; gradual wavy boundary.

I1C1
 15994 43 to 53 inches. Dark brown (7.5YR 4/2 and 4/4) sandy loam glacial till; massive; slightly hard when dry, friable when moist; few distinct medium mottles of strong brown (7.5YR 5/6 to 5/8); neutral; clear wavy boundary.

I1C2
 Not sampled 53 to 58 inches. Reddish brown (5YR 4/4) sandy loam till; massive; friable; neutral; some evidence of stratification in till.

Remarks: All colors given are for moist conditions. Till at this site contains more cobbles and stones than is modal but till is still well within range of characteristics. Evidence of weak stratification of till exists at contact between upper silty overburden and till.

Mineralogy: (Method 7B1) The very fine sand from the particle-size analysis was examined under the petrographic microscope. Quartz is the most common mineral. A substantial percentage of feldspar is present. Highly altered feldspar is common; a portion of the altered grains is essentially aggregates of clay minerals. Some of the feldspar grains appear quite fresh. Pyroxene is an important accessory mineral. Quartz and possibly fresh feldspar increase towards the surface. Clay mineralogy as follows: (Methods 7A2, 7A3)

(By Beltsville Laboratory)

Horizon	'Montmorillonite'		'Montmorillonite'		'% Kaolinite (by DTA)
	'Montmorillonite'	Interlayer 'Vermiculite'	'Vermiculite'	'Mica Interlayer 'Mica'	
A1	xxx	-	-	t	5
A22	xx	-	-	t	5
R21g	xxxx	-	-	x	5
R22g	xxxx	-	-	t	5
I1B3g	xxxx	-	-	t	5
I1C	xxx	-	-	t	5

dash, none detected; t, trace; x, small; xx, moderate; xxx, abundant; xxxx, dominant

SOIL TYPE Boone LOCATION Jackson County, Wisconsin
 sand, bench phase

SOIL NOS. S57W.s-27-1-(1-7) LAB. NOS. 7027-7033

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)									TEXTURAL CLASS	
		1B1a		3A1					2A2 > 2			
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY				
2.1	1-0.5	0.5-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.02	0.02-0.002				
0-3	A1	1.2	26.9	36.9	24.7	2.7	5.2	2.4	11.3	3.3	-	cos
3-7	A12	1.0	25.9	36.1	27.4	3.2	4.3	2.1	12.8	2.8	Tr.	cos
7-11	C1	1.1	25.7	35.9	27.3	3.6	3.4	3.0	12.5	2.6	Tr.	cos
11-23	C2	1.6	27.4	37.4	25.6	2.7	2.7	2.6	10.4	1.9	Tr.	cos
23-33	C3	1.1	23.9	38.4	29.4	4.2	1.4	1.6	14.5	0.5	Tr.	cos/s
33-45	C4	0.3	16.7	37.8	37.7	6.2	0.7	0.6	19.2	0.6	Tr.	s
45-58+	C5	1.3	24.2	40.2	29.7	3.3	0.6	0.7	11.7	0.7	Tr.	cos

8C1a	pH		ORGANIC MATTER			6C1a	4A3a
	1:5	1:10	6A1a ORGANIC CARBON	6B1a NITRO-GEN	C/N	Free Iron Fe2O3	Vol. Wt. g/cc.
			%	%		%	
5.6			1.88	0.103	18	0.2	
5.5			0.59	0.030	20	0.2	
5.5			0.28	0.011	25	0.3	1.56
5.5			0.12	0.006		0.2	
5.6			0.07	0.001		0.2	
6.0			0.04			0.1	1.65
5.9			0.03			0.1	

5A1a CATION EXCHANGE CAPACITY NH4Ac	EXTRACTABLE CATIONS					5B1a	5C3	5B1a	5A3a	MOISTURE AT SATURATION %
	6N2b	6O2b	6H1a	6P2a	6Q2a	BASE SAT. % NH4Ac EXCH.	Base Sat. % on Sum Cations	Sum Ext. Bases	Sum Ext. Cations	
	Ca	Mg	H	Na	K			me/100g.		
7.4	3.3	0.4	5.9	<0.1	0.1	51	39	3.8	9.7	
2.8	0.9	0.2	3.2	<0.1	0.1	43	27	1.2	4.4	
2.2	0.5	0.2	2.8	<0.1	0.1	36	22	0.8	3.6	
1.6	0.1	<0.1	2.0	<0.1	<0.1	6	5	0.1	2.1	
0.9	<0.1	0.4	1.6	<0.1	<0.1	44	20	0.4	2.0	
0.4	<0.1	<0.1	0.8	<0.1	<0.1				0.8	
0.5	<0.1	0.1	0.8	<0.1	<0.1	20	11	0.1	0.9	

Soil type: Boone sand, bench phase

Soil Nos.: S57-Ms-27-1

Location: Northwest quarter of Southwest quarter, Section 30, T21N, R3W, Jackson County, Wisconsin.

This profile was sampled in a virgin site except for past burns which have occurred in this area. It has developed in local sandy outwash from Cambrian sandstone in the "driftless area." The parent sands are almost entirely made up of quartz; there is no evidence of glacial influence, and the profile is strongly acid throughout.

Present vegetation is black oak, jack pine, with an understory of bracken fern and wintergreen. Relief is gently undulating with 1 and 2 percent slopes predominating. Typically, this profile occurs along small streams or in valley fills between areas of upland residual soils such as Boone and Hixton. This profile is excessively drained, ground water occurs at 7 feet, and permeability is rapid. The profile was moist at time of sampling. Air temperature was 8.1°C.

Sampled by: A. J. Klingelhoets, G. B. Lee, William DeYoung and R. H. Jordan, October 31, 1957.

Described by: A. J. Klingelhoets.

Horizon and

lineation

lab. number

A ₀₀	1/4 to 0 inch. Mat of undecomposed oak leaves, bracken fern, and few grass stems.
A ₁ 7027	0 to 3 inches. Black (10YR 2/1) loamy fine sand with weak medium granular structure; very friable when moist; many bleached quartz grains; plant roots plentiful; temperature 5.0°C; pH 5.5; abrupt smooth boundary; 2 to 4 inches thick.
A ₁₂ 7023	3 to 7 inches. Grayish brown (10YR 5/2) to brown (10YR 5/3) fine sand having very weak coarse platy structure; loose; some consistency; temperature 5.4°C; pH 5.3; clear irregular boundary; 1 to 6 inches thick.
C ₁ 7029	7 to 11 inches. Dark brown (10YR 4/3) to dark yellowish brown (10YR 4/4) loamy fine sand with weak medium subangular blocky structure; very friable when moist; tongues of A ₂ carry down into this horizon from above; tree roots plentiful; temperature 6.0°C; pH 5.3; clear wavy boundary; 3 to 7 inches thick.
C ₂ 7030	11 to 23 inches. Dark yellowish brown (10YR 4/4) to yellowish brown (10YR 5/4) fine sand with some consistency and a weak medium subangular blocky structure; very friable when moist; tree roots few to plentiful; temperature 6.8°C; pH 5.3; clear wavy boundary; 9 to 14 inches thick.
C ₃ 7031	23 to 33 inches. Yellowish brown (10YR 5/4) to brownish yellow (10YR 6/6) fine sand, single grained, loose; few tree roots; temperature 7.6°C; pH 5.3; clear wavy boundary; 7 to 12 inches thick.
C ₄ 7032	33 to 45 inches. Very pale brown (10YR 7/4) fine sand, single grained, loose; few iron stains of yellowish brown (10YR 5/6); temperature 8.4°C; pH 5.3; abrupt smooth boundary; 10 to 15 inches thick.
C ₅ 7033	45 to 58 inches. White (10YR 8/1) fine sand, single grained, loose; prominent yellowish red (5YR 3/8) iron stains; temperature 9.1°C; pH 5.5.

Remarks: Less than 1 percent by volume of the parent material is not quartz. The harsh feel of the quartz and poor sorting of the parent material indicate it is a local outwash. This profile has been classified as a Regosol intergrading to a weak Podzol.

SOIL TYPE Boone LOCATION Jackson, County, Wisconsin
sand, bench phase

SOIL NOS. S57W1s-27-2-(1-7) LAB. NOS. 7034-7040

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS	
		1B1a					3A1						2A2 > 2 ($< 19\mu$)
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.50-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.20-0.02	0.02-0.002			
0-1	A1	1.9	17.5	33.9	32.0	4.2	7.3	3.2	17.0	4.8	Tr.	s	
1-3 $\frac{1}{2}$	A12	<0.1	14.1	34.0	38.6	4.1	6.5	2.7	19.0	4.6	-	s	
3 $\frac{1}{2}$ -8	C1	<0.1	12.3	32.5	40.9	5.6	5.9	2.8	21.8	4.0	-	s	
8-22	C2	0.1	13.0	32.7	41.5	4.6	5.3	2.8	20.6	3.9	-	s	
22-28	C3	<0.1	15.1	35.4	42.3	3.5	1.4	2.3	18.3	0.9	-	s	
28-35	C4	0.1	12.4	31.8	46.6	6.9	1.2	1.0	25.8	1.0	Tr.	s	
35-58+	C5	<0.1	7.3	37.6	33.2	18.9	1.8	1.2	33.6	0.8	2	s	
pH		ORGANIC MATTER					6C1a	4A3a					
8C1a	1:5	1:10	6A1a ORGANIC CARBON	6B1a NITRO-GEN	C/N	Free Iron Fe ₂ O ₃	Vol. Wt.						
	1:1		%	%		%	g/cc						
5.0			1.82	0.076	24	0.3							
5.3			0.83	0.038	22	0.3							
5.4			0.36	0.021	17	0.3	1.56						
5.5			0.16	0.012		0.3							
5.6			0.05			0.2							
5.8			0.03			0.2	1.64						
5.8			0.04			0.2							
5A1a CATION EXCHANGE CAPACITY NH ₄ Ac		EXTRACTABLE CATIONS 5B1a					BASE SAT. % NH ₄ Ac EXCH.	5C3 Base Sat. % on Sum Cations	5B1a Sum Ext. Bases me/100g.	5A3a Sum Ext. Cations	MOISTURE AT SATURATION %		
	6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K								
	milliequivalents per 100g. soil												
5.9	1.5	0.2	5.9	<0.1	0.1	30	23	1.8	7.7				
3.8	1.0	0.2	4.3	<0.1	0.1	34	23	1.3	5.6				
2.3	0.6	0.2	3.5	<0.1	<0.1	35	19	0.8	4.3				
1.6	0.5	<0.1	2.0	<0.1	<0.1	31	20	0.5	2.5				
1.1	0.2	<0.1	1.6	<0.1	<0.1	18	11	0.2	1.8				
0.7	0.1	<0.1	0.8	<0.1	<0.1	14	11	0.1	0.9				
0.7	0.1	<0.1	0.8	<0.1	<0.1	14	11	0.1	0.9				

Soil Type: Boone sand, bench phase

Soil Nos.: S57Wis-27-2

Location: Southwest quarter of Northwest quarter, Section 5, T20N, R3W, Jackson County, Wisconsin.

This profile was sampled in another virgin site having almost identical characteristics to Soil Nos. S57Wis-27-1. The site differed only in having several Cambrian sandstone outcrops with upland soils developed on them in the vicinity of approximately 150 yards. Profile moist when sampled.

Sampled by: A. J. Klingelhoets, G. B. Lee, William DeYoung and R. H. Jordan, October 31, 1957.

Described by: A. J. Klingelhoets.

Horizon and

Lincoln

Lab. Number

Aoo	1/4 to 0 inch. Mat of undecomposed oak leaves, grasses and stems.
A1 7034	0 to 1 inch. Very dark brown (10YR 2/2) loamy fine sand with weak fine granular structure; very friable when moist; many bleached quartz grains; plant roots plentiful; temperature 5.9 degrees C; pH 5.5; abrupt smooth boundary; 1 to 3 inches thick.
A12 7035	1 to 3 1/2 inches. Dark grayish brown (10YR 4/2) fine sand having very weak coarse platy structure; very friable when moist; plant roots plentiful; temperature 5.6 degrees C; pH 5.3; clear irregular boundary; 1 to 5 inches thick.
C1 7036	3 1/2 to 6 inches. Dark brown (10YR 4/3) loamy fine sand grading into fine sand with depth; massive in place, weak fine to medium subangular blocky when disturbed; very friable when moist; tree roots plentiful; temperature 5.9 degrees C; pH 5.5; clear wavy boundary; 3 to 7 inches thick.
C2 7037	7 to 22 inches. Dark yellowish brown (10YR 4/4) to yellowish brown (10YR 5/4) fine sand having weak medium subangular blocky structure; loose; slightly coherent; few tree roots; temperature 6.6 degrees C; pH 5.5; clear wavy boundary; 10 to 15 inches thick.
C3 7038	22 to 28 inches. Yellowish brown (10YR 5/6) fine sand with very weak medium subangular blocky structure; loose; few tree roots; temperature 7.4 degrees C; pH 5.3; clear wavy boundary; 5 to 9 inches thick.
C4 7039	28 to 35 inches. Yellow (10YR 7/6) fine sand, single grained; loose; temperature 8.0 degrees C; few balls of brownish yellow (10YR 6/6) loamy fine sand; pH 5.5; abrupt smooth boundary; 6 to 10 inches thick.
C5 7040	35 to 53 inches. Very pale brown (10YR 8/3) to pale yellow (2.5Y 7/4) fine sand with some brownish yellow (10YR 6/6) iron staining; single grained, loose; pebble bank of iron cemented sandstone at top of horizon; few 1/4 inch bands of strong brown (7.5YR 5/6) fine sandy loam; temperature 8.6 degrees C; pH 5.5.

Remarks: Less than 1 percent by volume of the parent material is not quartz. The harsh feel of the quartz and poor sorting of the parent material indicate it is a local outwash. This profile has been classified as a Regosol intergrading to a weak Podzol.

SOIL Calamus silt loam SOIL Nos. 52W18-14-20 LOCATION Dodge County, Wisconsin
SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 54630 - 54638

Depth (in.)	Horizon	181b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments		
		Total		Sand						Silt				2A2 > 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)				
Pct. of < 2 mm																
0-3	A11-A12	77.9	15.4	0.3	0.7	0.7	1.2	3.8a		40.2	42.3		0			
3-5½	A2	77.7	16.0	0.1	0.7	0.6	0.9	4.0		39.0	43.3		0			
5½-8	A3	72.1	22.2	0.4	0.6	0.5	0.5	3.7		37.8	38.2		0			
8-12	B1	68.7	26.9	0.4	0.6	0.3	0.4	2.7		34.8	36.8		0			
12-16	B21	65.1	30.4	0.2	0.4	0.3	0.4	3.2		33.3	35.3		0			
16-23	B22	65.3	30.8	-	0.2	0.3	0.4	3.0		30.0	36.6		0			
23-28	B23	67.3	29.1	-	0.2	0.2	0.5	2.7		32.3	37.9		0			
28-36	B3	70.6	26.3	-	0.1	0.2	0.4	2.4		33.9	39.4		0			
36-48	C1	72.3	24.9	-	0.1	0.2	0.6	1.9		36.3	38.2		0			

Depth (in.)	6A1a Organic carbon	Nitrogen	C/N	Carbonate as CaCO ₃	Ext iron as Fe	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH	
						4A1a ½ bar	4A1b Oven dry	4D1		4B1c ½ bar	4B2 15 bar	8C1c (1 l) KCl		8C1a (1 l) H ₂ O	
						Pct	Pct	Pct		Pct	Pct	Pct		Pct	
0-3	3.77														6.4
3-5½	0.92														5.8
5½-8	0.49														5.6
8-12	0.29														5.0
12-16	0.35														5.3
16-23	0.32														6.0
23-28	0.31														6.2
28-36	0.25														6.4
36-48	0.23														6.9

Depth (in.)	Extractable bases 5B1a					6H2a Ext acidity	CEC		6G1d Ext. Al	Ratios to clay			8D3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	CEC Sum		Ext. Iron	15-bar water	5C3 Sum cations Pct		5C1 NH ₄ OAc Pct	
	mg/100 g														
0-3	15.8	5.9	tr.	0.2		7.1	29.0						76		
3-5½	6.3	3.1	tr.	0.1		5.5	15.0						63		
5½-8	7.6	4.2	tr.	0.2		6.1	18.1						66		
8-12	7.2	4.8	tr.	0.2		8.6	20.8						59		
12-16	10.0	6.9	tr.	0.3		6.8	24.0						72		
16-23	12.2	8.5	tr.	0.3		4.9	25.9						81		
23-28	12.2	8.7	tr.	0.3		4.1	25.3						84		
28-36	12.0	8.4	tr.	0.3		3.3	24.0						86		
36-48	12.0	8.4	tr.	0.3		2.4	23.1						90		

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt	Chl	Vm	Mi.	Int.	Qtz	Kl.	Gibbsite
	7A2 X-ray					7A3		

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. Undecomposed organic matter in sand fractions.

SOIL Calamus silt loam SOIL Nos. 52Wis-14-27 LOCATION Dodge County, Wisconsin

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 54639 - 54648

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1			
		1B1b Total			Sand					Silt				2A2 ≥ 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)	Int. III (0.05-0.02)	Int. II (0.02-0.002)	(2-0.1)					
Pct of < 2 mm																	
0-7	A1		72.8	17.4	0.4	0.9	1.1	2.6	4.8 ^B		39.8	39.4					0
7-10	A2		72.3	15.8	1.0	1.6	1.3	2.4	5.6		37.7	41.7					tr.
10-12	A3		70.0	19.3	1.2	1.3	1.1	2.3	4.8		35.2	41.1					tr.
12-16 ^{1/2}	B1		66.1	26.6	0.2	0.8	0.7	1.3	4.3		34.3	36.9					tr.
16 ^{1/2} -22 ^{1/2}	B21		66.0	28.0	0.1	0.4	0.5	0.9	4.1		33.7	37.0					0
22 ^{1/2} -29	B22		70.5	25.6	-	0.1	0.1	0.3	3.4		37.4	36.6					0
29-36 ^{1/2}	B31		73.3	23.0	-	-	0.1	0.4	3.2		35.6	41.2					0
36 ^{1/2} -41	I-IIB32		75.6	21.3	-	0.1	0.2	0.6	2.2		39.2	39.0					0
41-55	C1		44.7	10.1	2.5	3.5	4.5	14.3	20.4		15.6	58.9					12
55+	C2		37.2	7.8	4.5	5.9	7.0	18.5	19.1		16.5	51.3					28

Depth (in.)	6A1a Organic carbon Pct	Nitrogen Pct	C/N	6E1e Carbonate as CaCO ₃ Pct	Ext iron as Fe Pct	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH		
						4A1e 1/2 bar g/cc	4A1h Oven dry g/cc	4D1 COLE		4B1c 1/2 bar Pct	4B2 15 bar Pct	4C1 WRD in/in		8C1c (1:1) KCl	8C1a (1:1) H ₂ O	
																g/cc
0-7	5.2															6.4
7-10	1.3 ⁴															6.0
10-12	0.8 ⁰															5.9
12-16 ^{1/2}	0.5 ⁴															5.7
16 ^{1/2} -22 ^{1/2}	0.4 ⁴															5.8
22 ^{1/2} -29	0.3 ⁴															6.0
29-36 ^{1/2}	0.2 ⁰															6.4
36 ^{1/2} -41	0.2 ¹															7.2
41-55	0.2 ⁰			24												7.8
55+	0.1 ⁷			39												7.8

Depth (in.)	Extractable bases 5B1a					6H2a Ext acidity	CEC		6G1d Ext Al	Ratios to clay			8D3 Ca/Mg	Base saturation		
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	Ext Al		CEC Sum	Ext. iron	15-bar water		Ca/Mg	5C3 Sum cations Pct.	5C1 NH ₄ OAc Pct
0-7	20.5	6.8	tr.	0.3		7.4	35.0						79			
7-10	9.3	4.4	tr.	0.2		5.6	19.5						71			
10-12	9.3	5.0	0.2	0.3		5.6	20.4						72			
12-16 ^{1/2}	10.7	7.4	0.1	0.4		5.3	23.9						78			
16 ^{1/2} -22 ^{1/2}	11.7	8.2	0.1	0.4		4.9	25.3						81			
22 ^{1/2} -29	11.3	8.2	0.1	0.4		3.8	23.8						84			
29-36 ^{1/2}	13.5	8.2	0.1	0.4		2.8	25.0						89			
36 ^{1/2} -41	14.1	8.2	0.1	0.4		1.7	24.5						93			
41-55	b															
55+	b															

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt	Chl	Vm	Mi	Int.	Qtz.	Kl.	Gibbsite
	7A2 X-ray				7A3			

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 Undecomposed organic matter in sand fractions.
- b Calcareous not analyzed.

Soil Type: Calamus silt loam
 Soil No.: 52Wis-14-27
 Location: Dodge County, Wisconsin. NW⁴ NE⁴ Sec. 19 T11N R14E.
 Vegetation and land use: Red oak with lesser amounts of white oak and cherry.
 Sampled by: G. B. Lee

Horizon and
 Beltsville
 Lab. No.

- O1 3 to 6 inches of loose hardwood leaves.
 Not Sampled
- O2 A very thin layer, 1/4 inch or less, of partially decomposed organic matter. Earthworm casts
 Not Sampled at contact with A1.
- A1 0 to 7 inches. Dark gray (10YR 4/1, dry) to very dark gray (10YR 3/1) silt loam; well developed fine to medium crumb structure; friable; there is a high concentration of roots in this horizon; earthworm activity is intense; pH is 6.1; lower horizon boundary is clear.
 54639
- A2 7 to 10 inches. Dark gray and light brownish gray (10YR 4/1 and 6/2, dry) to dark grayish brown (10YR 4/2) silt loam; weak coarse platy structure which crushes to very fine crumb; very friable; pH is 5.5; lower horizon boundary is gradual.
 54640
- A3 10 to 12 inches. Dark grayish brown (10YR 4/2) silt loam; very weak coarse platy structure which breaks down into medium crumbs; gray coatings on peds; friable; pH is 5.6.
 54641
- B1 12 to 16-1/2 inches. Brown (10YR 4/3) silt loam; well developed fine to medium subangular blocky structure; gray coatings on peds; friable to slightly firm; pH is 5.4.
 54642
- B21 16-1/2 to 22-1/2 inches. Very dark grayish brown (10YR 3/2) silty clay loam; a few fine brown mottles are present; well developed medium subangular blocky structure; gray coatings on peds; firm; pH is 5.2.
 54643
- B22 22-1/2 to 29 inches. Dark brown (10YR 3/3.5) silty clay loam; slightly mottled; well developed medium to coarse subangular blocky structure; dark organic stains on peds; pH is 5.5.
 54644
- B31 29 to 36-1/2 inches. Dark brown (10YR 4/3) light silty clay loam; moderately mottled; weak coarse subangular blocky structure; organic coatings on peds; slightly firm; pH is 6.3; abrupt lower horizon boundary.
 54645
- I-IIB32 36-1/2 to 41 inches. Dark grayish brown (2.5Y 4/2) silt loam; slightly mottled with brown; coarse platy to massive structure; slightly indurated dry, friable moist; pH is 6.9; abrupt lower horizon boundary.
 54646
- C1 41 to 55 inches. Dark yellowish brown (10YR 4/6) and dark grayish brown (2.5Y 4/2) gritty silt loam; massive; organic stains are present; friable; pH is 7.4 and horizon is slightly calcareous in spots; this horizon appears to be of mixed till and silt origin.
 54647
- C2 55 inches plus. Dark yellowish brown and dark grayish brown (as above horizon) cobbly loam till; friable; pH is 7.7; calcareous in spots. At depth till is highly calcareous.
 54648

Notes: Colors refer to moist soil unless indicated otherwise.

SOIL Campia silt loam SOIL Nos. 47W1s-3-14 LOCATION Barron County, Wisconsin
SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 471428-471433

Depth (in.)	Horizon	1B1b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments		
		Total												2A2 > 2 Pct	2-19 Pct	19-76 Pct of < 76mm
		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)	Silt (0.05-0.02)	Int III (0.02-0.002)	Int II (0.2-0.02)				
0-3	A1	9.1	78.3	12.6	0.2	0.7	0.5	1.3	6.3	42.8	35.5	50.0	2.8	0		
3-12	A2	9.8	80.3	9.9	0	0.6	0.4	0.8	8.0	46.0	34.3	54.5	1.8	0		
12-18	A2 & B2	7.4	67.8	24.8	0	0.1	0.1	0.4	6.8	40.6	27.2	47.7	0.6	0		
18-29	B2t	8.1	65.5	26.4	0	0.2	0.2	0.5	7.2	20.7	44.8	28.3	0.9	0		
29-42	B3	14.7	61.9	23.4	0	0.1	0.2	1.0	13.4	39.5	22.4	53.7	1.3	0		
42+	C1	15.0	67.2	17.8	0	0.2	0.3	0.7	13.8	46.0	21.2	60.4	1.2	0		

Depth (in.)	6A1a Organic carbon Pct	Nitrogen Pct	C/N	Carbonate as CaCO ₃ Pct	Ext. iron as Fe Pct	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH		
						4A1a ½ bar g/cc	4A1b Oven dry g/cc	4A1c g/cc		4B1c ½ bar Pct	4B2 15 bar Pct	8C1c (1:1) KCl		8C1e (1:1) H ₂ O		
0-3	6.70															6.5
3-12	0.78															6.3
12-18	0.30															5.9
18-29	0.27															5.1
29-42	0.24															5.4
42+	0.15															

Depth (in.)	Extractable bases 5B1a					6H2a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay			8U3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	Ext. CEC		Ext. iron	15-bar water	5C3 Sum cations Pct		5C1 NH ₄ OAc Pct	
0-3	18.0	3.2	0.2	0.9		8.6	30.9							72	
3-12	4.9	0.8	tr.	0.3		4.0	10.0							60	
12-18	10.0	2.3	0.2	0.2		4.8	17.5							73	
18-29	7.4	3.0	0.2	0.4		8.6	19.6							56	
29-42	8.2	3.4	0.2	0.3		7.1	19.2							63	
42+	6.7	3.2	0.2	0.2		4.4	14.7							70	

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt	Chl	Vm.	Mi.	Int	Qtz	Kl	Gibbsite
	7A2 X-ray				7A3			

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 type: Campia silt loam

Soil No.: 47Wis-3-14

Location: Barron County, Wisconsin. East side NW 1/4 of SW 1/4 Section 26, township 36N., range 13W.

Horizon and

Beltsville

Lab. Nos.

A1 471428	0 to 3 inches. Dark gray platy silt loam.
A2 471429	3 to 12 inches. Gray platy silt loam.
A2 & B2 471430	12 to 18 inches. Reddish brown blocky silt loam.
B2t 471431	18 to 29 inches. Dark reddish brown blocky silty clay loam.
B3 471432	29 to 42 inches. Reddish brown stratified silt, very fine sand and clay.
C1 471433	42+ inches. Light reddish brown to reddish brown stratified silt, very fine sand and clay.

SOIL TYPE Cassel LOCATION Marathon County, Wisconsin
 silt loam

SOIL NOS. S61Wis37-1

LAB. NOS. 15911-15917

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS	
		1B1a		3A1						2A2			
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VEPY FINE SAND	SILT	CLAY	0.2-0.002	0.02-0.0002	> 2		
		2-1	1-0.5	0.5-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.02	0.02-0.0002	< 19mm		
0-10	Ap	1.8a	4.3a	8.0	11.1	4.3	56.6	13.9	32.6	32.1	3	s11	
10-15	A21	1.9b	4.5b	10.2	14.2	5.2	54.8	9.2	36.5	28.4	2	s11	
15-18	A22g	2.0	4.9	12.9	18.6	6.7	44.0	10.9	35.4	21.7	3	1	
18-26	T1B&Ag	1.2	4.4	11.4	16.5	6.9	38.7	20.9	32.6	18.7	3	1	
26-36	T1B21g	0.8	2.3	5.4	10.8	7.6	44.5	28.6	32.6	24.2	Tr.	cl	
36-45	T1B22g	2.2	3.6	5.2	11.0	7.2	42.4	28.4	30.3	24.3	1	cl	
45-55	T1B3g	8.9	10.8	10.0	17.2	8.2	24.7	20.2	28.0	13.1	10	scl/fsl	
8C1a		ORGANIC MATTER			BULK DENSITY				WATER RETENTION				
pH	6A1a	6B1a	C/N	Field		State		30-Cm.		A. D.	4B1b	4B2	
	O.C.	N		4B4	4A1a	4B3	4A1c	4A1b	1/3-Bar	15-Bar			
	%	%		Water	g/cc	Water	g/cc	g/cc	Pieces	Sieved	%		
4.8	1.94	0.174	11						23.2		7.6		
4.8	0.42	0.040	10	16.3c	1.74c	15.7c	1.71c	1.86c	19.8		4.8		
4.4	0.14	0.018							15.8		4.9		
4.5	0.11	0.017							21.1		7.9		
4.3	0.12			19.2	1.56d	22.7	1.55	1.56d	19.0		10.5		
4.3	0.10								19.3		10.8		
4.3	0.06								16.3		7.8		
5A1a		EXTRACTABLE CATIONS				5B1a	5C1	5C3	5B1a	8D1	8D3	6C1a	6G1a
CATION EXCHANGE CAPACITY NH ₄ OAc	6N2b	6O2b	6H1a	6P2a	6Q2a	Base Sat. %	Base Sat. %	Base Sat. %	CEC e		Ext. Iron as Fe ₂ O ₃	Al Ext.	
	Ca	Mg	H	Na	K	NH ₄ OAc	on Sum Cations	me/100g	Bases me/100g	Clay	Ca/Mg	%	me/100g
	milliequivalents per 100g. soil												
11.8	3.2	0.9	12.7	0.1	0.2	37	26	4.4	85		1.6	1.7	
6.9	0.1	1.2	14.9	Tr.	Tr.	19	8	1.3	75		1.1	1.9	
7.1	0.1	1.9	13.1	0.1	0.1	31	14	2.2	65		1.2	2.3	
13.3	2.9	2.7	16.4	0.1	0.2	44	26	5.9	64	1.1	1.2	4.3	
17.7	4.0	4.5	18.8	0.1	0.2	50	32	8.8	62	0.9	1.1	5.4	
16.4	4.0	4.5	18.1	0.1	0.2	54	33	8.8	58	0.9	1.2	4.7	
12.3	3.3	3.6	13.4	0.1	0.2	58	35	7.2	61	0.9	1.7	1.8	
a. Many Fe-Mn? nodules. b. Few Fe-Mn? nodules. c. One clod. d. Duplicate clods differ by 0.12 g/cc, which exceeds confidence limits of ± 0.05 g/cc. e. Derivative, calculated ratio.													

Soil type: *Cassel silt loam

Soil Nos.: S61W15-37-1

Location: Marathon County, Wisconsin; southeast quarter of southeast quarter of Section 13, T28N, R5E.

Vegetation and use: Corn, small grains, and hay on cultivated sampling site; marginal areas of similar soils have stands of yellow birch, hemlock, soft maple and ash.

Slope and land form: Nearly level ground moraine with slopes of 0 to 1 percent.

Drainage and permeability: Somewhat poorly (imperfectly) drained with slow to medium runoff and slow internal drainage; permeability is slow.

Parent material: Shallow to moderately shallow loess over gray clay loam or silty clay loam glacial till.

Collected by: R. B. Grossman, Gerald Post, Harvey Strelow, Robert Bartelme, G. B. Lee, Charles Reynolds and Paul H. Carroll, September 20, 1961.

Described by: Paul H. Carroll and G. B. Lee.

Horizon and

Lincoln

Lab. Number

Ap 15911	0 to 10 inches. Dark grayish brown (10YR 4/2) and very dark grayish brown (10YR 3/2) silt loam with weak fine subangular blocky structure; friable; many fine fibrous roots; strongly acid; abrupt smooth boundary.
A21 15912	10 to 15 inches. Pale brown (10YR 6/3) gritty silt loam with moderate thin platy structure; very friable; many medium and large distinct strong brown (7.5YR 5/6) mottles; strongly acid; abrupt wavy boundary.
A22g 15913	15 to 18 inches. Grayish brown (2.5Y 5/2) gritty silt loam with moderate medium platy structure; friable; many large prominent strong brown (7.5YR 5/6) and yellowish red (5YR 5/6) mottles; very strongly acid; abrupt wavy boundary.
IIB and Ag 15914	18 to 26 inches. Grayish brown (2.5Y 5/2) gritty silty clay loam with moderate coarse prismatic structure that breaks easily on disturbance to moderate medium angular blocks; firm; interior of the prisms, occupying approximately 50 percent of the structural peds, is dark yellowish brown (10YR 4/4); moderately thin, (1 to 8 mm.) light gray (10YR 7/1) tongues of bleached coarse silt and fine sand extend along the prism faces and occupy approximately 15 percent of the horizon body; very strongly acid; abrupt irregular boundary.
IIB21g 15915	26 to 36 inches. Gray (5Y 5/1) gritty and slightly pebbly silty clay loam with moderate coarse prismatic structure and some weak coarse plates that break easily under disturbance to moderate medium angular blocks; very firm; interior of the prisms contain common large prominent mottles of brownish yellow (10YR 6/6) and yellowish red (5YR 5/6) color; moderately thick clay films occupy nearly all blocky ped faces and extend along some prism faces; a few of the prism faces display light discontinuous coatings of light gray (10YR 7/1) bleached coarse silt and fine sand; very strongly acid; clear smooth boundary.
IIB22g 15916	36 to 45 inches. Gray (5Y 5/1) gritty and slightly pebbly silty clay loam with weak coarse prismatic structure that breaks under disturbance to moderate medium angular blocks; very firm; common large prominent strong brown (7.5YR 5/6 - 5/8) mottles occupy approximately 15 percent of the horizon body; very strongly acid; gradual smooth boundary.
IIB3g 15917	45 to 55 inches. Gray (5Y 5/1) strong clay loam with weak coarse angular blocky structure; very firm; many large prominent mottles of strong brown (7.5YR 5/8) occupy approximately 50 percent of the horizon body; very strongly acid; gradual smooth boundary.
IICg Not sampled	55 to 60 inches plus. Gray (5Y 5/1) stony, generally massive, clay loam glacial till with large prominent strong brown (7.5YR 5/8) mottles occupying approximately 50 percent of the horizon body; very strongly acid.

Remarks: All colors shown in the soil profile are for moist conditions.

Mineralogy: (Method 7E1) The very fine sand from the particle-size analysis was examined under the petrographic microscope. Quartz is the most common mineral. A substantial percentage of feldspar is present. Highly altered feldspar is common; a portion of the altered grains is essentially aggregates of clay minerals. Some of the feldspar grains appear quite fresh. Quartz and possibly fresh feldspar increase towards the surface.

SOIL TYPE *Cassel LOCATION Marathon County, Wisconsin
silt loam

SOIL NOS. S61Wis37-2 LAB. NOS. 15918-15926

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS	
		1B1a		3A1						2A2			
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY	0.2-0.02	0.02-0.002	> 2		< 9mm
2-1	1-0.5	0.5-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.02	0.02-0.002	< 9mm				
0-8	Ap	2.6a	4.1a	7.2	9.5	4.2	59.2	13.2	33.4	33.3	4	s11	
8-11	A21g	1.8	5.0	9.4	11.9	5.1	55.4	11.4	36.1	28.4	3	s11	
11-14	A22g	1.9	4.4	8.4	11.0	4.9	54.4	15.0	33.7	29.4	2	s11	
14-18	1B&Ag	2.0	4.5	7.9	10.4	5.0	41.0	29.2	29.2	20.7	5	c1	
18-25	1B21g	1.7	3.3	4.8	8.3	5.0	41.4	35.5	27.6	22.5	3	c1	
25-32	1B22g	3.3	4.5	4.4	7.9	5.1	40.7	34.1	25.9	23.7	2	c1	
32-43	1B3g	2.5	4.6	5.3	9.0	5.2	40.2	33.2	25.7	23.9	3	c1	
43-57	1IC1g	3.7	5.4	6.0	10.3	5.8	39.7	29.1	27.3	23.0	5	c1	
57-66	1IC2	5.3	6.0	5.3	9.5	6.1	41.0	26.8	27.4	24.4	6	1/c1	
8C1a		ORGANIC MATTER			BULK DENSITY			WATER RETENTION					
pH	1:1	6A1a	6B1a	C/N	Field State	30-Cm.	A. D.	4B1b	1/3-Bar Pieces	4B2			
		O.C.	N		4B4	4A1a	4B3	4A1c			4A1b	15-Bar Sieved	
		%	%		Water %	g/cc	%	g/cc	%	%			
5.1		2.22	0.162	14	34.1	1.24	30.2	1.24	1.32	25.0	7.3		
4.8		0.40	0.047	8	26.2	1.48	26.4	1.46	1.48	19.4	5.2		
4.6		0.22	0.034							18.3	6.1		
4.4		0.15	0.024								11.7		
4.2		0.11	0.024		21.9	1.62	19.8	1.58c	1.86	23.1	14.4		
4.1		0.07								22.2	13.5		
4.3		0.06			18.4d	1.73d	16.0d	1.71d	1.95d	20.4	12.3		
4.6		0.05								19.9	12.3		
4.6		0.03			17.2	1.72	14.0	1.69	1.82	20.3	10.9		
5A1a		EXTRACTABLE CATIONS				5B1a	5C1	5C3	5B1a	8D1	8D3	6C1a	6G1a
CATION EXCHANGE CAPACITY NH4OAc	6N2b	6O2b	6H1a	6P2a	6Q2a	Base Sat. % NH4OAc	Base Sat. % on Sum Cations	Sum Ext. Bases me/100g	CEC e 100g Clay	Ext. Ca/Mg	Free Iron as Fe2O3 %	Al KCl-Ext. me/100g	
		Ca	Mg	H	Na	K							
	millequivalents per 100g. soil												
11.8	3.2	2.6	18.1	Tr.	0.3	52	25	6.1	89	1.2	1.1	1.1	
6.9	1.1	1.0	14.2	Tr.	0.1	32	13	2.2	60	1.1	1.2	2.5	
9.5	1.6	1.4	15.0	0.1	0.2	35	18	3.3	63	1.1	1.3	3.4	
17.3	4.6	4.8	18.2	0.2	0.3	57	35	9.9	59	1.0	1.3	4.9	
22.4	6.7	7.1	19.0	0.2	0.3	64	43	14.3	63	0.9	0.9	5.0	
21.5	6.9	7.4	17.8	0.3	0.3	69	46	14.9	63	0.9	1.1	3.5	
20.4	7.3	7.9	9.7	0.2	0.2	76	62	15.6	61	0.9	1.0	2.4	
18.8	7.3	7.3	7.1	0.2	0.2	80	68	15.0	65	1.0	1.1	1.5	
18.2	7.7	7.2	5.7	0.2	0.2	84	73	15.3	68	1.1	1.5	0.7	

- a. Few Fe-Mn nodules.
- b. 7.7 Kg/N to 60 inches (Method 6A).
- c. Duplicate clods differ by 0.12 g/cc, which exceeds confidence limits of ±0.05 g/cc.
- d. One clod.
- e. Derivative, calculated ratio.

Soil type: *Cassel silt loam

Soil Nos.: S61Ms-37-2

Location: Marathon County, Wisconsin; northeast quarter of northeast quarter of Section 26, T28N, R5E.

Vegetation and use: Soil Bank land; broom and fescue grasses and clover.

Slope and land form: Nearly level ground moraine having slopes of 0 to 1 percent.

Drainage and permeability: Somewhat poorly (imperfectly) drained, with slow to medium runoff and slow internal drainage; permeability is slow.

Parent material: Shallow to moderately shallow loess over gray clay loam on silty clay loam glacial till.

Collected by: R. B. Grossman, Gerald Post, Harvey Strelow, Robert Bartelme, G. B. Lee, Charles Reynolds, and Paul H. Carroll, September 20, 1961.

Described by: Paul H. Carroll and G. B. Lee.

Horizon and

Lincoln

Lab. Number

Ap 15918	0 to 3 inches. Very dark grayish brown (10YR 3/2) silt loam with weak very fine subangular blocky structure; friable; medium acid; many fine fibrous roots; abrupt smooth boundary.
A21g 15919	8 to 11 inches. Grayish brown (2.5Y 5/2) silt loam with weak very thin platy structure; very friable; many large prominent strong brown (7.5YR 5/8) mottles cover approximately 50 percent of the ped faces; very strongly acid; fibrous roots common; abrupt smooth boundary.
A22g 15920	11 to 14 inches. Grayish brown (2.5Y 5/2) silt loam with weak thin and medium platy structure that breaks on disturbance to very weak fine angular, somewhat flaky, blocks; very friable; many large prominent mottles of strong brown (7.5YR 5/6) color cover approximately 50 percent of the ped surfaces; very strongly acid; abrupt irregular boundary.
IIB and Ag 15921	14 to 18 inches. Grayish brown (2.5Y 5/2) slightly pebbly silty clay loam with moderate medium prismatic structure that breaks under disturbance to weak fine angular blocks; slightly plastic; gray (10YR 6/1) tongues of bleached silt, 1 to 8 mm. thick, extend along the prism faces and occupy approximately 15 percent of the horizon body; many medium and large prominent mottles of yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) color occupy approximately 40 percent of the horizon body; very strongly acid; abrupt smooth boundary.
IIB21g 15922	18 to 25 inches. Gray (5Y 5/1) slightly pebbly silty clay loam with strong medium prismatic structure with inclusions of moderate coarse plates that break under disturbance to moderate fine angular blocks; plastic; clay films are moderately thick and nearly continuous on prism faces but only patchy and thin on faces of included blocky peds; many large prominent brown (10YR 5/3) and yellowish brown (10YR 5/4) mottles occupy approximately 20 percent of the horizon body; very strongly acid; clear smooth boundary.
IIB22g 15923	25 to 32 inches. Gray (5Y 5/1) and grayish brown (2.5Y 5/2) slightly pebbly silty clay loam with moderate medium prismatic structure and moderate coarse plates that break under disturbance to moderate fine angular blocks; plastic; clay films are moderately thick and nearly continuous on prism faces but only patchy and thin on faces of included angular blocks; many large prominent dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) mottles occupy approximately 40 percent of the horizon body; very strongly acid; clear smooth boundary.
IIB3g 15924	32 to 43 inches. Gray (5Y 5/1) and grayish brown (2.5Y 5/2) slightly pebbly silty clay loam with weak coarse prismatic structure that breaks under slight pressure to weak coarse angular blocks; plastic; clay films are thin and patchy on all blocky ped faces and form clay flows in root and worm channels; many large prominent dark yellowish brown (10YR 4/4) mottles occupy approximately 50 percent of the horizon body; very strongly acid; diffuse smooth boundary.
IIC1g 15925	43 to 57 inches. Gray (5Y 5/1) and grayish brown (2.5Y 5/2) slightly pebbly, generally massive, silty clay loam glacial till; many large prominent dark yellowish brown (10YR 4/4) mottles occupy approximately 50 percent of the horizon body; many dark clay flows occur in root and worm channels; contains many manganese spots; very strongly acid; diffuse smooth boundary.
IIC2 15926	57 to 66 inches. Brown (7.5YR 5/2) clay loam glacial till, generally massive; few dark clay flows in root and worm channels; many large distinct dark brown (7.5YR 4/4) mottles occupy approximately 50 percent of the horizon body; contains many manganese spots; strongly acid.

Remarks: All colors given are for moist conditions.

Mineralogy: (Method 7B1) The very fine sand from the particle size analysis was examined under the petrographic microscope. Quartz is the most common mineral. A substantial percentage of feldspar is present. Highly altered feldspar is common; a portion of the altered grains is essentially aggregates of clay minerals. Some of the feldspar grains appear quite fresh. Quartz and possibly fresh feldspar increase toward the surface. Clay mineralogy as follows: (Methods 7A2, 7A3)

Horizon	(By Beltsville Laboratory)					
	'Montmorillonite'	'Montmorillonite- Vermiculite' Interlayer	'Vermiculite'	'Montmorillonite-' Mica Interlayer	'Mica'	'% Kaolinite (by DTA)
Ap	xx	-	t	-	t	5
A22g	xx	-	t	-	t	5
IIB and Ag	xxxx	-	t	-	t	5
IIB22g	xxxx	-	t	-	t	5
IIB3g	xxxx	-	t	-	t	5
IIC2	xxxx	-	-	-	t	5

dash, none detected; t, trace; x, small; xx, moderate; xxx, abundant; xxxx, dominant

SOIL *Dodge silt loam SOIL Nos. 562W1s-11-1 LOCATION Columbia County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 17800-17809 May 1966
General Methods: 1A, 1Elb, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm)											Clay		Coarse fragments		
		Total		Sand					Silt				3A1a Gation-ate	Non-Gation-ate	3B2 Vol. Pct.	3B1 Pct. > 2	2-19 Pct. of
		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 (0.02-0.002)	Int III (0.02-0.002)	Int II (0.2-0.02)					
Pct. of < 2 mm																	
0-8	Ap	7.6	78.6	13.8	0.1a	0.3a	0.7b	1.3	5.2	39.4	39.2	45.3	2.4				
8-10	A3	5.8	73.1	21.1	-	0.2b	0.5b	1.0	4.1	34.8	38.3	39.4	1.7				
10-16	B1	5.5	70.3	24.2	-	0.2b	0.4b	0.9	4.0	34.4	35.9	38.9	1.5				tr
16-23	B21	5.0	66.9	28.1	0.1a	0.2b	0.3b	0.8	3.6	34.0	32.9	38.0	1.4				tr
23-31	B22	7.9	63.1	29.0	0.1	0.6	1.3	2.4	3.5	32.1	31.0	36.8	4.4				tr
31-39	11B23	48.7	24.6	26.7	0.6	4.6	12.0	23.8	7.7	11.1	13.5	29.7	41.0				tr
39-47	11B3	66.1	20.7	13.2	0.8c	5.0c	13.7c	31.9c	14.7c	11.8	8.9	42.6	51.4	-	13	11	18
47-53	11C1	72.0	20.0	8.0	1.4c	5.6c	15.5c	33.5c	16.0c	12.1	7.9	44.4	56.0	-	8	14	20
53-67	11C2	71.4	21.7	6.9	2.6d	8.2d	17.5e	30.5e	12.6c	11.4	10.3	37.9	58.8	-	7	16	22
67-81	11C3	70.6	22.4	7.0	3.1d	8.0d	17.3e	29.8c	12.4c	11.6	10.8	37.6	58.2	tr	7	23	30

Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6C2a Ext. Iron as Fe Pct.	6E1b 6E2a Carbonate as CaCO3 Pct.	Bulk density				4D1 COLE g/cc	Water content				8C1a (1:1)	pH
						4A1a Field State	4A1d 1/3-Bar	4A1e 1/3-Bar	4A1b Air-Dry		4B4 Field State	4B1c 1/3-Bar	4B2 15-Bar	4C1 1/3-to 15-Bar		
						g/cc	h g/cc	g/cc	g/cc		Pct	Pct	Pct	in./in.		
0-8	1.44	0.132	11	0.7	tr(s)	1.34	1.33	1.40	0.017	15.2	21.8	6.7	0.20			6.3
8-10	0.48	0.053	9	0.9	-(s)	1.53	1.50	1.54	0.010	10.9	20.8	8.7	0.18			6.4
10-16	0.39	0.042	9	1.1		1.48	1.42	1.54	0.028	10.8	21.2	9.3	0.17			5.2
16-23	0.36	0.037	10	1.2		1.53g	1.47g	1.60g	0.028			11.7				5.0
23-31	0.28	0.029	10	1.3		1.58	1.52	1.66	0.028	16.6	20.6	12.6	0.12			5.0
31-39	0.21	0.024	10	1.3	-(s)	1.56	1.46	1.66	0.044	16.1	18.0	11.0	0.10			6.2
39-47	0.14	0.012		0.7		1.67g	1.43	1.62g	0.039			5.4				7.5
47-53	0.08			0.4		1.78g	1.52	1.78g				3.4				7.8
53-67	0.07			0.3		1.78	1.50	1.781	1.77			2.9	0.11m			7.9
67-81	0.05			0.3		1.86	1.43	1.861	1.86	10.1	10.4k	2.8	0.11m			8.0

Depth (in.)	Extractable bases				5H1a Sum	6H1a Ext. Acidity	6H1b Ext. Sum	6H1c NH4OAc	6G1b KCl-Ext. Al	8D3 Ca/Mg	Base saturation	
	6N2a Ca	6O2a Mg	6P2a Na	6Q2a K							5C3 Sum	5C1 NH4OAc
	meq/100 g										Pct	Pct
0-8	8.0	3.3	0.1	0.2	11.6	3.4	15.0	11.6		2.4	77	100
8-10	7.7	4.1	0.1	0.2	12.1	5.3	17.4	12.8		1.9	70	94
10-16	7.5	4.4	0.1	0.3	12.3	6.6	18.9	14.5	0.3	1.7	65	85
16-23	8.7	5.9	0.1	0.4	15.1	8.4	23.5	17.8	0.8	1.5	64	85
23-31	9.8	6.7	0.1	0.4	17.0	7.8	24.8	19.2	0.5	1.5	68	88
31-39	8.4	6.3	0.1	0.3	15.1	3.7	18.8	15.2		1.3	80	99
39-47	4.9n	3.2p	tr	0.2	8.3			7.2		1.5		115
47-53	2.6n	2.0p	tr	0.1	4.7			3.8		1.3		124
53-67	2.1n	1.6p	tr	0.1	3.8			2.9		1.3		131
67-81	2.2n	1.6p	tr	0.1	3.9			2.6		1.4		150

Depth (in.)	Ratios to Clay 8D1			a. > 50-100% Fe-Mn.	j. Coefficient of Linear Extensibility.
	NH4OAc CEC	Ext. Iron	15-Bar Water		
0-8	0.84	0.05	0.48	b. 5-25 Fe-Mn.	k. 1/10-Bar
8-10	0.61	0.04	0.41	c. 0-5% carbonate.	m. 1/10-Bar (Method 4C2).
10-16	0.60	0.05	0.38	d. 25-50% carbonate.	n. NH4Cl-EtOH extraction (Method 6N3a).
16-23	0.63	0.04	0.42	e. 5-25% carbonate.	p. NH4Cl-EtOH extraction (Method 6O3a).
23-31	0.66	0.04	0.43	f. 8.3 kg/m ² to 60 inches (Method 6A).	
31-39	0.60	0.05	0.41	g. Estimated.	
39-47	0.54	0.05	0.41	h. Calculated to include volume but not weight of > 2-mm material. (Method 3B2)	
47-53	0.48	0.05	0.42	i. 1/10-Bar (Method 4Alg).	
53-67	0.42	0.04	0.42		
67-81	0.37	0.04	0.42	q. One or more horizons has relatively low cation exchange capacity. As cation exchange capacity decreases, the relative error of base saturation increases. Trace quantities are omitted from the sum of bases. For very low CEC values, this omission contributes significantly to the relative error of base saturation.	

Soil Type: *Dodge silt loam
 Soil Nos.: S62Wis-11.1
 Location: SW 1/4 NE 1/4, Sec. 29, T10N, R12E, Columbia County, Wisconsin.
 Position and Relief: Undulating ground moraine; 1 to 2 percent convex slope.
 Drainage and Permeability: Well drained; moderately permeable; no ground water within the 7-foot observed depth.
 Parent Material: Loess over brown calcareous, sandy loam glacial till.
 Vegetation: Corn, hay, small grains.
 Erosion: Slight.
 Stoniness: Few stones in the till.
 Root Distribution: Abundant fibrous roots to 10 inches; fewer below.
 Sampled by: P. Carroll, G. Lee, B. Watson, R. Grossman and D. McMurtry.
 Described by: P. H. Carroll and G. Lee.

Horizon and
 Lincoln
 Lab. No.

- A₁
17800 0 to 8 inches. Very dark grayish brown (10YR 3/2) to dark grayish brown (10YR 4/2) silt loam with weak fine subangular blocky structure; friable; very fine fibrous roots numerous; neutral; abrupt smooth boundary.
- A₃
17801 8 to 10 inches. Dark brown (10YR 4/3) silt loam that exhibits a yellowish brown (10YR 5/4) color when rubbed; weak medium platy structure that breaks when disturbed to weak very fine subangular blocks; friable; fine fibrous roots common; neutral; clear smooth boundary.
- B₁
17802 10 to 16 inches. Dark brown (10YR 4/3) silt loam that exhibits a yellowish brown (10YR 5/4) color when rubbed; weak fine and very fine subangular blocky structure; friable; ped faces have thin patchy bleached silt coats; common to few fine roots; slightly acid; clear smooth boundary.
- B₂₁
17803 16 to 23 inches. Dark brown (10YR 4/3) heavy silt loam that exhibits a yellowish brown (10YR 5/4) color when rubbed; moderate fine angular and subangular blocky structure; firm; medium acid; gradual smooth boundary.
- B₂₂
17804 23 to 31 inches. Dark yellowish brown (10YR 4/4) light silty clay loam having dark brown (10YR 4/3) coatings on ped faces; weak medium prismatic structure that breaks when disturbed to moderate and strong angular and subangular blocks; firm; few dark-colored ferric hydroxide or manganese spots on ped faces; medium acid; gradual wavy boundary.
- IIB₂₃
17805 31 to 39 inches. Dark brown (7.5YR 4/4) clay loam having ped faces also dark brown in color (7.5YR 4/3) but slightly lower in value than ped interiors; weak coarse prismatic structure that breaks when disturbed to moderate medium subangular blocks; firm; few dark-colored ferric hydroxide or manganese spots and thin nearly continuous clay films of dark brown (7.5YR 3/2) on ped faces; slightly acid; clear wavy to irregular boundary.
- IIB₃
17806 39 to 47 inches. Dark brown (7.5YR 4/4) light clay loam to loam having ped faces also dark brown in color (7.5YR 4/3) but slightly lower in value than ped interiors; weak medium and coarse subangular blocky structure; friable; thin patchy clay films on ped faces and lining root and wormholes; mildly alkaline; clear wavy boundary.
- IIC₁
17807 47 to 53 inches. Brown (7.5YR 5/4) light loam having 5 percent by volume of rock fragments coarser than 3/4 inch; very weak thin platy structure to nearly massive; friable; weak effervescence with HCl; clear wavy boundary.
- IIC₂
17808 53 to 67 inches. Yellowish brown (10YR 5/4) sandy loam with 5 percent by volume of rock fragments coarser than 3/4 inch; weak thin platy structure to nearly massive; friable; strong effervescence with HCl; gradual smooth boundary.
- IIC₃
17809 67 to 81 inches. Yellowish brown (10YR 5/4) sandy loam with approximately 10 percent by volume of rock fragments coarser than 3/4 inch; weak to moderate thin platy structure; friable; strong effervescence with HCl.

SOIL *Dodge silt loam SOIL Nos. S62Ws-13-1 LOCATION Dane County, Wisconsin
 SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 17810-17821 May, 1966
 General Methods: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm)											3A1		Clay		2A2 Coarse fragments		
		Total		Sand					Silt				int II (0.2-0.02)	(2-0.1)	3A1a Carbonate	Non-Carbonate	3B2 > 2 Vol. Pct.	3B1 > 2 Pct. of	2-19 < 19
		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)								
0-6	Ap1	5.4	78.7	15.9	-	0.3a	0.4b	0.9c	3.8	38.8	39.9	43.1	1.6						
6-8	Ap2	5.2	78.0	16.8	-	0.2a	0.4b	0.9c	3.7	38.5	39.5	42.7	1.5						
8-13	B11	3.2	68.4	28.4	-	0.1a	0.1b	0.3c	2.7	31.2	37.2	34.1	0.5						tr
13-19	B12	3.4	64.4	32.2	0.1a	0.1a	0.1b	0.4c	2.7	32.5	31.9	35.4	0.7						
19-23	B21	4.1	64.2	31.7	tr	0.2	0.3	0.6	3.0	34.0	30.2	37.3	1.1						
23-29	B22	8.6	60.3	31.1	0.3	0.8	1.5	2.8	3.2	30.0	30.3	34.6	5.4						tr
29-35	11E23	49.9	25.9	24.2	1.0	5.2	13.3d	23.1d	7.3d	12.3	13.6	30.0	42.6	-	24				4
35-39	11E3	63.5	21.9	14.6	1.4e	5.8e	13.9e	29.2d	13.2d	8.7	10.5	39.0	50.3	-	15	7	11	3	3
39-48	11C1	66.4	26.6	7.0	1.6f	5.9e	15.1e	29.4d	14.4d	11.4	11.3	43.9	52.0	-	7	13	19	13	13
48-60	11C2	64.4	29.5	6.1	2.1f	5.9f	13.0e	27.6d	15.8d	17.0	12.5	46.8	48.6	-	6	14	19	13	13
60-72	11C3	62.7	31.8	5.5	2.8f	5.7f	12.2e	26.1e	15.9d	18.1	13.7	47.4	46.8	tr	6	21	27	16	16
72-84	11C4	64.9	30.0	5.1	1.9f	6.0f	13.7e	28.1e	15.2d	17.8	12.2	47.0	49.7	tr	5	20	26	15	15
Depth (in.)	Organic carbon g Pct	Nitrogen Pct.	C/N	Ext. Iron as Fe Pct.	6E1b Carbonate as CaCO3 Pct.	4A1a Field-State g/cc	Bulk density			4D1 COLE g	Water content				8C1a (1.1)	pH			
							4A1d 1/3-Bar g/cc	4A1d 1/3-Bar g/cc	4A1b Air-Dry g/cc		4B4 Field-State Pct.	4B1c 1/3-Bar Pct.	4B2 15-Bar Pct.	4C1 15-Bar in./in					
0-6	1.12	0.107	10	0.7	-(s)	1.42		1.41	1.42	0.003	15.3	20.7	7.6	0.18				6.0	
6-8	0.98	0.095	10	0.7	-(s)	1.50		1.42	1.48	0.014	10.3	22.0	7.4	0.21				6.2	
8-13	0.36	0.041	9	1.2	-(a)	1.46		1.43	1.48	0.010	12.2	20.2	11.2	0.13				6.0	
13-19	0.29	0.029	10	1.4		1.50		1.46	1.54	0.017	14.6	22.2	13.2	0.13				5.5	
19-23	0.24	0.026		1.3		1.53h		1.48h	1.58h	0.020			13.1					5.1	
23-29	0.23	0.027		1.3		1.56		1.50	1.62	0.028	16.4	22.9	13.3	0.14				5.3	
29-35	0.16	0.019		1.1		1.62		1.58	1.66	0.017	13.6	16.0	10.0	0.09				6.3	
35-39	0.12	0.012		0.7	14	1.62h		1.47	1.58h	0.016			6.1					7.5	
39-48	0.07			0.5	28	1.73		1.51	1.74		10.1	9.6	3.5	0.10				7.8	
48-60	0.06			0.4	33	1.79h		1.55	1.81h	1.78h			3.5					8.0	
60-72	0.05			0.3	35	1.87		1.50	1.89	1.86	9.6	10.1	2.6	0.11				8.0	
72-84	0.06			0.4	36	1.87h		1.51	1.89h	1.86h			2.4					8.1	
Depth (in.)	Extractable bases				5E1a Sum	6H1a Ext. Acidity	6A3a Sum Cations	6G1b NH4 OAc Ext. Al	8D3 Ca/Mg	Base Sat.									
	6N2a Ca	6O2a Mg	6P2a Na	6Q2a K						5C3 Sum	5C1 NH4 OAc								
0-6	7.7	3.1	tr	0.3	11.1	4.6	15.7	11.7			2.5	71	95						
6-8	8.0	3.2	tr	0.2	11.4	4.1	15.5	12.2			2.5	74	93						
8-13	11.0	5.7	0.1	0.4	17.2	5.2	22.4	17.7			1.9	77	97						
13-19	11.7	7.1	0.1	0.5	19.4	7.5	26.9	20.9	0.3		1.6	72	93						
19-23	10.8	7.3	0.1	0.5	18.7	8.3	27.0	20.9	0.8		1.5	69	89						
23-29	11.2	7.6	0.1	0.5	19.4	7.8	27.2	21.1	0.8		1.5	71	92						
29-35	6.6	6.0	0.1	0.4	13.1	3.7	16.8	14.6			1.1	78	90						
35-39	5.5k	3.5m	0.1	0.2	9.3			8.4			1.6		111						
39-48	2.7k	1.8m	tr	0.1	4.6			3.8			1.5		121						
48-60	2.4k	1.6m	tr	0.1	4.1			3.0			1.5		137						
60-72	2.3k	1.5m	tr	0.1	4.2			2.7			1.3		126						
72-84	2.2k	1.5m	tr	0.1	3.8			2.4			1.5		158						
Depth (in.)	Ratios to Clay 8D1				NH4 OAc CEC	Ext. Iron	15-Bar Water	a. > 50-100% Fe-Mn.	b. 25-50% Fe-Mn.	c. 5-25% Fe-Mn.	d. 0-5% carbonate.	e. 5-25% carbonate.	f. 25-50% carbonate.	g. 6.4 kg/m ² to 60 inches (Method 6A).	h. Estimated.	i. Calculated to include volume but not weight of > 2-mm. material. (Method 3B2)	j. Coefficient of linear Extensibility.	k. NH4 Cl-EtOH extraction (Method 6N3a).	m. NH4 Cl-EtOH extraction (Method 6O3a).
	0-6	0.74	0.04	0.48															
6-8	0.73	0.04	0.44																
8-13	0.62	0.04	0.39																
13-19	0.65	0.04	0.40																
19-23	0.66	0.04	0.41																
23-29	0.68	0.04	0.43																
29-35	0.60	0.05	0.41																
35-39	0.58	0.05	0.42																
39-48	0.54	0.06	0.50																
48-60	0.49	0.07	0.57																
60-72	0.49	0.05	0.47																
72-84	0.47	0.08	0.47																

Soil Type: *Dodge silt loam
 Soil Nos.: S62W1s-13-1
 Location: NW 1/4 NE 1/4, Sec. 13, T9N, R11E, Dane County, Wisconsin; 100 yards south of road.
 Position and Relief: Undulating ground moraine; 1 to 2 percent convex slope.
 Drainage and Permeability: Well drained; moderately permeable; no ground water within the 7-foot observed depth.
 Parent Material: Loess over brown calcareous sandy loam glacial till.
 Vegetation: Corn, hay and small grains.
 Erosion: Slight.
 Stoniness: Few large stones in the till.
 Root Distribution: Abundant fibrous roots to 4 inches, common to 29 inches and few to 39 inches.
 Sampled by: E. Carroll, G. Lee, B. Watson, R. Crossman and D. McMurtry.
 Described by: E. H. Carroll and G. Lee.

Horizon and
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- Ap1
17810 0 to 6 inches. Very dark grayish brown (10YR 3/2) to dark grayish brown (10YR 4/2) silt loam with weak fine crumb structure; very friable; numerous very fine roots; slightly acid; abrupt smooth boundary.
- Ap2
17811 6 to 9 inches. Very dark grayish brown (10YR 3/2) to dark grayish brown (10YR 4/2) silt loam with weak fine subangular blocky structure; friable; slightly acid; abrupt smooth boundary.
- B11
17812 9 to 13 inches. Dark brown (10YR 4/3) silt loam that exhibits a yellowish brown (10YR 5/4) color when rubbed; weak medium platy structure that breaks on disturbance to weak very fine angular blocks; thin patchy bleached silt coats on ped faces; friable; slightly acid; clear smooth boundary.
- B12
17813 13 to 19 inches. Dark brown (10YR 4/3) silt loam that exhibits a yellowish brown (10YR 5/4) color when rubbed; moderate very fine angular and subangular blocky structure; friable; medium acid; clear smooth boundary.
- B21
17814 19 to 23 inches. Dark brown (10YR 4/3) heavy silt loam that exhibits a yellowish brown (10YR 5/4) color when rubbed; weak medium prismatic structure that breaks under disturbance to moderate and strong fine angular and subangular blocks; firm; strongly acid; clear smooth boundary.
- B22
17815 23 to 29 inches. Dark yellowish brown (10YR 4/4) light silty clay loam with dark brown (10YR 4/3) coatings on ped faces; weak medium prismatic structure that breaks under disturbance to moderate medium angular and subangular blocks; firm; few dark-colored ferric hydroxide or manganese spots on ped faces; medium acid; clear smooth boundary.
- I1B23
17816 29 to 35 inches. Dark brown (7.5YR 4/4) clay loam having ped faces also dark brown in color (7.5YR 4/3) but slightly lower in value than ped interiors; weak coarse prismatic structure that breaks on disturbance to moderate medium subangular blocks; firm to very firm; few dark-colored ferric hydroxide or manganese spots and nearly continuous dark brown (7.5YR 3/2) thin clay films on ped faces; strongly acid; gradual irregular boundary.
- I1B3
17817 35 to 39 inches. Dark brown (7.5YR 4/4) light clay loam to loam having approximately 5 percent rock fragments greater than 3/4-inch diameter; ped faces also are dark brown in color (7.5YR 4/3) but slightly lower in value than ped interiors; weak coarse subangular blocky structure; firm; thin patchy clay films of dark brown (7.5YR 3/2) color on some ped faces and lining root and worm channels; slight effervescence with HCl; gradual smooth boundary.
- I1C1
17818 39 to 48 inches. Yellowish brown (10YR 5/4) light loam having approximately 5 percent rock fragments and pebbles greater than 3/4-inch diameter; weak medium subangular blocky structure; friable; strong effervescence with HCl; gradual smooth boundary.
- I1C2
17819 48 to 60 inches. Yellowish brown (10YR 5/4) sandy loam having approximately 5 percent rock fragments and pebbles greater than 3/4-inch diameter; weak thin platy structure; friable; strong effervescence with HCl; gradual smooth boundary.
- I1C3
17820 60 to 72 inches. Brown (10YR 5/3) and pale brown (10YR 6/3) sandy loam having approximately 10 percent rock fragments and pebbles greater than 3/4-inch diameter; weak thin platy structure; friable to somewhat brittle; strong effervescence with HCl; diffuse smooth boundary.
- I1C4
17821 72 to 84 inches. Brown (10YR 5/3) and pale brown (10YR 6/3) sandy loam having approximately 10 percent rock fragments and pebbles greater than 3/4-inch diameter; weak thin platy structure; friable; strong effervescence with HCl.

SOIL Elbe silty clay loam SOIL Nos. 53Wis-14-16 LOCATION Dodge County, Wisconsin

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 54649 - 54655

Depth (in.)	Horizon	1B1b Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1				
		Total												2A2 > 2 Pct.	2-19 Pct.	19-76 Pct. of < 76mm		
		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)	Silt Int III (0.05-0.02)	Int II (0.2-0.02)	(2-0.1)						
0-4	A11		a															
4-9	A12		58.7	35.5	-	0.6	0.8	2.0	2.4		37.5	24.7						
9-14	A3g		59.6	35.0	-	0.4	0.6	1.5	2.9		36.8	26.7						
14-24	Cg1		64.9	30.4	0.1	0.2	0.3	1.0	3.1		37.1	31.6						
24-30	Cg2		57.8	38.6	0.1	0.7	0.4	0.8	1.6		40.3	19.6						
30-46	Cg3		57.5	39.4	-	0.4	0.4	0.8	1.5		41.0	18.5						
46+	IIC		32.6	5.7	7.1	7.8	9.0	20.0	17.8		13.8	48.5						

Depth (in.)	6A1a Organic carbon Pct.	Nitrogen Pct.	C/N	6E1e Carbonate as CaCO ₃ Pct.	Ext. iron as Fe Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD m/m	pH		
						4A1e 1/2 bar g/cc	4A1h Oven dry g/cc	4B1c 1/2 bar Pct.		4B2 15 bar Pct.	8C1c (1:1) KCl	8C1a (1:1) H ₂ O				
														g/cc	g/cc	Pct.
0-4	10.6															
4-9	4.8															6.5
9-14	0.97															6.7
14-24	0.32															7.1
24-30	0.39															7.3
30-46	0.39															7.4
46+	0.12			4.1												7.3
																8.0

Depth (in.)	6N2d Extractable bases 5B1a					6H2a Ext acidity	CEC		6G1d Ext. Al	Ratios to clay			8O3 Ca/Mg	Base saturation	
	Ca	Mg	Na	K	Sum		5A3a Sum cations	Ext. Al		CEC Sum	Ext. iron	15-bar water		5C3 Sum cations Pct.	5C1 NH ₄ OAc Pct.
0-4	41.6	18.9	0.2	0.5		10.8	72.0								85
4-9	32.6	15.5	0.2	0.4		7.4	56.1								87
9-14	21.4	12.3	0.2	0.4		2.7	37.0								93
14-24	14.1	10.4	0.1	0.4		1.6	26.6								94
24-30	15.4	11.2	0.2	0.5		2.2	29.5								92
30-46	15.1	10.8	0.1	0.5		2.0	28.5								93
46+	b														

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt	Chl	Vm	Mi	Int	Qtz.	Kl	Gibbsite
	7A2 X-ray				7A3			

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

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

a Organic layer.
b Calcareous not analyzed.

Soil Type: Elba silty clay loam
 Soil No.: 53Wis-14-16
 Location: Dodge County, Wisconsin. NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 14 T10N R14E.
 Vegetation and Land use: Elm, ash, and grasses.
 Sampled by: G. B. Lee

Horizon and
 Beltsville
 Lab. No.

A11 0 to 4 inches. Black (10YR 2/1) light silty clay loam high in organic matter; well developed medium to coarse crumb structure; friable; high concentration of small roots; gradual lower horizon boundary; pH is 6.7.
 54649

A12 4 to 9 inches. Black (N/2) silty clay loam; well developed medium to coarse blocky structure that breaks into well developed fine blocky aggregates; slightly firm; fewer small roots but many large roots; clear wavy lower horizon boundary; pH is 6.8.
 54650

A3g 9 to 14 inches. Very dark (3Y 3/1) to dark gray (5Y 4/1) silty clay loam; structure and consistence as in above horizon. This is a transitional horizon. pH is 7.0.
 54651

C1g 14 to 24 inches. Uniform olive gray (5Y 5/2) heavy silty clay loam; moderate, medium to coarse, prismatic structure which breaks to medium blocky aggregates; firm; lower horizon boundary is gradual; pH is 7.3.
 54652

C2g 24 to 30 inches. Mainly light brownish gray, grayish brown (2.5Y 5/2) silty clay, mottled light yellowish brown (10YR 6/4) weak, coarse prismatic structure; very firm; pH is 7.2.
 54653

C3g 30 to 46 inches. As above, but becoming massive in structure, a few small roots are present; wavy, abrupt lower horizon boundary; pH is 7.2.
 54654

I1C 46 inches plus. Variegated light yellowish brown (10YR 6/4) and brownish yellow (10YR 6/8) gravelly loam; massive; loose; calcareous; roots are present in this layer.
 54655

Notes: Colors refer to moist soil.

SOIL Elba silt loam, thin surface SOIL Nos. 54W1a-14-22 LOCATION Dodge County, Wisconsin

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 5523-5526

Depth (in.)	Horizon	1B1b Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1		
		Total			Sand					Silt				2A2 > 2 Pct	2-19 Pct	19-76 Pct of < 76mm
		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 (0.2-0.1)				
0-7	A1	62.1	35.4	0.1	0.3	0.2	0.5	1.4 ^{6a}	36.4	27.3			0			
7-9	A3g	64.4	34.3	-	-	-	0.1	1.2		37.7	27.9		0			
9-20	C1g	68.6	30.1	-	-	-	0.1	1.2		40.3	29.5		0			
20-60+	C2g	72.1	23.9	-	0.1	0.1	0.3	3.5		34.5	41.2		0			
Pct. of < 2 mm																
Depth (in.)	6A1a Organic carbon Pct	Nitrogen Pct	C/N	Carbonate as CaCO ₃ Pct	Ext iron as Fe Pct	Bulk density 4A1e 4A1b ½ bar Oven dry g/cc g/cc g/cc			4D1 COLE	Water content 4B1c 4B2 ½ bar 15 bar Pct. Pct. Pct.			4C1 WRD m/n	pH 8C1c 8C1a (1-1) (1-1) KCl H ₂ O		
0-7	5.5														6.8	
7-9	0.85														7.1	
9-20	0.27														7.1	
20-60+	0.17														7.5	
Depth (in.)	Extractable bases 5B1a 6N2d 6O2b 6P2a 6Q2a Ca Mg Na K meq/100 g				6M2a Ext. acidity	CEC 5A3a Sum cations		6G1d Ext. Al	Retros to clay CEC Sum Ext. Iron 15-bar water			8D3 Ca/Mg	Base saturation 5C3 5C1 Sum cations Pct NH ₄ OAc Pct.			
0-7	31.3	13.0	0.2	0.5	6.3	51.3							88			
7-9	18.9	10.7	0.2	0.4	2.6	32.8							92			
9-20	14.9	10.0	0.2	0.4	1.6	27.1							94			
20-60+	11.5	7.4	0.2	0.4	1.1	20.6							95			
Depth (in.)	Clay Fraction Analysis 7A1b-d Mt. Chl. Vm. M ₁ Int. Qtz. Kl. Gibbsite 7A2 X-ray 7A3															

Mt. = Montmorillonite, Chl. = chlorite, Vm. = Vermiculite, m₁ = 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.
s. Undecomposed organic matter in sand fractions.

Soil Type: Elba silt loam, thin surface.
 Soil No.: 54Wis-14-22
 Location: Dodge County, Wisconsin. SW4 NE4 Sec. 31 T9N R13E.
 Vegetation and land use: Consisted of native sedges and grasses.
 Drainage: Very poorly drained.
 Sampled by: G. B. Lee

Horizon and
 Beltsville
 Lab. No.

- A1
 5523 0 to 7 inches. Black (N/2) silty clay loam high in organic matter; moderate, medium sub-angular blocky structure in place which breaks down into moderate to strong very fine sub-angular blocky aggregates; firm when moist and very hard when dry. There is a high concentration of roots in this horizon which varies from 5 to 10 inches in thickness. It's lower horizon boundary is gradual; pH is 5.3.
- A3g
 5524 7 to 9 inches. Very dark gray and dark gray (N/3, N/4) silty clay loam; weak medium sub-angular blocky structure in place which breaks down into moderate fine granular aggregates; firm when moist and slightly hard dry; fewer roots than in above horizon; earthworm mixing is evident. This is a transitional horizon that varies in thickness from one to four inches. It's lower boundary is clear and wavy; pH is 6.5.
- Cg1
 5525 9 to 20 inches. Olive gray (5Y 5/2) silty clay loam; moderate fine blocky structure; sticky when wet and very hard dry; lower horizon boundary is gradual; pH is 7.5.
- Cg2
 5526 20 to 60 inches plus. Light olive gray (5Y 6/2) silty clay loam mottled with rust; moderate, medium, prismatic structure in place which tends to become massive with depth; sticky when wet and hard dry. When sampled, ground water entered the pit at about 30 inches (through a root channel) and rose to within 22 inches of the surface. A few roots were present in this horizon. No investigation was made beyond 60 inches; pH is 8.5, becoming calcareous at depth.

Notes: Colors refer to moist soil unless indicated otherwise.

SOIL Emmet loamy fine sand SOIL Nos. S59Wis-42-1 LOCATION Oconto County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 11831-11840 April 1966

General Methods: 1A, 1B1a, 2A1, 2B

Depth (in)	Horizon	Size class and particle diameter (mm) 3A1													Clay Carbonate	Non-Carbonate	Coarse fragments 2A2		
		Total		Clay (= 0.002)	Very coarse (2-1)	Sand			Silt			Int II (0.2-0.02)	(> 2 < 19)	2-19			19-76		
		Sand (2-0.05)	Silt (0.05-0.002)			Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Int III (0.05-0.02)	Int II (0.2-0.02)							(2-0.1)	Pct of < 76mm
0-1/2	A1	62.6	29.6	7.3	0.1	0.9	2.3	27.1	32.2	16.1	13.5	69.9	30.4						
1/2-2 1/2	A2	67.4	28.2	4.4	0.4	1.0	2.4	29.1	34.5	16.8	11.4	75.2	32.9						
2 1/2-3 1/2	B1r1	70.3	25.6	4.1	0.2	1.1	2.5	30.3	36.2	15.9	9.7	77.1	34.1						
3 1/2-15	B1r2	76.0	20.1	3.9	0.3	1.7	3.8	33.6	36.6	13.9	6.2	77.2	39.4						
15-23	B1r-C	77.1	20.0	2.9	1.0	5.3	11.7	35.2	23.9	11.7	8.3	56.2	53.2						
23-31	A2m	73.8	21.6	4.6	1.7	2.6	14.8	33.1	17.6	13.4	8.2	47.2	56.2						
31-35	IIA2m-B	62.4	28.3	9.3	1.3	5.3	12.9	28.4	14.0	13.1	15.2	40.5	48.4						
35-40	IIBt	58.9	21.8	19.3	1.6a	6.2a	11.2a	26.6a	13.3a	11.5	10.3	37.6	45.6						
40-57	IIC1	63.0	24.5	12.5	2.1b	5.4a	11.2a	28.2a	16.1a	14.1	10.4	44.2	46.9						
57-66	IIC2	68.3	25.2	6.5	2.0b	5.6a	10.1a	30.1a	20.5a	15.3	9.9	52.2	47.8						

Depth (in)	6A1a Organic carbon	6B1a Nitrogen	C/N	6E1a 6E2 Carbon as CaCO ₃	6C1a Ext. Iron as Fe ₂ O ₃ Pct.	Bulk density			4D1 COLE C	Water content				pH	8C1a (11)	
						4A1a Field State	4A1c 30-cm Oven- Dry	4A1h Oven- Dry		4B1 Field State	4B3 30-cm	4B1b 1/10- Bar	4B2 15- Bar			4C2 1/10- Bar minus 15-Bar in./in.
0-1/2	9.56	0.463	20	Tr(s)	0.7										6.6	
1/2-2 1/2	1.58	0.098	16		0.8							15.5	4.0		6.2	
2 1/2-3 1/2	0.45	0.035	13		1.0							11.1	2.2		6.0	
3 1/2-15	0.27	0.026	10		0.9							8.8	1.8		6.0	
15-23	0.16	0.016			0.8							7.8	1.4		6.2	
23-31	0.06	0.005			0.8							7.8	0.9		6.5	
31-35	0.15				1.2	1.68	1.67	1.66	-	0.8	10.8	12.2	2.8	0.16		6.5
35-40	0.25			3	1.3								7.4			7.4
40-57	0.18			10	1.1	1.73	1.67	1.70	0.007	3.0	16.8	15.8	4.8	0.18		8.0
57-66	0.05			18	0.6							10.6	2.7			8.4

Depth (in)	Extractable bases 5B1a					6E1a Ext. Acidity	Cat. Exch. Cap. 5A3a Sum Cations!	Cat. Exch. Cap. 5A1a Not Heated	Cat. Exch. Cap. 5A1a Heated 240°C	KCl Ext. Al	8D3 Ca/Mg	Base saturation d	
	6N2b Ca	6O2b Mg	6P2a Na	6Q2a K	Sum							5C3 Sum Cations	5C1 NH ₄ OAc
0-1/2	21.5	6.1	Tr.	0.4	28.0	8.0	36.0	24.9			3.5	78	112
1/2-2 1/2	4.3	1.5	Tr.	0.1	5.9	3.6	9.5	6.3			2.9	62	94
2 1/2-3 1/2	1.7	0.6	Tr.	0.1	2.4	3.5	5.9	3.4			2.8	41	70
3 1/2-15	1.2	0.5	Tr.	Tr.	1.7	3.1	4.8	2.9			2.4	35	59
15-23	1.0	0.6	Tr.	Tr.	1.6	2.4	4.0	2.1			1.7	40	76
23-31	1.0	0.4	Tr.	Tr.	1.4	1.2	2.6	1.6			2.5	54	88
31-35	2.2	1.0	Tr.	0.1	3.3	1.9	5.2	3.8			2.2	63	87
35-40			0.1	0.2				9.6					
40-57			0.1	0.1				5.8					
57-66			Tr.	0.1				2.9					

Depth (in)	Ratios to Clay 8D1			
	NH ₄ OAc CEC	Ext. Iron	15-Bar Water	
0-1/2	3.19	0.09	2.68	
1/2-2 1/2	1.43	0.18	0.91	
2 1/2-3 1/2	0.83	0.24	0.54	
3 1/2-15	0.74	0.23	0.46	
15-23	0.72	0.28	0.48	
23-31	0.35	0.17	0.20	
31-35	0.41	0.13	0.30	
35-40	0.50	0.09	0.38	
40-57	0.46	0.09	0.38	
57-66	0.45	0.09	0.42	

a. 5-25% carbonate.
 b. > 50% carbonate.
 c. Coefficient of Linear Extensibility.
 d. One or more horizons has relatively low cation exchange capacity. As cation exchange capacity decreases, the relative error of base saturation increases. Trace quantities are omitted from the sum of bases. For very low CEC values, this omission contributes significantly to the relative error of base saturation.
 Note: See descriptions for mineralogy.

Soil type: **Bmet fine sandy loam**

Soil Nos.: **S59Wis-42-1**

Location: **Oconto County, Wisconsin; northwest quarter of southeast quarter of Section 31, T28N, R19E; about three miles southeast of the city of Gillette; 200 feet east and 150 feet north of southwest corner of Heaney woodlot; photo BIC-7-53 (1938).**

Vegetation and use: **Beech, hard maple and basswood woodlot; grazed in recent years.**

Slope and land form: **Gently undulating complex slopes of 3 to 5 percent; late Wisconsin (Valders) ground moraine.**

Drainage and permeability: **Well drained; surface runoff and internal drainage are medium; permeability is moderate.**

Parent material: **Calcareous glacial till.**

Collected by: **J. S. Allen, William DeYoung, and G. B. Lee, September 3, 1959.**

Described by: **E. G. Link.**

Horizon and

Lincoln

Lab. Number

Aoo	1/2 to 0 inch. Recently deposited leaves, twigs, and grasses.
A1 11831	0 to 1/2 inch. Black (10YR 2/1) loam with moderate medium granular structure; very friable when moist; neutral reaction.
A2 11832	1/2 to 2 1/2 inches. Grayish brown (10YR 5/2) to yellowish brown (10YR 5/4, 7.5YR 5/4 crushed) loamy fine sand with very weak medium platy structure that breaks to weak very fine subangular blocky structure; very friable when moist; where thin, horizon has a distinct film-like appearance; slightly acid.
Bir1 11833	2 3/4 to 8 1/2 inches. Brown (7.5YR 5/4) to dark brown (7.5YR 4/4 crushed) loamy fine sand with weak medium granular structure; very friable when moist; medium acid.
Bir2 11834	3 3/4 to 15 inches. Dark brown (7.5YR 4/4) to brown (7.5YR 5/4, 7.5YR 5/4 crushed) loamy fine sand with weak medium subangular blocky structure that breaks to single grains; friable when moist; medium acid.
Bir 11835	15 to 23 inches. Dark brown (7.5YR 4/4, 7.5YR 5/4 crushed) loamy fine sand with weak medium subangular structure that breaks to single grains; horizon included a few gravel less than 10-mm.; friable when moist; medium acid.
A2m 11836	23 to 31 inches. Dark brown (7.5YR 4/2) sandy loam (7.5YR 6/2 dry and 7.5YR 4/4 moist and crushed); massive; firm when moist; a few gravel to 10-mm. in size; medium acid.
A2m-Bt 11837	31 to 35 inches. Reddish brown (5YR 4/3, 7.5YR 5/4 crushed) sandy clay loam with weak medium prismatic structure to massive; firm when moist; pinkish gray (7.5YR 6/2 dry) coatings; medium acid.
IIBt 11838	35 to 40 inches. Yellowish red (5YR 4/6) to reddish brown (5YR 4/4, 7.5YR 4/4 to 5/4 crushed) heavy sandy clay loam with weak medium prismatic structure that breaks to medium subangular blocky structure; firm when moist; strong brown (7.5YR 5/6) flecks of weathered dolomite fragments; dark organic coatings on root hair channels; mixed gravel and stones to 6 inches in diameter, most less than 20-mm.; slightly acid.
IIC1 11839	40 to 57 inches. Reddish brown (5YR 4/4 to 5/4) heavy loam to sandy clay loam; massive; firm when moist; mixed gravel and stones, most less than 20-mm.; effervescence with HCl.
IIC2 11840	57 to 66 inches. Reddish brown (5YR 5/3 to 5/4) loam to sandy loam; massive; firm when moist; mixed gravel and stones, most less than 20-mm.; strong effervescence with HCl.

Remarks: Unless otherwise indicated all colors are for moist soil. Reaction determined by Hellige-Truog pH kit. B (31 to 40 inches) and C (40 to 66 inches) horizons sampled for Bureau of Public Roads. Roots plentiful to 35 inches. Depth to Bt horizon ranges from 13 to 40 inches. Thickness of A2m horizon ranges from 4 to 14 inches but normally 8 to 12 inches. Banding appears in A2m horizon where it occurs at 21 inches or deeper.

Mineralogy (Method 7B1): The Bir2 horizon contains about 40 percent quartz in the very fine sand.

SOIL Fayette silt loam SOIL Nos. 3^A LOCATION Grant County, Wisconsin
SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. D3243-D3251

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1		
		1B1b Total			Sand						Silt			2A2 > 2	2-19	19-76
		Sand (2-0.75)	Silt (0.05-0.002)	Clay (\leq 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)				
0-6	A1	77.9	13.9	0.1	0.5	0.5	1.2	5.9		55.5	29.0		0			
6-12	A2	79.5	15.7	-	0.2	0.2	0.5	3.9		43.6	40.1		0			
12-18	B1	70.2	21.8	0.1	0.3	0.4	1.4	5.8		36.9	39.8		0			
18-24	B21	65.4	26.9	0.1	0.3	0.4	1.1	5.8		32.7	39.2		0			
24-30	B22	61.4	31.1	0.1	0.2	0.3	0.9	6.0		29.1	38.8		0			
30-34	B23	62.9	29.8	0.1	0.2	0.2	0.6	6.2		28.7	40.8		0			
34-39	B3	62.3	30.4	-	0.1	0.2	0.6	6.2		30.1	39.0		0			
39-45	C1	65.1	28.1	0.1	0.2	0.3	0.9	5.3		29.0	41.9		0			
45-52	C2	62.7	30.5	-	0.2	0.2	0.7	5.7		29.8	39.1		0			

Depth (in.)	6A3a Organic Matter by H2O2 Pct	Nitrogen Pct.	C/N	Carbonate as CaCO ₃ Pct.	Ext. Iron as Fe Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH	
						4A1e 1/3 bar g/cc	4A1h Oven dry g/cc	4D1		4B1c 1/3 bar Pct.	4B2 15 bar Pct.	8C1c (1:1) KCl		8C1a (1:1) H ₂ O	
0-6	2.3														6.4
6-12	0.5														6.1
12-18	0.3														5.3
18-24	0.3														4.9
24-30	0.3														4.7
30-34	0.2														4.7
34-39	0.1														4.7
39-45	-														4.9
45-52	-														4.9

Depth (in.)	Extractable bases 5B1e					6H2a Ext. acidity	CEC		6G1d Ext. Al	Ratio to clay			8D3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	CEC Sum		Ext. iron	15-bar water	5C3 Sum cations Pct.		5C1 NH ₄ OAc Pct.	
0-6	7.2	0.9				6.2								57	
6-12	5.4	0.3				3.3								63	
12-18	6.1	2.1				4.2								66	
18-24	7.0	3.1				6.8								60	
24-30	8.1	3.5				9.1								58	
30-34	8.7	4.2				8.6								60	
34-39	9.4	4.4				8.3								62	
39-45	9.8	3.8				6.8								67	
45-52	10.4	3.1				6.9								66	

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt	Chl.	Vm.	Mi	Int.	Qtz.	Kl.	Gibbarts
	7A2 X-ray				7A3			

^a Part of Project Z-1-2-8

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 type: Fayette silt loam

Soil No.: 3^a

Location: Grant County, Wisconsin. NE 1/4 of SW 1/4, Sec. 9, T 6 N, R 2 W, Twp. of Fennimore

Vegetation: Clover strip - 20 feet south of fence and 25 feet NE of 18 in. elm tree

Slope: 4%

Collected by and date: R. J. Muckenhirn and T. C. Bass, July 13, 1944

Horizon and

Beltsville

Lab. Nos.

- A1 0 to 6 inches. Brownish gray silt loam. Fine granular. Some earthworms present. Grass roots abundant. Occasional spots of lighter colored soil mixed in by plowing from lower layers.
D3243
- A2 6 to 12 inches. Light yellowish brown silt loam, thin platy in place, breaks to fine granular. Occasional spots and streaks of brownish gray mark filled earthworm burrows. Aggregates slightly vesicular and have thin dusting of silica flour on cleavage faces. Roots moderately abundant.
D3244
- B1 21 to 18 inches. Moderate yellowish brown silt loam; fine to medium subangular blocky structure; fair number of grass roots and alfalfa and clover roots present; occasional earthworm burrows filled with brownish gray soil. Aggregates slightly vesicular.
D3245
- B21 18 to 24 inches. Moderate yellowish brown silty clay loam. Medium subangular blocky structure; fewer roots than in 12-18 inch layer. Roots have medium diameters - 1/8 inch diameter.
D3246
- B22 24 to 30 inches. Dark yellowish brown, medium blocky silty clay loam. Aggregates are fairly angular and have occasional flecks and spots of dark colors (organic matter?)
D3247
- B23 30 to 34 inches. Moderate to dark yellowish brown silty clay loam. Medium blocky. Similar to 24-30 inch layer but slightly lighter in color, and shows tendency toward larger blocks which are firm (moderately resistant) to crushing.
D3248
- B3 34 to 39 inches. Moderate yellowish brown silty clay loam (light). Coarse blocky structure, moderately resistant to crushing. Infrequent plant roots into this layer.
D3249
- C1 39 to 45 inches. Moderate yellowish brown silt loam, weakly aggregated into coarse blocks which have some very fine sand or silica flour on sides.
D3250
- C2 45 to 52 inches. Moderate yellowish brown silt loam with light gray cleavage faces on some aggregates (apparently covering of very fine sand or silica flour). A few spots of dark gray. In general, a soft yellowish brown material.
D3251
- C3 52+ inches. Silty material, yellow brown, with scattered pebbles and stones of limestone and flint.

^a Part of Project Z-1-2-8

SOIL Fayette silt loam SOIL Nos. 4^B LOCATION Grant County, Wisconsin

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. D3252-D3267

Depth (in)	Horizon	1B1b Size class and particle diameter (mm) SA1											3B2 Cm	3B1 Coarse fragments		
		Total		Sand					Silt					2A2 ≥ 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)				
Pct of < 2 mm																
0-1	A1	72.9	17.3	0.1	0.4	1.6	7.3	38.4	42.8	0	0	0	0	0	0	
1-3	A21	75.0	16.5	0.1	0.2	0.3	1.5	6.4	38.6	43.8	0	0	0	0	0	
3-4	A22	76.0	15.9	-	0.2	0.3	1.1	6.5	38.4	44.9	0	0	0	0	0	
4-8	A23	77.5	14.6	-	0.1	0.2	0.9	6.7	39.3	45.5	0	0	0	0	0	
8-11	A24	76.1	15.4	-	0.2	0.3	0.9	7.1	38.4	45.4	0	0	0	0	0	
11-14	B1	72.8	19.4	-	0.1	0.1	0.5	7.1	34.9	45.3	0	0	0	0	0	
14-17	B21	72.2	21.1	-	0.1	0.1	0.4	6.1	33.9	44.7	0	0	0	0	0	
17-19	B22	66.8	24.3	-	0.1	0.2	0.5	8.1	31.1	44.2	0	0	0	0	0	
19-23	B23	64.3	26.3	-	0.1	0.2	0.6	8.5	28.3	44.9	0	0	0	0	0	
23-27	B24	62.5	27.9	-	0.1	0.2	0.5	8.8	26.5	45.1	0	0	0	0	0	
27-34	B25	62.7	28.7	-	0.1	0.2	0.4	8.0	26.4	44.6	0	0	0	0	0	

Depth (in)	6A3a Organic Matter by H2O2 Pct	Nitrogen Pct	C/N	Carbonate as CaCO ₃ Pct	Ext iron as Fe Pct	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH	
						4A1a ½ bar g/cc	4A1h Oven dry g/cc	4B1c ½ bar Pct		4B2 15 bar Pct	8C1c (1:1) KCl	8C1a (1 1) H ₂ O			
0-1	6.2														6.5
1-3	3.8														6.4
3-4	2.4														5.9
4-8	1.1														5.2
8-11	0.9														4.8
11-14	0.7														4.5
14-17	0.4														4.5
17-19	0.3														4.8
19-23	0.3														4.0
23-27	0.3														4.7
27-34	0.2														4.8

Depth (in)	Extractable bases 5B1a					6H2a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay			8B3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	Ext. Al		CEC Sum	Ext. Iron	15-bar water		5C3 Sum cations Pct.	5C1 NH ₄ OAc Pct.
	mg/100 g														
0-1	11.5	2.2				5.9							70		
1-3	8.6	2.0				5.1							68		
3-4	4.6	1.1				6.1							4.8		
4-8	3.5	0.6				5.4							43		
8-11	2.6	0.6				5.8							36		
11-14	2.8	1.1				6.9							35		
14-17	4.0	2.1				6.4							49		
17-19	5.8	2.8				5.8							60		
19-23	7.2	2.7				6.9							59		
23-27	8.6	3.5				7.1							63		
27-34	9.2	3.8				6.8							66		

Depth (in)	Clay Fraction Analysis 7A1b-d							
	Mt	Chl.	Vm.	Mi.	Int	Qtz	Kl	Gibbsite
	7A2 X-ray				7A3			

Part of Project Z-1-2-8

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 type: Fayette silt loam
 Soil No.: 4^a
 Location: Grant County, Wisconsin. NW 1/4 of SE 1/4 of Sec. 27, T 6 N, R 6 W, town of Wyalusing
 Vegetation: Ungrazed woods
 Collected by and date: R. J. Muckenhirn and T. C. Bass, July 14, 1944

Horizon and
 Beltsville
 Lab. Nos.

- O1 1 to 1/2 inches. Loose leaves from deciduous trees--white oak, hickory, maple, basswood; understory of dogwood, Virginia creeper, crane's bill, bedstraw.
- O2 1/2 to 0 inches. Partly decomposed leaves and twigs forming soft slightly mottled layer of light grayish brown or pale brown color.
- A1 0 to 1 inches. Dark brownish gray, loose, friable, finely granular silt loam. Fibrous roots abundant.
 D3252
- A21 1 to 3 inches. Brownish gray silt loam, medium platy in place, breaks to coarse granular, soft, weakly resistant aggregates. Roots abundant, diameters 1/8 to 1/2 inch, many fine fibrous roots. Aggregates crush to light brownish gray.
 D3253
- A22 3 to 4 inches. Light brownish gray to brownish gray silt loam. Coarse platy in place, somewhat vesicular, breaks to coarse granular and crushes to light brownish gray. Wormholes common, roots abundant but less so than in layer immediately above.
 D3254
- A23 4 to 8 inches. Pale brown silt loam; very vesicular, having holes about 1/10 mm. in diameter. Medium platy in place, breaks to coarse, mellow granules. Wormholes abundant, worm casts abundant, leaves present in some of larger worm burrows. Roots present but mostly 1/8 to 1/2 inch in diameter, few fibrous roots. This layer is rather sharply distinguished from next layer below in color and structure; however, the depth varies from 8 to 14 inches, making this layer from 4 to 10 inches thick. Abandoned burrows or root channel (2 in. diameter) filled with brownish gray soil from surface observed in deeper portion of this layer.
 D3255
- A24 8 to 11 inches. Pale brown silt loam, slightly platy, breaks into coarse granules, highly vesicular. Roots present but few fine, fibrous roots. Silica flour on exterior of aggregates in thin covering.
 D3256
- B1 11 to 14 inches. Light yellowish brown silt loam, weakly defined medium subangular blocky structure. Highly vesicular, fair coating of silica flour on faces of aggregates which are easily crushed to mellow silt loam. Earthworm casts abundant and appear to make up a large part of this and of two horizons just above.
 D3257
- B21 14 to 17 inches. Moderate yellowish brown silt loam, coarse platy structure with horizontal cleavage planes evident when in place. Breaks to vesicular moderate yellowish brown, mellow, medium granular silt loam. Roots few and generally 1/4 inch in diameter. Wormholes and casts present but not abundant.
 D3258
- B22 17 to 19 inches. Moderate yellowish brown silty clay loam (light) or heavy silt loam. Medium subangular blocky structure, crushes easily to moderate yellowish brown medium granular silt loam. Faintly vesicular, root and worm holes infrequent. This layer grades into one above and one below.
 D3259
- B23 19 to 23 inches. Dark yellowish brown silty clay loam, slightly vesicular, medium subangular blocky structure, crushes to moderate yellowish brown. Aggregates stable and moderately resistant to crushing. Roots sparse, little evidence of wormholes.
 D3260
- B24 23 to 27 inches. Dark yellowish brown, medium blocky silty clay loam. Aggregates moderately resistant to crushing, faintly vesicular. Crush to moderate yellowish brown. Roots and wormholes sparse. Splotches and spots of gray and reddish brown silt loam present in lower part of this horizon.
 D3261
- B25 27 to 34 inches. Dark yellowish brown silty clay loam with moderate brown spots and splotches (1/4-1/2 in. in diameter) of moderate brown or light gray. Also dark stains, apparently organic matter. Medium blocky structure, firm, subangular; crushes to moderate yellowish brown. Occasional root present.
 D3262
- D3263 31 to 34 inches. Same as above layer.
- B26 34 to 39 inches. Strong to dark yellowish brown silt loam, medium blocky structure, moderately vesicular. Dark organic stains and specks of organic matter. Tree roots present, including a few fine fibrous roots; the latter more evident in this layer than in those immediately above. Strong brown color on inside of blocks; exterior has occasional spots of reddish brown or gray especially near decaying roots.
 D3264
- B3 39 to 45 inches. Light yellowish brown silt loam, splotched with light gray and strong brown. Coarse blocky, moderately developed structure, color unchanged on crushing.
 D3265
- C1 45 to 51 inches. Light yellowish brown silt loam.
 D3266
- C2 60 to 72 inches. Light yellowish brown silt loam.
 D3267

^a Part of Project 2-1-2-8.

SOIL Fayette silt loam SOIL No. 5^A LOCATION Grant County, Wisconsin

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. D3268-D3279

Depth (in.)	Horizon	181b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments		
		Total												2A2 ≥ 2 Pct	2-19 Pct of ≤ 76mm	19-76 Pct
		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)				
0-4	A1	79.9	13.2	0.1	0.3	0.3	0.8	5.4		37.5	48.3		tr.			
4-8	A21	81.3	11.8	0.1	0.3	0.3	0.8	5.4		38.7	48.5		0			
8-9	A22	80.1	13.9	0.1	0.3	0.3	0.6	4.7		41.1	44.2		0			
9-11	A23	72.8	21.6	-	0.2	0.2	0.5	4.7		36.0	41.8		0			
11-15	B1	69.5	25.5	-	0.1	0.1	0.4	4.4		33.9	40.2		0			
15-21	B21	64.7	30.9	-	-	0.1	0.2	4.1		30.7	38.2		0			
21-25	B22	63.0	32.9	-	-	0.1	0.2	3.8		28.5	38.4		0			
25-29	B23	62.9	32.8	-	0.1	0.1	0.3	3.8		28.9	38.0		0			
29-33	B24	65.0	31.0	-	-	0.1	0.3	3.6		30.9	37.9		0			
33-36	B3	64.9	30.3	0.1	-	0.1	0.3	4.3		28.8	40.7		0			
36-39	C1	65.7	29.7	-	0.1	0.1	0.2	4.2		28.4	41.6		tr.			
39-42	C2	63.0	29.6	0.1	0.3	0.2	0.4	3.4		29.0	36.8		tr.			

Depth (in.)	6A3a Organic Matter by H2O2 Pct	Nitrogen Pct	C/N	Carbonate as CaCO ₃ Pct.	Ext iron as Fe Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD m/m	pH	
						4A1e g/cc	4A1h g/cc	4A1i g/cc		4B1c Pct	4B2 15 bar Pct	8C1c (1 l) KCl		8C1a (1 l) H ₂ O	
0-4	2.8														6.6
4-8	2.0														6.0
8-9	1.8														5.8
9-11	0.8														5.3
11-15	0.6														4.9
15-21	0.6														4.7
21-25	0.6														4.8
25-29	0.5														4.8
29-33	0.2														4.8
33-36	0.2														4.8
36-39	0.3														4.8
39-42	0.4														4.9

Depth (in.)	Extractable bases 5B1a					6H2a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay			8D3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	Ext. Al		CEC Sum	Ext. iron	15-bar water		8C3 Sum cations Pct	8C1 NH ₄ OAc Pct.
0-4	6.3	4.1				3.6								74	
4-8	5.7	1.6				3.8								66	
8-9	5.4	1.7				4.1								63	
9-11	6.2	3.1				4.1								69	
11-15	6.4	3.6				5.4								65	
15-21	7.5	4.7				7.6								62	
21-25	8.9					7.6								65	
25-29	9.3	5.2				7.5								66	
29-33	9.1	5.7				7.2								67	
33-36	9.2	5.9				6.9								69	
36-39	9.1	5.0				6.8								68	
39-42	10.1	5.4				6.7								70	

Depth (in.)	Clay Fraction Analysis 7A1b-d						
	Mt	Chl	Vm	Mi	Int.	Qtz	Kl, Gibbsite
	7A2 X-ray			7A3			

^A Part of Project Z-1-2-8

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 type: Fayette silt loam
 Soil No.: 5^a
 Location: Grant County, Wisconsin. SW corner of NW 1/4, Sec. 12, T 4 N, R 2 W, Ellenboro Town
 Vegetation: Weeds - yarrow, vervain, and goldenrod in a blue grass sod. Sumacs and some sweet clover
 were present.
 Slope: 4%
 Collected by: R. J. Muckenhirn and T. C. Bass

Horizon and
 Beltsville
 Lab. Nos.

- A1
 D3268 0 to 4 inches. Brownish gray silt loam, medium granular, very friable and easily crushed to light brownish gray silt loam. Becomes slightly lighter with depth, and includes spots of light yellowish brown soil apparently turned up by plowing. Surface 2 to 3 inches thickly matted with grass roots; these decrease in lower half but are abundant enough to bind the soil into a mass. Roots generally very fine and hair-like.
- A21
 D3269 4 to 8 inches. Light brownish gray silt loam, thin platy in place breaking to fine, mellow granular. Worm burrows and casts abundant throughout.
- A22
 D3270 8 to 9 inches. Light brownish gray to light yellowish brown silt loam, thin platy structure in place, breaks to fine mellow granules. Silica flour plentiful on exterior of plates; worm casts abundant. This layer consists of a mixture of the light brownish gray soil with the layer below but the two are inseparable because of mixing by worm action.
- A23
 D3271 9 to 11 inches. Color is slightly lighter than moderate yellowish brown. A silt loam, medium platy in place, silica flour coating on plates, which easily crush to light yellowish brown. Roots common but less plentiful than in layers above and most of them are fine hair-like grass roots.
- B1
 D3272 11 to 15 inches. Moderate yellowish brown heavy silt loam, medium granular in place and easily crushes to light yellowish brown. This layer is held together in a mass by fine fibrous grass roots; worm casts present but not abundant.
- B21
 D3273 15 to 21 inches. Dark yellowish brown silty clay loam, medium subangular blocky in place; crushes with moderate resistance to light yellowish brown. Surfaces are streaked and coated with silica giving them variegated colors of brown and white or light gray. Occasional fibrous root present; worm action not evident. Dark stains (organic matter?) are fairly common on aggregates. Slightly vesicular.
- B22
 D3274 21 to 25 inches. Dark yellowish brown silty clay loam, medium blocky structure, crushes with some difficulty to moderate yellowish brown. Blocks are subangular and are dense and compact, but not hard. Roots scarce and evidence of work activity absent. Aggregates are slightly vesicular, and have occasional dark stains or splotches, apparently from organic matter.
- B23
 D3275 25 to 29 inches. Dark yellowish brown silty clay loam, coarse blocky structure, moderately vesicular. Blocks are similar to those above but larger. Occasional root present.
- B24
 D3276 29 to 33 inches. Dark yellowish brown silty clay loam. Very similar to above layer. Surfaces of blocks seem to be slightly darker, however, and have a dull, greasy appearance, which was much less evident from 25 to 29 inches.
- B3
 D3277 33 to 36 inches. Dark yellowish brown heavy silt loam (or light silty clay loam). Rather massive in place but coarse, subangular blocks are easily separated out. Large dark splotches occur on surfaces of aggregates, which have somewhat greasy appearance. Some reddish brown on cleavage faces.
- C1
 D3278 36 to 39 inches. Dark yellowish brown silt loam with slight reddish cast. Massive or coarse blocky structure. Some penetration of chert grains and red residual clay into this layer.
- C2
 D3279 39 to 42 inches. Massive or coarse blocky, moderate brown silty clay. Dark (iron or organic matter?) stains on blocks. Chert present in small amounts.

^a Part of Project Z-1-2-8

SOIL Fayette silt loam SOIL Nos. 2^a LOCATION Richland County, Wisconsin
SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. D3233-D3242

Depth (in.)	Horizon	181b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments		
		Total		Sand					Silt					2A2 > 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)				
Pct. of < 2 mm													Pct. of < 76mm			
0-2	A1	77.8	14.9	-	0.3	0.4	1.5	5.1		38.9	45.0		-			
2-7	A21	73.4	15.6	-	0.4	0.8	2.5	7.3		36.0	46.2		-			
7-10	A22	76.6	15.2	-	0.3	0.5	1.5	5.9		39.9	43.4		-			
10-14	B1	74.8	20.0	-	0.1	0.2	0.7	4.2		41.0	38.4		-			
14-18	B21	70.3	24.8	-	0.1	0.2	0.6	4.0		38.0	36.7		-			
18-23	B22	68.7	26.6	-	0.1	0.1	0.4	4.1		36.4	36.7		-			
23-29	B23	66.6	28.2	-	0.2	0.2	0.7	4.1		32.9	38.2		-			
29-36	B3	68.6	27.9	-	0.1	0.1	0.3	3.0		33.0	38.8		-			
36-45	C1	66.4	21.2	0.1	2.9	2.8	2.8	3.8		32.7	39.2		-			
45-56	C2	68.1	23.2	0.1	1.5	2.1	2.5	2.5		39.8	32.1		2			

Depth (in.)	6A3a Organic Matter by H2O2 Pct.	Nitrogen Pct.	C/N	Carbonate as CaCO3 Pct.	Ext iron as Fe Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD m/in	pH	
						4A1e 1/2 bar g/cc	4A1h Oven dry g/cc			4B1c 1/2 bar Pct.	4B2 15 bar Pct.			8C1c (1.1) KCl	8C1a (1.1) H2O
0-2	3.5														
2-7	1.5														7.4
7-10	1.1														7.1
10-14	0.7														6.4
14-18	0.4														5.7
18-23	0.5														5.3
23-29	0.4														5.0
29-36	0.5														4.8
36-45	-														4.9
45-56	-														4.7

Depth (in.)	Extractable bases 5B1a					6H2a Ext. acidity	CEC		6G1d Ext Al	Ratios to clay			8D3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations			CEC Sum	Ext iron	15-bar water		5C3 Sum cations Pct	5C1 NH4OAc Pct
0-2	9.2	3.9		1.9										87	
2-7	6.9	2.1		2.6										78	
7-10	5.9	0.8		3.7										64	
10-14	6.2	1.7		4.9										62	
14-18	6.5	3.2		5.9										62	
18-23	6.8	3.8		7.3										59	
23-29	7.5	4.3		7.8										60	
29-36	8.0	4.2		7.6										61	
36-45	6.1	2.6		5.9										60	
45-56	6.0	3.4		5.7										62	

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt	Chl	Vm	Mt	Int	Qtz	Kl	Gibbsite
	7A2 X-ray				7A3			

^a Part of Project Z-1-2-8

Mt = Montmorillonite, Chl. = chlorite, Vm = Vermiculite, ml = 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 type: Fayette silt loam

Soil No.: 2^a

Location: Richland County, Wisconsin. SE 1/4 Sec. 1, T 9 N, R 1 W. about 500 feet east of farmstead of Harry Pauls, and 1 mi. NE of Pauls School.

Slope: 8%

Collected by and date: R. J. Muckenhirn and T. C. Bass, July 13, 1944

Horizon and
Beltsville
Lab. Nos.

A1 D3233	0 to 2 inches. Light brownish gray silt loam in place. Fine granular structure crushes to pale brown floury silt loam. Grass roots very abundant.
A21 D3234	2 to 7 inches. Very light yellowish brown silt loam. Very thin platy structure in place, crushes to light yellowish brown. Very fine grass roots abundant. A few earthworms present.
A22 D3235	7 to 10 inches. Very light yellowish brown silt loam, very thin platy structure in place, crushes to light yellowish brown. A wavy line of separation between this and next horizon below so that the horizon ends at 10-13 inches from surface. Grass roots frequent.
B1 D3236	10 to 14 inches. Moderate yellowish brown silt loam, medium platy in place, breaks to medium granular structure.
B21 D3237	14 to 18 inches. Moderate yellowish brown to moderate brown silt loam. Fine subangular blocky structure, moderately resistant to crushing.
B22 D3238	18 to 23 inches. Moderate brown silty clay loam, medium subangular blocky structure, slightly vesicular, fairly numerous earthworms, burrows; thin, spotty silica coating on outside of aggregates. Aggregates moderately dense and resistant to crushing.
B23 D3239	23 to 29 inches. Dark yellowish brown silty clay loam. Medium subangular blocky in place with slight amount of silica flour in spots and thin streaks. Crushes to moderate yellow brown.
B3 D3240	29 to 36 inches. Moderate yellowish brown light silty clay loam, medium blocky; densely packed, firm aggregates.
C1 D3241	36 to 45 inches. Moderate yellowish brown heavy silt loam with occasional pale brown spots and streaks (apparently organic matter) on sides of aggregates which are coarse, weakly resistant, blocky.
C2 D3242	45 to 56 inches. Moderate yellowish brown silt loam; coarse blocky, weakly resistant aggregates with occasional brown or brownish black spots and splotches.
C3	56+ inches. Silty material, containing cherty limestone pebbles and stones, light yellowish brown in color.

^a Part of Project Z-1-2-8

SOIL Fayette silt loam SOIL Nos. 48Wis-52-20 LOCATION Richland County, Wisconsin

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 53B - 5314

Depth (in.)	Horizon	181b Size class and particle diameter (mm) 3A1										3B2 Cm	3B1 Coarse fragments				
		Total					Sand						Silt		2A2 > 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)	Pct of < 75µm			
Pct of < 2 mm													Pct.				
0-7	A1	83.6	13.6	-	0.1	0.2	0.5	2.0			36.9		0				
7-10	A2	78.2	19.0	-	0.1	0.1	0.4	2.2			37.2		0				
10-15	B1	69.4	28.4	-	-	0.1	0.5	1.8			31.0		0				
15-24	B21	69.9	27.9	-	-	-	0.3	1.9			31.0		0				
24-34	B22	70.1	27.7	-	-	-	0.2	2.0			29.9		0				
34-46	B3	69.4	29.9	-	-	-	0.2	1.5			31.9		0				
46-65	C1	72.9	25.3	0.1	-	0.1	0.3	1.3			35.5		0				

Depth (in.)	8A1a Organic carbon Pct.	Nitrogen Pct.	C/N	Carbonate as CaCO ₃ Pct.	Ext iron as Fe Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH	
						4A1e ½ bar g/cc	4A1h Oven dry g/cc	4A1i g/cc		4B1c ½ bar Pct.	4B2 15 bar Pct.	4C1c (1:1) KCl		4C1e (1:1) NH ₄ OAc	
						0-7	0.99								
7-10	0.52														5.6
10-15	0.23														5.4
15-24	0.28														5.2
24-34	0.28														5.4
34-46	0.16														5.3
46-65	0.15														5.6

Depth (in.)	Extractable bases 5B1a					6H2a Ext. acidity	6G2 CEC		6G1d Ext. Al	Ratios to clay			8D3 Ca/Mg	Base saturation	
	5N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3e Sum cations	Ext. Al		CEC Sum	Ext. Iron	15-bar water		5C3 Sum cations Pct.	5C1 NH ₄ OAc Pct.
	meq/100 g														
0-7	6.2	1.6	0.2	0.1		5.1	13.2							61	
7-10	6.2	1.9	0.2	0.1		6.2	14.6							58	
10-15	8.1	3.6	0.3	0.1		8.9	21.0							58	
15-24	4.7	4.2	0.3	0.2		8.6	18.0							52	
24-34	9.1	4.4	0.4	0.2		8.6	22.7							62	
34-46	10.2	5.2	0.4	0.2		8.6	24.8							64	
46-65	9.5	4.9	0.4	0.2		6.6	21.6							69	

Depth (in.)	Clay Fraction Analysis 7A1b-d						
	Mt	Chl.	Vm.	Mi	Int.	Qtz.	Kl
	7A2 X-ray				7A3		

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 Type: Fayette silt loam
Soil No.: 48Wis-52-20
Location: Richland County, Wisconsin. NW corner NE $\frac{1}{4}$ Sec. 15, T. 10N., R. 2W.
Slope and land form: 7 percent
Sampled by: Glenn H. Robinson

Horizon and
Beltsville
Lab. No.

A1 538	0 to 7 inches. Light brownish gray (10YR 6/2) silt loam.
A2 539	7 to 10 inches. Brown (10YR 5/3) silt loam.
B1 5310	10 to 15 inches. Brown (10YR 5/3) heavy silt loam.
B21 5311	15 to 24 inches. Very dark grayish brown (10YR 3/2) with light brown coatings on surface silty clay loam.
B22 5312	24 to 34 inches. Very dark brown silty clay loam.
B3 5313	34 to 46 inches. Yellowish brown (10YR 5/4) silt loam.
C1 5314	46 to 65 inches. Dark yellowish brown (10YR 4/4) massive silt loam.

SOIL TYPE *Kellner LOCATION Portage County, Wisconsin
loamy sand

SOIL NOS. - S57Wis-49-1 LAB. NOS. 7004-7008

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS
		1B1a		3A1						2A2		
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY	> 2	($< 9\mu$)		
2-1	1-0.5	0.5-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.02	0.02-0.002				
0-5	A1	1.6	26.2	34.3	25.3	3.6	5.4	3.6	13.4	3.6	Tr.	cos
5-11	C1	2.4	27.6	33.6	24.6	3.8	4.9	3.1	13.6	3.1	Tr.	cos
11-25	C2	4.3	29.8	33.8	23.7	3.1	3.0	2.3	11.8	1.6	Tr.	cos
25-40	C3	3.5	27.1	41.2	25.0	1.3	0.5	1.4	6.6	0.6	Tr.	cos
40-60+	C4	9.4	39.3	32.9	15.7	0.5	1.1	1.1	3.5	0.9	21	cos
pH		ORGANIC MATTER				6C1a	4A3a					
8C1a	1:5	1:10	6A1a	6B1a		Free Iron	Vol.					
1:1			ORGANIC CARBON %	NITRO-GEN %	C/N	Fe ₂ O ₃ %	Wt. g/cc					
5.1			1.34	0.083	16	0.7	1.44					
5.6			0.43	0.020	22	0.7	1.55					
5.9			0.16	0.007		0.5						
6.3			0.07			0.4	1.64					
6.6			0.04			0.8						
5A1a	EXTRACTABLE CATIONS					5B1a	5C3	5B1a	5A3a	MOISTURE AT SATURATION		
CATION EXCHANGE CAPACITY NH ₄ Ac	6N2b	6O2b	6H1a	6P2a	6Q2a	BASE SAT. % NH ₄ Ac EXCH.	Base Sat. % on Sum Cations	Sum Ext. Bases	Sum Ext. Cations	%		
	Ca	Mg	H	Na	K			me/100g.	me/100g.			
	← milliequivalents per 100g. soil →					5C1						
5.6	1.5	0.8	6.3	<0.1	0.1	43	28	2.4	8.7			
3.1	1.2	0.8	2.8	<0.1	<0.1	64	42	2.0	4.8			
1.6	<0.1	0.5	1.6	<0.1	<0.1	31	24	0.5	2.1			
1.0	<0.1	0.6	0.8	<0.1	<0.1	60	43	0.6	1.4			
1.2	<0.1	0.5	0.4	<0.1	<0.1	42	56	0.5	0.9			

Soil type: *Kellner loamy sand

Soil Nos.: S57Wis-49-1

Location: Portage County, Wisconsin; southeast quarter of northeast quarter of Section 35, T24N, R8E.

This profile was sampled in a virgin area except for past burnings. Parent materials consist dominantly of sandy glacial outwash with scattered fine gravel. Quartz makes up approximately 94 percent of the mineral content while about 6 percent is composed of other minerals. Native vegetation consists of mixed pine and black oak with an understory of hazelnut and grasses. Relief is nearly level, with 1-percent slopes predominating. Drainage is excessive, ground water deep, and permeability rapid. The profile was moist at time of sampling. The very dark brown to black surface soil of this profile, especially after cultivation, is characteristic of Prairie soils. It is believed that this soil profile is very similar to what the Michigan people are calling Prairie intergrading to Podzol.

Sampled by: A. J. Klingelhoets, G. B. Lee, William DeYoung, and R. H. Jordan, October 29, 1957.

Described by: A. J. Klingelhoets.

Horizon and
Lincoln
Lab. Number

Aoo and Ao	1/2 to 0 inch. Thin layer of oak leaves, pine needles and grasses over a black (10YR 2/0) decomposed organic layer; temperature 6.0 degrees C.; pH 6.0.
A1 7004	0 to 5 inches. Very dark brown (10YR 2/2) to black (10YR 2/1) loamy sand having weak medium subangular blocky structure which breaks down readily into moderate medium granules; very friable; plant roots plentiful; abundance of bleached quartz grains; (a good A2 with dark gray (10YR 4/1) sand, 1 inch in thickness, was observed in immediate vicinity); roots plentiful; temperature 7.2 degrees C.; pH 5.8; abrupt smooth boundary; 4 to 9 inches thick. (Two cores taken at 1 to 4 inches.)
C1 7005	5 to 11 inches. Dark brown (7.5YR 3/4) loamy sand with weak medium subangular blocky structure; very friable when moist; tree roots plentiful; temperature 7.4 degrees C.; pH 5.8; clear irregular boundary; 5 to 9 inches thick. (Two cores taken at 7 to 10 inches.)
C2 7006	11 to 25 inches. Dark brown (7.5YR 4/4) medium sand with very weak medium subangular blocky structure; loose; tree roots plentiful; temperature 8.3 degrees C.; pH 5.8; gradual wavy boundary; 8 to 15 inches thick.
C3 7007	25 to 40 inches. Strong brown (7.5YR 4/6 to 5/6) medium sand which is single grained; loose; contains few loamy fine sand balls 1/4- to 1/2-inch diameter in lower portion of horizon; temperature 9.4 degrees C.; pH 5.8; abrupt wavy boundary; 14 to 19 inches thick. (Two cores taken at 29 to 32 inches.)
C4 7008	40 to 60 inches plus. Brown (7.5YR 5/4) to strong brown (7.5YR 5/6) medium sand and fine gravel, single grained; loose; stratified; containing few dark reddish-brown (5YR 4/4 to 3/4) iron segregations which are slightly cemented and 1/2- to 1-inch diameter; temperature 9.8 degrees C.; pH 5.9.

Remarks: All pH readings by use of Hellige-Truog kit. All colors were taken under moist field conditions. Air temperature 3.6 degrees C.

Soil type: *Kellner loamy sand

Soil Nos.: S57Wis-49-2

Location: Portage County, Wisconsin; southwest quarter of northwest quarter of Section 23, T24N, R8E.

This sample site had been cultivated prior to 1940, a severe burn occurred in 1942, and it has been in idle land since. Parent materials consist of sandy glacial outwash with over 10 percent of minerals other than quartz. Native vegetation was mixed pine; present vegetation is a 15-year-old stand of jack pine with some black oak, and a grass understory. This soil occurs on nearly level topography with 1-percent slopes predominating. Drainage is excessive, ground water table deep, and permeability rapid. The very dark brown to black surface soil of this profile, especially after cultivation, is characteristic of Prairie soils. It is believed that this soil profile is very similar to what the Michigan people are calling Prairie intergrading to Podzol.

Sampled by: A. J. Klingelhoets, G. B. Lee, William DeYoung, and R. H. Jordan, October 30, 1957.

Described by: A. J. Klingelhoets.

Horizon and

Lincoln

Lab. Number

Ap 7009	0 to 7 inches. Black (10YR 2/1) to very dark brown (10YR 2/2) loamy sand having weak medium subangular blocky breaking down readily into moderate fine granular structure; very friable when moist; plant roots plentiful; many bleached quartz grains; temperature 5.7 degrees C.; pH 5.2; abrupt smooth boundary; 6 to 9 inches thick. (Two cores taken at 1 to 4 inches.)
C1 7010	7 to 17 inches. Dark brown (7.5YR 3/4) loamy sand with weak medium subangular blocky structure; very friable; tree roots plentiful; temperature 6.1 degrees C.; pH 5.3; clear wavy boundary; 8 to 12 inches thick. (Two cores taken at 7½ to 10½ inches.)
C2 7011	17 to 23 inches. Dark brown (7.5YR 4/4) to brown (7.5YR 5/4) in lower part, coarse sand with very weak medium subangular blocky structure; loose; tree roots plentiful; temperature 7.3 degrees C.; pH 5.8; gradual irregular boundary; 6 to 10 inches thick.
C3 7012	23 to 35 inches. Yellowish brown (10YR 5/4) coarse sand and fine gravel, single grained; loose; temperature 8.3 degrees C.; pH 5.8; abrupt wavy boundary; 10 to 18 inches thick. (Core samples taken at 25 to 28 inches.)
C4 7013	35 to 48 inches plus. Light yellowish brown (10YR 6/4) medium sand and fine gravel; single grained; loose; stratified in place; few iron segregations of dark reddish brown (5YR 3/4) which are slightly coherent; temperature 9.4 degrees C.; pH 5.8.

Remarks: All pH readings by use of Hellige-Truog kit. All colors were taken under moist field conditions. Air temperature 3.4 degrees C.; rain.

SOIL Kewaunee silt loam SOIL Nos. S59Wis-8-1 LOCATION Calumet County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 11765-11775 April 1966

General Methods: 1A, 1B1a, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm)											Clay		Coarse fragments		
		3A1											Carbonate	Non-Carbonate	2A2		
		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)	(<19) Pct.	2-19 Pct.	19-76 Pct.			
0-4	A1	25.2	61.2	13.7	-	0.5a	0.9a	2.0b	20.9	33.9	27.3	56.6	4.3	-	-	-	
4-8	A2	27.2	60.9	11.9	0.1c	0.6c	0.9a	2.9b	22.7	34.7	26.2	59.2	4.5	-	-	-	
8-10	A3	25.0	55.1	19.9	0.2c	0.6c	0.9a	2.9b	20.4	31.3	23.8	53.5	4.6	-	-	-	
10-12	T1B1	20.3	47.6	32.1	0.2c	0.4c	0.8a	2.8b	16.1	25.8	21.8	43.6	4.2	-	-	-	
12-17	T1B21	14.1	40.3	45.6	0.3b	0.4c	0.8b	2.9b	9.7	18.1	22.2	29.5	4.4	-	-	-	
17-23	T1B22	13.6	38.2	48.2	0.3b	0.8b	1.5b	5.1b	5.9	14.0	24.2	22.8	7.7	-	-	-	
23-28	T1B3	23.9	41.8	34.3	1.3d	1.8d	2.4e	8.4e	10.0e	18.2	23.6	33.2	13.9	15	-	-	
28-34	T1C1	21.7	42.2	36.1	2.8d	2.7d	2.3e	6.3e	7.6e	16.7	25.5	27.9	14.1	10	-	-	
34-43	T1C2	20.6	43.6	35.8	2.3a	2.2d	2.2e	5.7e	8.2e	15.6	28.0	26.9	12.4	8f	-	-	
43-55	T1C3	13.5	41.9	44.6	1.5d	1.5d	1.4e	3.9e	5.2e	11.3	30.6	18.7	8.3	11	-	-	
55-63	T1C4	13.4	39.1	47.5	1.7d	1.7d	1.3e	3.7e	5.0e	10.7	28.4	17.8	8.4	10	-	-	

Depth (in.)	6A1a		6B1a		6E1a		6C1a		Bulk density			Water content			pH	
	Organic carbon	Nitrogen	C/N	6E2a Carbonate as CaCO ₃	6C2a Ext. Iron as Fe ₂ O ₃ Pct.	4A1a Field State		4A1h Oven-Dry		4B4 Field State		4B2 15-Bar		8C1a (1)		
						Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.			
0-4	4.67	0.324	14	Tr (g)	1.1							12.1			6.4	
4-8	0.76	0.060	13		1.3							4.5			5.8	
8-10	0.58	0.055	10		1.8							7.8			5.7	
10-12	0.73	0.063	12		2.3							12.8			5.8	
12-17	0.59	0.052	11		2.6	1.68		1.72		14.6		17.1			5.8	
17-23	0.47	0.043	11	Tr (g)	2.6	1.72		1.70		7.7		18.5			6.7	
23-28	0.34	0.032	11		1.9							13.3			7.7	
28-34	0.20				2.6							13.1			8.0	
34-43	0.18				3.0	1.2	1.93		1.89		6.7	12.1			8.0	
43-55	0.20				2.9	1.4						15.0			8.1	
55-63	0.22				3.0	1.4						15.4			8.0	

Depth (in.)	Extractable bases					6H1a Ext. Acidity		Cat. Exch. Cap.		8D3 Ca/Mg	Base saturation	
	6N2b Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	5A3a Sum Cations	5A1a NH ₄ OAc	5C3 Sum Cations	5C1 NH ₄ OAc			
	meq/100 g							Pct.	Pct.			
0-4	15.6	4.9	0.1	0.5	21.1	6.7	27.8	20.6		3.2	76	102
4-8	4.1	1.8	0.1	0.3	6.3	4.5	10.8	8.2		2.3	58	77
8-10	6.0	3.8	0.1	0.3	10.2	5.8	16.0	11.8		1.6	64	86
10-12	9.9	6.4	0.2	0.5	17.0	6.8	23.8	18.2		1.5	71	93
12-17	12.7	9.4	0.1	0.5	22.7	7.8	30.5	23.6		1.4	74	96
17-23	13.7	10.4	0.2	0.5	24.8	4.4	29.2	23.5		1.3	85	106
23-28		9.3	0.1	0.3				17.5				
28-34			0.1	0.3				14.3				
34-43			0.1	0.3				13.0				
43-55			0.2	0.3				14.2				
55-63			0.2	0.3				13.8				

Depth (in.)	Ratios to Clay 8M1		
	NH ₄ OAc CEC	Ext. Iron	15-Bar Water
0-4	1.50	0.08	0.88
4-8	0.69	0.11	0.38
8-10	0.59	0.09	0.39
10-12	0.57	0.07	0.40
12-17	0.52	0.06	0.38
17-23	0.49	0.05	0.38
23-28	0.51	0.06	0.39
28-34	0.40	0.04	0.36
34-43	0.36	0.03	0.34
43-55	0.32	0.03	0.34
55-63	0.29	0.03	0.32

- a. 25-50% Fe-Mn.
- b. 5-25% Fe-Mn.
- c. > 50% Fe-Mn.
- d. > 50% carbonate.
- e. 5-25% carbonate.
- f. Carbonatic fragments; < 2 percent noncarbonate residue in > 2-mm. material.

Soil type: Kewaunee silt loam

Soil Nos.: S99Wis-8-1

Location: Calumet County, Wisconsin; Lot 71, town of Brothertown about 2 miles northeast of the village of Calumetville; 180 feet south and 60 feet east of northwest corner of Watry woodlot. Photo BHN-2H-159 (1953).

Vegetation and use: American elm, hickory, basswood, and ironwood farm woodlot, grazed in recent years.

Slope and land form: Gently sloping, 3 to 4 percent; sample site located on inside face of late Wisconsin (Valders) glacial moraine.

Drainage and Permeability: Well drained; surface runoff and internal drainage are medium; permeability is moderately slow.

Parent material: Reddish brown calcareous clay till with a thin silt mantle.

Collected by: J. S. Allen, William DeYoung, and G. B. Lee, August 31, 1959.

Described by: E. G. Link.

Horizon and

Lincoln

Lab. Number

A1 11765	0 to 4 inches. Black (10YR 2/1) silt loam with moderate medium granular structure; very friable when moist; neutral reaction.
A2 11766	4 to 8 inches. Dark brown (7.5YR 4/2) to dark grayish brown (10YR 4/2, 7.5YR 5/2 crushed) silt loam with moderate fine platy structure; friable when moist; slightly acid.
A3 11767	8 to 10 inches. Dark brown (7.5YR 4/2, 7.5YR 5/2 crushed) silt loam with weak thick platy structure that breaks to weak fine subangular blocky structure; friable when moist; medium acid.
IIB1 11768	10 to 12 inches. Dark brown (7.5YR 3/2 to 4/2, 5YR 3/3 to 4/3 crushed) clay with moderate fine to medium subangular blocky structure; firm when moist; medium acid.
IIB21 11769	12 to 17 inches. Dark reddish brown (5YR 3/3) to reddish brown (5YR 4/3, 5YR 4/3 crushed) clay with weak medium prismatic structure breaking to medium to strong medium angular blocky structure; very firm when moist; medium acid.
IIB22 11770	17 to 23 inches. Dark reddish brown (5YR 3/3 to 2.5YR 3/4, 5YR 3/4 crushed) clay with moderate medium prismatic structure that breaks to strong medium to coarse angular blocky structure; very firm when moist; peds have slightly darker, 5YR 3/2, organic coatings; slightly acid.
IIB3 11771	23 to 28 inches. Reddish brown (2.5YR 4/4 to 5YR 4/3, 5YR 4/3 crushed) clay with moderate medium to coarse subangular blocky structure; very firm when moist; horizon includes pebble band; peds have darker, 5YR 3/2, organic coatings; mildly alkaline.
IIC1 11772	28 to 34 inches. Reddish brown (5YR 4/3) silty clay with weak medium prismatic structure that breaks to weak medium angular blocky structure; very firm when moist; pinkish gray (7.5YR 7/2) coatings less extensive than lower horizons; strong effervescence with HCl.
IIC2 11773	34 to 43 inches. Reddish brown (5YR 4/3) silty clay with weak medium prismatic structure that breaks to weak medium angular blocky structure; very firm when moist; pinkish gray (7.5YR 7/2) coatings along most root channels; most stones present are less than 4 inches in diameter; violent effervescence with HCl.
IIC3 11774	43 to 55 inches. Reddish brown (5YR 4/3) silty clay with weak medium prismatic structure that breaks to weak medium angular blocky structure; very firm when moist; pinkish gray (7.5YR 7/2) coatings along most root channels; most stones present are less than 4 inches in diameter; violent effervescence with HCl.
IIC4 11775	55 to 63 inches. Reddish brown (5YR 4/3) silty clay with weak medium prismatic structure that breaks to weak medium angular blocky structure; very firm when moist; pinkish gray (7.5YR 7/2) coatings along most root channels; most stones present are less than 4 inches in diameter; violent effervescence with HCl.

Remarks: Colors given are for moist soil. B and C horizons were sampled for Bureau of Public Roads. Reaction determined by Hellige-Truog pH kit.

SOIL Kewaunee silt loam SOIL Nos. S59Wla-20-2 LOCATION Rond du Lac County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 11784-11793 April 1966
General Methods: 1A, 1E1a, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1											Clay		Coarse fragments 2A2			
		Total			Sand					Silt			Clay (2-0.1)	Non-Carbonate (2-0.1)	> 2 (<19) Pct.	2-19 Pct.	19-76 Pct.	
		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)						
Pct of < 2 mm																		
0-3	A1	23.2	57.5	19.3	0.3a	2.1a	3.9a	9.7a	7.2	21.5	36.0	33.7	16.0			-		
3-5 1/2	A2	23.2	58.9	17.9	0.9a	2.2a	3.6a	9.3a	7.2	21.8	37.1	33.8	16.0			Tr.		
5 1/2-7 1/2	A3	25.0	54.2	20.8	1.6a	2.8a	4.0a	9.7a	6.9	19.5	34.7	31.4	18.1			Tr.		
7 1/2-10	11B1	21.4	42.6	36.0	1.9a	2.5a	3.5a	7.9	5.6	14.1	28.5	23.7	15.8			Tr.		
10-16	11E21	14.1	24.8	61.1	1.2a	1.7a	2.4	5.3	3.5	6.4	18.4	12.5	10.6			Tr.		
16-21	11E22	15.7	29.1	55.2	0.7a	1.5a	2.4b	6.5b	4.6b	7.5	21.6	15.6	11.1			Tr.		
21-28	11E3	31.0	31.4	37.6	2.6c	3.3c	3.6b	11.2b	10.3b	12.8	18.6	29.5	20.7			Tr.		
28-36	11C1	23.4	33.9	42.7	4.0c	3.4c	2.6b	6.5b	6.1b	11.7	22.2	21.4	17.3			15		
36-47	11C2	19.6	35.3	45.1	3.2c	3.0c	2.4b	5.5b	5.5b	11.5	23.8	20.0	14.1			11d		
47-57	11C3	23.5	38.4	38.1	4.2c	3.5c	2.6b	6.5b	6.7b	13.8	24.6	24.0	16.8			15		

Depth (in.)	6A1a	6B1a	C/N	6E1a	6C1a	Bulk density			Water content			pH		
	Organic carbon	Nitrogen		6E2a	Ext. Iron as Fe2O3	g/cc	g/cc	g/cc	Pct.	Pct.	Pct.	8C1a	(1:1)	
0-3	3.97	0.252	16	Tr(s)	1.4									6.4
3-5 1/2	1.78	0.119	15		1.4									6.2
5 1/2-7 1/2	0.81	0.060	14		1.5									6.0
7 1/2-10	0.74	0.058	13		2.6									6.1
10-16	0.69	0.061	11	Tr(s)	3.4									6.7
16-21	0.55	0.052	11	4	2.7									7.4
21-28	0.44	0.032	14	20	1.9									7.8
28-36	0.24			21	1.6									7.9
36-47	0.15			29	1.4									8.0
47-57	0.15			35	1.2									8.3

Depth (in.)	Extractable bases				6E1a	6E1a	Ext. H ₂ O	Ext. H ₂ O	Ext. H ₂ O	8D3	Base saturation	
	Ca	Mg	Na	K	Sum	Acidity	5A3a	5A1a	Ca/Mg		5C3	5C1
0-3	11.5	4.6	0.1	0.4	16.6	6.5	23.1	17.3		2.5	Pct	Pct.
3-5 1/2	6.1	2.6	0.1	0.2	9.0	5.2	14.2	10.7		2.3	72	96
5 1/2-7 1/2	4.4	2.6	0.1	0.2	7.3	4.8	12.1	8.7		1.7	63	84
7 1/2-10	8.6	6.1	0.1	0.2	15.0	6.5	21.5	16.0		1.4	60	84
10-16	18.0	13.6	0.1	0.6	32.3	6.4	38.7	28.7		1.3	70	94
16-21			0.1	0.6				24.7			83	112
21-28			0.1	0.4				17.6				
28-36			0.1	0.4				17.5				
36-47			0.1	0.3				15.7				
47-57			0.1	0.3				12.5				

Depth (in.)	Ratios to Clay 8D1		
	NH ₄ OAc CEC	Ext. Iron	15-Bar Water
0-3	0.90	0.07	0.53
3-5 1/2	0.60	0.08	0.36
5 1/2-7 1/2	0.42	0.07	0.28
7 1/2-10	0.44	0.07	0.31
10-16	0.47	0.06	0.36
16-21	0.45	0.05	0.36
21-28	0.47	0.05	0.36
28-36	0.41	0.04	0.34
36-47	0.35	0.03	0.32
47-57	0.33	0.03	0.31

a. 5-25% Fe-Mn.
b. 5-25% carbonate.
c. > 50% carbonate.
d. Carbonatic fragments; < 2 percent noncarbonate residus in > 2-mm. material.

Soil type: Kewaunee silt loam
 Soil Nos.: S59Wis-20-2
 Location: Fond du Lac County, Wisconsin; northeast quarter of northeast quarter of Section 4, T16N, R16E; about eight miles northwest of the city of Fond du Lac on U. S. Highway 41; 375 feet west and 50 feet north of southeast corner of Woller woodlot. Photo XF-2B-129 (1941).
 Vegetation and use: Hickory, red and white oak; not grazed in recent years; plant roots plentiful to a depth of 20 inches.
 Slope and land form: Gently sloping, 3 percent; sample site located at crest of late Wisconsin (Valders) glacial moraine.
 Drainage and permeability: Well drained; surface runoff and internal drainage are medium; permeability is moderately slow.
 Parent material: Reddish brown calcareous clay till with a thin silt mantle.
 Collected by: J. S. Allen, William DeYoung, and G. B. Lee, August 31, 1959.
 Described by: E. G. Link.

Horizon and
 Lincoln
 Lab. Number

A1 11784	0 to 3 inches. Very dark gray (10YR 3/1) silt loam with moderate medium to coarse granular structure; soft when dry; neutral.
A2 11785	3 to 5½ inches. Grayish brown (10YR 5/2, 10YR 4/1 crushed) silt loam with moderate fine platy structure that breaks to moderate fine granular structure; slightly hard when dry; neutral.
A3 11786	5½ to 7½ inches. Dark brown (7.5YR 4/2, 7.5YR 5/2 crushed) silt loam with weak medium platy structure that breaks to weak very fine subangular blocky structure; vesicular; slightly hard when dry; strongly acid.
IIB1 11787	7½ to 10 inches. Reddish brown (5YR 5/3, 5YR 4/3 crushed) silty clay loam with weak to moderate fine subangular blocky structure; hard when dry; pinkish gray (5YR 7/2 dry) coatings from overlying horizon; medium acid.
IIB2 11788	10 to 16 inches. Dusky red (2.5YR 3/2) to dark reddish brown (5YR 3/4, 2.5YR 4/4 crushed) clay with moderate medium prismatic structure that breaks to moderate medium to fine subangular blocky structure; very firm when moist; neutral.
IIB22 11789	16 to 21 inches. Reddish brown (2.5YR 4/4) to dark reddish brown (2.5YR 3/4, 2.5YR 4/4 crushed) clay with moderate medium prismatic structure that breaks to moderate medium to fine subangular blocky structure; very firm when moist; mildly alkaline.
IIB3 11790	21 to 28 inches. Reddish brown (2.5YR 4/4 to 5YR 4/3, 2.5YR 5/4 crushed) clay with moderate medium prismatic structure that breaks to moderate medium angular blocky structure; very firm when moist; pebble band or line at lower contact, upper portion of which is weathered; most pebbles less than 8-mm; effervescence with HCl.
IIC1 11791	28 to 36 inches. Reddish brown (2.5YR 4/4 to 5YR 4/3) clay with weak medium prismatic structure that breaks to weak medium subangular blocky structure; very firm when moist; pinkish gray (5YR 7/2) soft segregated lime; effervescence with HCl.
IIC2 11792	36 to 47 inches. Reddish brown (2.5YR 4/4 to 5YR 4/3) silty clay with weak medium prismatic structure that breaks to weak medium subangular blocky structure; very firm when moist; pinkish gray (5YR 7/2) soft segregated lime; violent effervescence with HCl.
IIC3 11793	47 to 57 inches. Reddish brown (2.5YR 4/4 to 5YR 4/3) silty clay with weak medium prismatic structure that breaks to weak medium subangular blocky structure; very firm when moist; pinkish gray (5YR 7/2) soft segregated lime; violent effervescence with HCl.

Remarks: Colors given are for moist soil. Reaction determined by Hellige-Truog pH kit. B and C horizons sampled for Bureau of Public Roads. Depth to pebble band ranges from 15 to 24 inches. Not modal for series, pebble band at B3-C1 contact.

SOIL Kewaunee silt loam (Podzolized) SOIL Nos 560W1a-36-1 LOCATION Manitowoc County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 13571-13578 April 1966

General Methods: 1A, 1E1a, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1															Clay		Coarse fragments			
		Total			Sand					Silt					3A1a Carbonate	Non-Carbonate	2A2 > 2 (<19) Pct.	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. of < 2 mm																						
3-0	O2																					
0-2	A2	30.1	60.1	9.8	0.9	3.2	5.8	12.0	8.2	23.8	36.3	37.7	21.9		10	Tr.						
2-7	B1r	25.0	57.7	17.3	0.6	2.4	4.6	9.9	7.5	21.0	36.7	33.2	17.5		17	Tr.						
7-11	I1A2m	25.1	42.2	32.7	0.6	2.3	4.4	10.4	7.4	15.4	26.8	27.8	17.7		33	Tr.						
11-21	I1Bt	24.7	28.3	47.0	0.8b	2.4b	4.2b	10.3b	7.0b	9.4	18.9	21.3	17.7	-	47	4						
21-30	I1C1	25.3	37.6	37.1	2.0c	2.4b	3.7b	9.3b	7.9b	13.6	24.0	26.1	17.4		33	8						
30-45	I1C2	24.9	35.8	36.3	1.4c	2.4c	3.6b	9.3b	8.2b	14.4	24.4	27.2	16.7	9	27	7d						
45-58+	I1C3	28.0	36.8	35.2	2.8c	2.9c	3.9b	9.9b	8.5b	13.1	23.7	26.5	19.5	8	27	6						
11-21	a.	22.7	27.3	50.0	0.5	2.0	4.8	8.9	6.5	9.0	18.3	20.6	16.2									
21-30	a.	25.9	29.7	44.4	0.5	2.5	5.7	10.5	6.7	9.1	20.6	21.4	19.2									
30-45	a.	28.4	30.0	41.6	0.9	2.7	6.6	11.2	7.0	9.4	20.6	22.3	21.4									
45-58+	a.	30.0	29.6	40.4	0.8	2.9	6.3	11.7	8.3	9.9	19.7	24.9	21.7									
Depth (in.)	6A1a	6B1a	C/N	6E1a Carbonate as CaCO3	6C1a Iron as Fe2O3 Pct.	Bulk density			4D1 COLE	Water content				pH	8C1a (1:1)							
	Organic carbon	Nitrogen				4A1a Field State	4A1c 30-cm	4A1h Oven Dry		4B3 Field State	4B3 30-cm.	4B2 1/3-Bar	4B2 15-Bar			4C1 1/3-to 15-Bar f in/in.						
3-0	32.34	1.149	28		0.6										4.7							
0-2	2.25	0.096	23		0.6										4.3							
2-7	2.47	0.101	24		1.6	1.08	1.00	1.12	0.040	24.7	27.6	25.3	8.7	0.17	4.4							
7-11	0.64	0.038	17		1.7										5.0							
11-21	0.46	0.037	12		2.0	1.53	1.54	1.74	0.044	23.4	22.4	21.6	16.1	0.08	7.1							
21-30	0.24	0.018	13	5	1.2	1.92	1.82	1.94	0.020	11.0	16.3	18.2	12.5	0.10	7.9							
30-45	0.16			33	1.0	1.94	1.85	1.94	0.017	11.9	15.6	18.6	11.2	0.14	8.1							
45-58+	0.14			32	1.0	1.91	1.84	1.94	0.017	14.0	15.8	18.2	11.2	0.13	8.1							
Depth (in.)	Extractable bases				6H1a Exct. Acidity	Cat. Cap. 5A3a Cations	Exch. Cap. 5A1a NH4 OAc	Cat. Exch. Cap. BaCl2-TEA 25	Exch. Cap. Not Heated	6G2a KCl-Exct. 240°C	8D3 Ca/Mg	Base saturation										
	6N2b Ca	6O2b Mg	6P2a Na	6Q2a K								5C3 Sum Cations	5C1 NH4 OAc									
3-0	28.0	8.4	0.1	0.8	37.3	92.0	58.0			Tr.	3.3	40	54									
0-2	2.0	0.9	Tr.	0.1	3.0	10.4	13.4	9.8	13.1	10.3	2.2	22	31									
2-7	1.1	0.6	Tr.	0.1	1.8	23.0	24.8	14.0	23.4	12.5	1.8	7	13									
7-11	4.0	2.6	0.1	0.2	6.9	10.2	17.1	12.5	15.8	12.5	2	1.5	40									
11-21			0.1	0.4			19.5	12.4														
21-30			0.1	0.2																		
30-45			0.1	0.2			8.9															
45-58+			0.1	0.2			8.2															
Depth (in.)	Ratios to Clay				8M1 Iron	8M2 Water	a. Analysis after carbonate removal (See Method 1B3).	b. 5-25% carbonate.	c. > 50% carbonate.	d. Carbonatic fragments; < 2 percent noncarbonate residue in > 2-mm. material.	e. Coefficient of Linear Extensibility calculated for fine earth fabric (< 2mm.); if coarse fragments (> 2mm.) are included, the present values will be reduced approximately 1 part in 10.	f. Calculated for fine earth fabric (< 2mm.).	g. Air-dry.	h. Noncarbonate clay.								
	8M1 NH4 OAc CEC	8M2 NH4 OAc CEC	8M3 Ext. CEC	8M4 15-Bar Water																		
3-0																						
0-2	1.00	1.00	0.06	0.48																		
2-7	0.81	0.81	0.09	0.50																		
7-11	0.38	0.38	0.05	0.30																		
11-21	0.41	0.41	0.04	0.34																		
21-30	0.33	0.38	0.03	0.34																		
30-45	0.24	0.36	0.03	0.31																		
45-58+	0.23	0.30	0.03	0.32																		

Soil type: Kewaunee silt loam (podzolized)

Soil Nos.: S60Wis-36-1

Location: Manitowoc County, Wisconsin; southeast quarter of southeast quarter of Section 29, T21N, R24E; about two miles northeast of the village of Mishicot; 260 feet west and 175 feet south of northeast corner of Daulke woodlot.

Vegetation and use: Hemlock, hard maple, blue beech and white birch woodlot; not grazed in recent years.

Slope and land form: Gently sloping, 2 to 3 percent; late Wisconsin (Valders) ground moraine.

Drainage and permeability: Well to moderately well drained; surface runoff and internal drainage are medium; permeability is moderately slow.

Parent material: Reddish brown calcareous silty clay till with a thin loamy surface covering.

Collected by: R. B. Crossman, G. B. Lee, William DeYoung, and E. G. Link, July 20, 1960.

Described by: E. G. Link.

Horizon and

Lincoln

Lab. Number

A ₀₀	3½ to 3 inches. Raw, recently deposited leaves, twigs and other plant remains.
A _c 13571	3 to 0 inch. Black (10YR 2/1) partly decomposed litter.
A ₂ 13572	0 to 2 inches. Gray (10YR 6/1) light silt loam with weak to moderate thin platy structure that breaks to weak very fine granular structure; friable when moist; very strongly acid; clear wavy boundary.
B _{ir} 13573	2 to 7 inches. Reddish brown (5YR 4/4) to dark reddish brown (5YR 3/4) light silt loam with moderate fine subangular blocky structure that breaks to weak medium granular structure; friable when moist; grades to brown (7.5YR 5/3) in lower one inch and has evidence of weak fine platy structure; very strongly acid; clear wavy boundary.
IIA _{2m} 13574	7 to 11 inches. Reddish brown (5YR 4/4) silty clay loam with moderate medium to coarse subangular blocky structure; very firm when moist; reddish brown (5YR 5/3) ped coatings; strongly acid; clear irregular boundary.
IIB _t 13575	11 to 21 inches. Reddish brown (5YR 5/4) clay with weak medium prismatic structure that breaks to moderate medium angular blocky structure; firm when moist; interior of peds reddish brown (2.5YR 4/4); continuous clay skins; some soft weathered small dolomite fragments; neutral; clear irregular boundary.
IIC ₁ 13576	21 to 30 inches. Reddish brown (5YR 4/3 to 5/3) silty clay with medium prismatic structure that breaks to weak medium angular blocky structure; very firm when moist; partial clay skins in upper 6 inches of horizon; numerous pebbles, mostly dolomite and less than 2-mm.; pale yellow (5Y 7/3) soft segregated lime along vertical cleavage faces that are covered with root hairs; moderately alkaline; gradual irregular boundary.
IIC ₂ 13577	30 to 45 inches. Reddish brown (5YR 5/3) light silty clay that appears to be massive in place but breaks to weak coarse prismatic structure; very firm when moist; pale yellow (5Y 7/3) soft segregated lime along vertical cleavage faces that are covered with root hairs; few fragments, mostly dolomite to 50-mm. in size; violent effervescence with HCl; diffuse broken boundary.
IIC ₃ 13578	45 to 58 inches plus. Reddish brown (5YR 4/3 to 5/3) light silty clay that appears to be massive in place but breaks to weak coarse prismatic structure; very firm when moist; pale yellow (5Y 7/3) soft segregated lime along vertical cleavage faces that are covered with numerous root hairs; few fragments, mostly dolomite to 55-mm. in size; violent effervescence with HCl.

Remarks: Colors given are for moist soil. Reaction by Hellige-Truog pH kit. B (11 to 21 inches) and C (30 to 58 inches) horizons sampled for Bureau of Public Roads. Plant roots plentiful to 11 inches. Not modal, Bisequal profile (Podzol over Gray-Brown Podzolic).

Micromorphology (Method 4E1): Preferred orientation of the clay in the B_{ir} horizon is very weak. Iron oxides appear to be uniformly distributed with only a few concentrations formed in place. Grains of iron oxide(?) of coarse clay and fine silt size, probably inherited, are common. The IIB_t horizon has rather thick clay films along macro-planar surfaces and in pores. Oriented clay is common as coatings on sand grains, and as small volumes throughout the matrix. The C horizon is uniform with no plasma preparations (aseptic). It is rich in fine-grain carbonate that may mask observations of oriented silicate clay because of its high interference color. Therefore, the uniformity of the matrix may be more apparent than real.

Mineralogy (Methods 7A, 7B1): The dolomite-to-calcite ratio, determined by X-ray diffraction, is 2:1 in the IIC₂ horizon, but only dolomite persists in the carbonate fringe zone, IIB_t. The very fine sands of the IIA_{2m} horizon contain 40 percent quartz and 60 percent other grains, mostly weatherable. Feldspar predominates the weatherable minerals. About one fourth of the weatherable grains consist of microcrystalline aggregates, apparently altered feldspar. The feldspar is undifferentiated except for the observation that about 10 percent have a refractive index consistent with oligoclase. Accessory minerals include hornblende, pyroxene, zircon, epidote, kaolinite, tourmaline, apatite and an appreciable fraction of opaques, including some magnetite. Mineralogical changes with depth in the noncarbonate fraction are not large. The A₂ horizon contains smaller proportions of ferromagnesian minerals, grains coated with iron oxide, and grains of highly altered feldspar than in the B_{ir} horizon below. The A₂ also contains a trace of carbonate; these grains are similar to those in the C. The mineralogy of the coarse silt, 20 to 50 microns, differs little from the mineralogy of the very fine sand. A green hornblende is the most common accessory mineral throughout the soil in the coarse silt. Clay mineralogy of the IIB_t and IIC₂ horizons is essentially the same. The carbonate-free clay contains small to moderate amounts of mica (or illite), montmorillonite and kaolinite, a small amount of chlorite and a trace of vermiculite. The minerals are fairly well crystallized. The ratio of fine to coarse clay is approximately 1:4. The fine clay mineralogy is essentially the same as that of the total clay. The mineralogy is mixed.

SOIL Kewaunee silt loam (Podzolized) SOIL Nos. 960WS-36-2 LOCATION Manitowoc County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 13579-13588 April 1966

General Methods: 1A, 1B1a, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm)											JAI						
		Total			Sand					Silt			Clay		Coarse fragments				
		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)	3A1a Carbonate	Non Carbonate	2A2 > 2 (< 9)	2-19	19-76	
Pct of < 2 mm																			
3-0	O2																		
0-2	A2	47.6	44.9	7.5	1.2	5.2	10.4	19.9	10.9	20.2	24.7	39.9	36.7						
2-7	B1r	38.5	41.0	20.5	0.7	3.8	7.8	16.2	10.0	16.1	24.9	33.5	28.5	8	Tr.				
7-10	11A2m	28.5	34.1	37.4	0.8	2.4	5.0	12.1	8.2	10.9	23.2	24.9	20.3		37	Tr.			
10-18	11Bt	31.0	29.6	39.4	0.8c	1.9c	3.5c	13.4c	11.4c	10.1	19.5	30.2	19.6		39	Tr.			
18-26	11C1	27.4	37.1	35.5	1.3d	2.3d	3.7c	10.6c	9.5c	13.4	23.7	29.1	17.9	6	30	4			
26-38	11C2	24.4	38.3	37.3	1.8d	2.2d	3.5c	8.4c	8.5d	12.3	26.0	25.3	15.9	9	28	6			
38-50	11C3	30.7	40.2	29.1	2.4d	3.0d	4.5c	11.1c	9.7c	13.7	26.5	29.3	21.0	7	22	7e			
50-60	11C4	24.9	37.9	37.2	1.6d	2.5d	3.6c	8.7c	8.5c	12.2	25.7	25.4	16.4	9	28	6			
a	B1rh	51.5	37.2	11.3	1.4	5.7	11.2	21.7	11.5	16.0	21.2	37.4	40.0		11	2			
10-18	b.	29.4	27.5	43.1	0.6	1.9	3.7	13.3	9.9	9.7	17.8	28.2	19.5						
18-26	b.	28.4	29.2	42.4	0.7	2.3	4.6	11.9	8.9	9.6	19.6	25.2	19.5						
26-38	b.	26.0	31.2	42.8	0.8	2.9	5.5	10.9	5.9	10.1	21.1	21.5	20.1						
38-50	b.	34.5	30.9	34.6	1.2	3.5	6.5	14.2	9.1	10.8	20.1	27.1	25.4						
50-60	b.	26.1	31.2	42.7	0.7	2.2	4.4	10.8	8.0	10.6	20.6	24.3	18.1						
Depth (in.)	Organic carbon	6A1a Nitrogen	6B1a C/N	6E1a Carbonate as CaCO3	6C1a Ext. Iron as Fe2O3 Pct.	4A1a Field State	4A1c 30-cm.	4A1h Oven-Dry	4D1 Bulk density	COLE f	4B4 Field-State	4B3 30-cm.	4B1b 1/3-Bar	4B2 15-Bar	4C2 1/3-to 15-Bar				8C1a (1:1)
	Pct	Pct		Pct.		g/cc	g/cc	g/cc			Pct	Pct.	Pct.	Pct.	in./in.				
3-0	36.1	1.09	33		0.3														4.2
0-2	0.98	0.043	23		0.6														4.2
2-7	1.69	0.075	22		1.5	1.32	1.32	1.34	0.007	17.4	21.8	22.4	7.9	0.19					4.3
7-10	0.56	0.038	15		1.9														5.1
10-18	0.39	0.030	13	10	1.7	1.54	1.59	1.76	0.036	23.2	20.3	18.3	13.8	0.07					7.6
18-26	0.23	0.016		28	1.0	1.92	1.86	1.96	0.017	12.3	14.5	15.8	12.1	0.07					8.0
26-38	0.20			31	1.0	1.88	1.84	1.91	0.014	13.8	14.9	16.9	12.7	0.08					8.1
38-50	0.13			32	0.9	1.96	1.90	1.97	0.014	11.0	13.5	14.4	10.3	0.08					8.2
50-60	0.13			30	1.0								12.4						8.2
a	1.36	0.063	22		0.8								4.9						4.3
Depth (in.)	Extractable bases				5B1a Sum	6H1a Ext. Acidity	Cat. Exch. Cap.	Ext. h	Cap. Not Heated	Cap. Heated	6C2a KCl-Ext. Al	8D3 Ca/Mg				Base saturation			
	6N2b Ca	6O2b Mg	6P2a Na	6Q2a K		5A3a Sum Cations	5A1a NH4	5A2a OAc	5A5 Heated	5A5 240°C					5C3 Sum Cations	5C1 NH4/CA Cations			
	meq/100 g																		
3-0	15.3	7.8	Tr.	0.7	23.8	84.4	108.2	68.7							2.0	22	35		
0-2	0.5	0.4	Tr.	0.1	1.0	6.9	7.9	5.1			2				1.2	13	20		
2-7	0.8	0.6	Tr.	0.1	1.5	20.5	22.0	11.8	19.8	11.5	6				1.3	7	13		
7-10	5.0	3.3	0.1	0.2	8.6	10.5	19.1	13.5	13.6	7.0	2				1.5	45	64		
10-18			0.1	0.3				15.5											
18-26			Tr.	0.2				11.0											
26-38			0.1	0.2				10.5											
38-50			Tr.	0.2				8.0											
50-60			0.1	0.2				9.5											
a	0.6	0.4	Tr.	0.1	1.1	13.9	15.0	9.2								7	12		
Depth (in.)	Ratios to Clay																		
	8D1 NH4 OAc	8D2 NH4 OAc	8D1 Ext. Iron	8D1 15-Bar Water															
	1																		
3-0	0.68	0.68	0.08	0.35															
0-2	0.58	0.58	0.07	0.38															
2-7	0.36	0.36	0.05	0.32															
7-10	0.39	0.40	0.04	0.35															
10-18	0.31	0.37	0.03	0.34															
18-26	0.28	0.38	0.03	0.34															
26-38	0.27	0.36	0.03	0.35															
38-50	0.26	0.34	0.03	0.33															
50-60	0.26	0.34	0.03	0.33															
a	0.81	0.81	0.07	0.43															

- a. See Remarks section of description.
 - b. Analysis after carbonate removal (See Method 1B3).
 - c. 5-25% carbonate.
 - d. > 50% carbonate.
 - e. Carbonatic Fragments; 2-5 percent noncarbonate residue in > 2-mm material.
 - f. Coefficient of linear Extensibility calculated for fine-earth fabric (< 2 mm.); if coarse fragments (> 2 mm.) are included, the present values will be reduced approximately 1 part in 10.
 - g. Calculated for fine-earth fabric (< 2 mm.).
 - h. Air-dry.
 - i. Noncarbonate clay.
- Note: See descriptions for mineralogy.

Soil type: Kewaunee silt loam (podzolized)

Soil Nos.: S6041s-36-2

Location: Manitowoc County, Wisconsin; northeast quarter of northwest quarter of Section 9, T21N, R24E; about five miles northeast of the village of Mahicot; approximately 1,000 feet south of highway at homestead site.

Vegetation and use: Hemlock, blue beech and hard maple woodlot; grazed in recent years.

Slope and land form: Gently sloping, 2 to 3 percent; Late Wisconsin (Valders) ground moraine.

Drainage and permeability: Well to moderately well drained; internal drainage is medium; permeability is moderately slow.

Parent material: Reddish brown calcareous silty clay till with a thin loamy surface covering.

Collected by: R. B. Grossman, G. B. Lee, William DeYoung, and E. G. Link, July 21, 1960.

Described by: E. G. Link.

Horizon and

Lincoln

Lab. Number

A _o 13579	3 to 0 inch. Dark reddish brown (5YR 2/2) partly decomposed plant remains.
A ₂ 13580	0 to 2 inches. Grayish brown (10YR 5/2) to light brownish gray (10YR 6/2) light silt loam to very fine sandy loam with weak to moderate medium platy structure; friable when moist; extremely acid; clear irregular boundary.
B _{1r} 13581	2 to 7 inches. Reddish brown (5YR 4/4) light silt loam with weak fine to very fine subangular blocky structure; friable when moist; extremely acid; clear wavy boundary.
IIA _{2m} 13582	7 to 10 inches. Dark brown (7.5YR 4/4) silty clay with moderate medium subangular blocky structure; very firm when moist; reddish brown (5YR 4/4) ped interior color; very strongly acid; clear irregular boundary.
IIB _t 13583	10 to 18 inches. Reddish brown (2.5YR 4/4) silty clay with weak medium prismatic structure that breaks to moderate medium subangular blocky structure; very firm when moist; reddish brown (5YR 5/3) coatings; complete clay skins; organic stains along fine root channels; numerous pebbles, most less than 5-mm. in size; effervescence with HCl; gradual irregular boundary.
IIC ₁ 13584	18 to 26 inches. Reddish brown (5YR 5/3) silty clay with weak coarse prismatic structure that breaks to weak coarse subangular blocky structure; very firm when moist; clay skins along vertical ped surfaces; pinkish gray (7.5YR 6/2) soft segregated lime; pale yellow (5Y 7/3) coatings; numerous pebbles, most less than 5-mm. in size; strong effervescence with HCl.
IIC ₂ 13585	26 to 38 inches. Reddish brown (2.5YR 5/4) light silty clay that appears to be massive in place but breaks to weak coarse prismatic structure; very firm when moist; pinkish gray (5YR 6/2) soft segregated lime and pale yellow (5Y 7/3) coatings; numerous pebbles, mostly less than 5-mm. in size with very few to 8 inches in diameter; violent effervescence with HCl; diffuse broken boundary.
IIC ₃ 13586	38 to 50 inches. Reddish brown (5YR 4/4 to 5/4) light silty clay loam that appears to be massive in place but breaks to weak coarse prismatic structure; very firm when moist; pinkish gray (5YR 6/2) soft segregated lime and pale yellow (5Y 7/3) coatings; numerous pebbles, mostly less than 5-mm. in size with few up to 8 inches in diameter; violent effervescence with HCl.
IIO ₄ 13587	50 to 60 inches. Same as horizon above.

Remarks: Colors given are for moist soils. Reaction by Hellige-Truog pH kit. B (10 to 18 inches) and C (26 to 52 inches) horizons sampled for Bureau of Public Roads. Roots plentiful to 10 inches. A discontinuous B_{1r} horizon noted in sample pit. A sample of B_{1r} (lab. No. 13588) was taken from along the pit face three feet west of the profile sampled; the B_{1r} occurs between the A₂ and B_{1r} of the horizon sequence described. Not modal, Bisequal profile (Podzol over Gray-Brown Podzolic).

Micromorphology (Method 4E1): Preferred orientation of the clay in the B_{1r} horizon is very weak. Iron oxides appear to be uniformly distributed with only a few concentrations formed in place. Grains of iron oxide(?) of coarse clay and fine silt sizes, probably inherited, are common.

Mineralogy (Method 7A): The carbonate-free clay from the IIC₃ horizon contains small to moderate amounts of mica (or illite), montmorillonite and kaolinite, a small amount of chlorite and a trace of vermiculite. The minerals are fairly well crystallized. The ratio of fine to coarse clay is approximately 1:4. The fine clay mineralogy is essentially the same as that of the total clay. The mineralogy is mixed.

SOIL Keyser silt loam SOIL Nos. 54Wis-14-21 LOCATION Dodge County, Wisconsin

SOIL SURVEY LABORATORY Beltsville, Maryland LAB Nos. 5516 - 5522

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1		
		181b Total			Sand				Silt					2A2 ≥ 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)	Int III (0.05-0.02)	Int II (0.02-0.002)	(2-0.1)				
Pct. of < 2 mm													Pct. of < 76mm			
0-10	A11	68.1	27.5	0.2	0.4	0.5	0.9	2.4 ^a		35.4	35.7		0			
10-14	A3	68.6	28.0	-	0.3	0.3	0.5	2.3		36.3	34.9		0			
14-18	B1	67.7	29.1	0.1	0.3	0.2	0.4	2.2		33.6	36.5		0			
18-22	B21	64.7	31.3	0.1	0.4	0.3	0.4	2.8		32.2	35.6		0			
22-32	B22g	66.4	29.5	0.2	0.5	0.3	0.5	2.6		31.5	37.9		0			
32-40	B31	72.8	24.5	-	-	0.1	0.5	2.1		37.3	37.9		0			
40-66	I-III32	74.9	21.5	-	0.1	0.2	0.5	2.8		35.9	42.2		0			
Depth (in.)	6A1a Organic carbon	Nitrogen	C/N	6E1e			Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH	
				Carbonate as CaCO ₃	Ext iron as Fe		4A1e g/cc	4A1h g/cc	4A1h Oven dry g/cc		4B1c Pct.	4B2 Pct.	8C1c KCl (1:1)		8C1a H ₂ O (1:1)	
0-10	4.46															7.3
10-14	1.78															7.0
14-18	1.11															6.0
18-22	0.53															5.8
22-32	0.48															6.1
32-40	0.16															6.9
40-66	0.10			5.0												7.7
Depth (in.)	Extractable bases 5B1a					6H2a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay			8D3 Ca/Mg	Base saturation		
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	Ext. Al		CEC Sum	Ext iron	15-bar water		5C3 Sum cations Pct.	5C1 NH ₄ OAc Pct.	
0-10	21.8	9.9	0.1	0.2		5.6	37.6							85		
10-14	13.2	7.4	0.1	0.2		6.4	27.3							76		
14-18	10.2	6.0	0.1	0.3		8.3	24.9							67		
18-22	11.2	6.9	0.1	0.4		8.6	27.2							68		
22-32	11.5	7.3	0.1	0.4		3.6	22.9							84		
32-40	11.8	7.7	0.1	0.4		2.5	22.5							89		
40-66	b															
Depth (in.)	Clay Fraction Analysis 7A1b-d															
	Mt	Chl.	Vm.	Mi.	Int.	Qtz	Kl.	Gibbsite								
7A2 X-ray								7A3								

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 Undecomposed organic matter in sand fractions.

b Calcareous not analyzed.

Soil Type: Keyser silt loam.
 Soil No.: 54Wis-14-21
 Location: Dodge County, Wisconsin. SE4 SW4 Sec. 18 T11N R15E.
 Vegetation and land use: Consisted mainly of quack and blue grass.
 Drainage: Moderately well drained.
 Parent Material: Consists of 5-1/2 feet of silt (loess) over dolomitic loam till.
 Sampled by: G. B. Lee, October 1954

Horizon and
 Beltsville
 Lab. No.

O1 A very small amount of grass, leaves, stems, etc.
 Not Sampled

A11 0 to 10 inches. Black (10YR 2/1) silt loam; moderate medium granular structure; friable
 5516 when moist; gradual lower horizon boundary; pH 7.5.

A3 10 to 14 inches. Very dark gray (10YR 3/1) heavy silt loam; weak platy structure in place
 5517 which breaks down into moderate medium granular aggregates; friable; clear lower horizon
 boundary; pH is 7.5. This horizon has fewer roots present than the horizon above.

B1 14 to 18 inches. Very dark grayish brown and very dark gray (10YR 3/2 and 3/1) silty clay
 5518 loam; weak medium prismatic structure in place which breaks down to moderately well developed,
 fine, subangular blocky aggregates; friable; lower horizon boundary is gradual; pH is 5.8.

B21 18 to 22 inches. Dark grayish brown (10YR 4/2) silty clay loam having a few tiny rust-
 5519 colored mottles present; weak, medium, prismatic structure in place which breaks down into
 moderately well developed fine subangular blocky aggregates; friable to slightly firm; pH is
 5.5.

B22g 22 to 32 inches. Dark brown (10YR 4/2) silty clay loam having a few rust-colored mottles
 5520 present; moderate coarse prismatic structure which breaks down into moderately well developed,
 fine subangular blocky aggregates; friable to slightly firm; pH is 5.8.

B31 32 to 40 inches. Brown and light brownish gray (10YR 5/3 and 2.5Y 6/2) silty clay loam
 5521 mottled with yellowish brown (10YR 5/8); moderate fine to coarse prismatic structure in place
 which breaks down into moderately well developed medium subangular blocky aggregates; friable;
 pH is 6.5.

I-II B32 40 to 66 inches. Light brownish gray and yellowish brown (2.5Y 6/2 and 10YR 5/4) silt loam
 5522 mottled with yellowish brown (10YR 5/8); weak medium subangular blocky structure; friable; pH
 7.5; abrupt lower horizon boundary.

II C1 At 66 inches dolomitic, gravelly loam till.
 Not Sampled

Notes: Colors refer to moist soil.

SOIL Keyser silt loam SOIL Nos. 53Wis-14-22 LOCATION Dodge County, Wisconsin

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 54656 - 54663

Depth (in)	Horizon	Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1			
		IB1b Total				Sand				Silt				2A2 ≥ 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)
0-9	Ap	73.9	21.6	0.2	0.4	0.4	0.8	2.7 ^a		39.6	37.4						
9-14	A3	72.0	25.6	-	0.1	0.1	0.2	2.0		36.9	37.2						
14-21	B1	66.2	31.3	-	0.1	0.1	0.3	2.0		35.1	33.2						
21-26	B2g	65.1	32.7	-	0.1	0.2	0.3	1.6		35.9	31.0						
26-32	B2g	65.5	32.4	-	-	0.1	0.2	1.8		33.1	34.2						
32-40	B3l	67.0	30.6	-	-	0.1	0.3	2.0		33.5	35.6						
40-50	B3e	66.1	30.1	-	-	0.2	0.8	2.8		31.8	37.7						
50-60	I-IIB33	72.6	20.5	0.1	0.3	0.6	1.5	4.4		32.9	45.0						tr.

Depth (in)	6A1a Organic carbon	Nitrogen	C/N	6E1e Carbonate as CaCO ₃	Ext. iron as Fe	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH		
						4A1e ½ bar	4A1h Oven dry	4A1d g/cc		4B1c ½ bar	4B2 15 bar	8C1c (1:1) KCl		8C1a (1:1) H ₂ O		
0-9	2.56															6.8
9-14	0.86															5.6
14-21	0.45															5.2
21-26	0.30															5.2
26-32	0.30															5.2
32-40	0.28															5.4
40-50	0.26			3												6.6
50-60	0.15			18												7.8

Depth (in)	Extractable bases 5B1a					6H2a Ext. acidity	CEC		8G1d Ext Al	Ratios to clay			8D3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	Ext		CEC Sum	Ext iron	15-bar water		5C3 Sum cations Pot	5C1 NH ₄ OAc Pot
0-9	14.3	6.2	0.1	0.2		4.7	25.5							82	
9-14	9.0	5.0	0.1	0.2		7.2	21.5							66	
14-21	10.8	6.8	0.1	0.3		9.4	27.4							66	
21-26	11.6	7.7	0.1	0.3		7.8	27.5							72	
26-32	11.4	7.4	0.1	0.3		7.2	26.4							73	
32-40	11.7	7.8	0.1	0.3		6.3	26.2							76	
40-50		9.2	0.1	0.3		3.6									
50-60	b														

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt.	Chl.	Vm.	Mi.	Int.	Qtz.	Kl.	Gibbsite
	7A2 X-ray				7A3			

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 Undecomposed organic matter in sand fractions.
- b Calcareous not analyzed.

Soil Type: Keyser silt loam
 Soil No. 53Wis-14-22
 Location: Dodge County, Wisconsin. SW4 NW4 Sec. 32 T11N R15E.
 Sampled by: G. B. Lee

Horizon and
 Beltsville
 Lab. No.

- Ap
 54656 0 to 9 inches. Black to very dark brown (10YR 2/1.5) heavy silt loam; lumpy, breaks to medium crumbs; friable to slightly firm.
- A3
 54657 9 to 14 inches. Mainly, about 60 percent, very dark grayish brown (10YR 3/2) silt loam mixed with dark grayish brown (10YR 4/2), about 30 percent, very dark brown (10YR 2/2); weak coarse platy structure breaks down to moderate medium granules; gray coatings on peds; friable.
- B1
 54658 14 to 21 inches. Dark brown (7.5YR 3/3) light silty clay loam; color when crushed is brown (10YR 4/3); weak medium blocky structure breaks down to moderate fine blocks; peds are slightly coated with gray; friable.
- B2g
 54659 21 to 26 inches. Dark brown (10YR 3/3) silty clay loam; a few fine, faint yellowish red mottles (5YR 4/8); color when crushed is dark yellowish brown (10YR 4/4); moderate medium blocky structure; peds are slightly coated with gray; slightly firm.
- B2g
 54660 26 to 32 inches. Brown, pale brown and dark brown (10YR 5/3, 6/3 and 4/3) silty clay loam mottled with many (about 30 percent of mass) medium, distinct, strong brown (7.5YR 5/6) mottles; weak medium prismatic structure breaks into well developed fine blocks; slightly firm.
- B31
 54661 32 to 40 inches. Brown (10YR 4/3) and light brownish gray (2.5Y 6/2) silty clay loam having many medium distinct rusty mottles. Moderate, medium blocky to coarse prismatic structure; slightly firm.
- B32
 54662 40 to 50 inches. Light brownish gray and light yellowish brown (2.5Y 6/2 and 6/4) silty clay loam; mottled yellowish red (5YR 5/8); moderately well developed coarse prismatic structure; firm; several limestone flags at this depth.
- I-II B33
 54663 50 to 60 inches. Yellowish brown (10YR 5/4) silt loam having rusty mottles; structure weak medium subangular blocky; friable.
- II C 60 inches. Yellowish brown (10YR 5/6) very fine sand; single grain; loose; calcareous.

Notes: Colors refer to moist soils unless indicated otherwise.

SOIL* Lafont silt loam

SOIL Nos. 9601a-60-3

LOCATION Taylor County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska

LAB Nos. 13608-13615

May 1965

Depth (in.)	Horizon	Size class and particle diameter (mm) <u>3A1</u>											<u>2A2</u> Coarse fragments				
		<u>1B1a</u> Total		Sand								Silt	Int. II (0.2-0.075)	Int. I (0.075-0.02)	> 2 Pct	2 - 19 Pct	3B2 19-76 Pct of < 76mm
		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 (0.02-0.002)	0.02-0.002 (0.02-0.002)	Pct. of < 2 mm					
0-3	A1	11.8	78.7	9.5	0.4a	1.5a	1.8	3.3	4.8	42.4	36.3	48.6	7.0	Tr.	Tr.	-	
3-7	B1r	12.4	80.4	7.2	0.9a	1.5a	1.9	3.0	5.1	47.0	33.4	53.3	7.3	Tr.	Tr.	-	
7-14	B3	22.0	73.4	4.6	1.9a	3.4	3.7	6.4	6.6	46.0	27.4	55.2	15.4	Tr.	Tr.	-	
14-20	A'2	41.7	54.8	3.5	2.8	6.9	8.1	14.5	9.4	35.0	19.8	50.5	32.3	6	6	-	
20-25	1A and 1P	53.3	40.5	6.2	5.1	9.4	10.4	17.9	10.5	25.6	14.9	43.7	42.8	10	10	-	
25-33	1B'2	65.9	26.1	8.0	6.6	12.6	14.0	21.7	11.0	15.6	10.5	35.6	54.9	17	17	-	
33-42	1B'3	81.6	14.0	4.4	10.8	22.3	17.8	22.7	8.0	7.6	6.4	24.6	73.6	17	17	-	
42-54	1C1	91.5	5.3	3.2	8.5	20.3	24.1	31.4	7.2	4.3	1.0	23.3	84.3	16	16	-	
Depth (in.)	6A1a Organic carbon Pct	6B1a Nitrogen Pct	C/N	Carbonate as CaCO ₃ Pct.	6C1a Ext. Iron as Fe ₂ O ₃ Pct.	Bulk density			4D1 COLE b	Water Content					pH	8C1a (1.1)	
						4A1a Field- State g/cc	4A1c 30-Cm. g/cc	4A1h Oven- Dry g/cc		4B1a Field- State Pct	4B3 30-Cm. Pct	4B1b 15-Bar Pct	4B2 15-Bar Pct	4C1 1/3- to 15-Bar in. per in.			
0-3	3.98	0.244	16		1.2											5.0	
3-7	1.70	0.099	17		1.6											4.9	
7-14	0.80	0.043	19		1.3	1.20	1.24	1.28	0.010	16.1	28.1	19.7	7.2			4.8	
14-20	0.20	0.017			1.4	1.66	1.68	1.68		7.7	16.2	12.9	4.1	0.16		4.9	
20-25	0.13	0.012			1.5								2.7	0.16		5.0	
25-33	0.09				1.5	1.88	1.86	1.90	0.007	6.9	11.2	8.5	3.2			5.2	
33-42	0.05				1.3								3.8	0.07		5.5	
42-54	0.05				1.2								2.1			5.8	
													1.2				
Depth (in.)	Extractable bases				6B1a Ext. Acidity	Cat. Exch. Cap.		6C2a Ext. Al	8D3 Ca/Mg	Base saturation							
	6M2b Ca	6O2b Mg	6P2a Na	6Q2a K		Sum	5A3a Sum			5A1a Sum	5C3 Sum	5C1 Sum					
0-3	6.3	1.6	Tr.	0.3	8.2	24.4	15.6		3.9		34	52					
3-7	1.5	0.4	Tr.	0.1	2.0	17.6	10.5				10	19					
7-14	0.4	0.2	Tr.	0.6	0.6	11.5	6.8	3.3			5	9					
14-20	0.5	0.2	Tr.	Tr.	0.7	6.3	4.9				10	14					
20-25	2.5	1.0	0.1	0.1	3.7	4.7	6.4		2.5		44	58					
25-33	3.5	1.2	Tr.	0.1	4.8	2.8	6.6	0.6	2.9		63	73					
33-42	2.7	0.8	Tr.	Tr.	3.5	1.4	4.9		3.4		71	78					
42-54	1.7	0.8	Tr.	Tr.	2.5	0.7	3.2		2.1		78	89					
Depth (in.)	Ratios to Clay 8D1			NH ₄ OAc CEC	Ext. Iron	15-Bar Water	a. 5-25% Fe-Mn nodules. b. Coefficient of Linear Extensibility. c. One or more horizons has relatively low cation exchange capacity. As cation exchange capacity decreases, the relative error of base saturation increases. Trace quantities are omitted from the sum of bases. For very low CEC values, this omission contributes significantly to the relative error of base saturation. Note: See descriptions for mineralogy.										
0-3	1.64	0.13	0.99														
3-7	1.46	0.22	1.00														
7-14	1.48	0.28	0.89														
14-20	1.40	0.40	0.77														
20-25	1.03	0.24	0.52														
25-33	0.82	0.19	0.48														
33-42	1.02	0.30	0.48														
42-54	0.88	0.38	0.38														

Soil type: *Iafont silt loam

Soil Nos.: S60Wis-60-3

Location: Taylor County, Wisconsin; northeast quarter, southeast quarter, Section 6, T32N, R3W, Cleveland Township.

Position and relief: Undulating ground moraine; approximately 5 percent slope; north aspect.

Drainage and permeability: Well drained; moderately permeable; no ground water table within the observed 5-foot depth.

Parent material: Loess over reddish brown loam to sandy clay loam glacial till of Cary age and Patrician source.

Vegetation: Maple, red oak, aspen and basswood trees; understory of ferns.

Erosion: None to very slight. Stoniness: None.

Root distribution: Abundant fibrous roots to lower boundary of B₁ horizon; fewer below.

Sampled by: Paul H. Carroll, William DeYoung, Robert Grossman and Jerry Post, July 25, 1960.

Described by: Paul H. Carroll.

Horizon and

Lincoln

Lab. Number

A ₀₀	2 to 0 inch. Fresh leaf litter.
A ₁ 13608	0 to 3 inches. Black (10YR 2/1) to very dark brown (10YR 2/2) silt loam with weak fine granular structure; horizon shows considerable mixing of A ₁ and A ₂ by meso-fauna and macro-fauna activity; discontinuous thin gray (10YR 6/1) to light brownish gray (10YR 6/2) A ₂ horizon occurs intermittently with the A ₁ on the horizontal plane; very friable; abundant fibrous and few coarse roots; strongly acid; clear smooth boundary.
B ₁ 13609	3 to 7 inches. Dark brown (7.5YR 4/4) silt loam with weak fine granular structure; very friable; fibrous roots common; strongly acid; gradual smooth boundary.
B ₃ 13610	7 to 14 inches. Yellowish brown (10YR 5/4) silt loam with weak thin platy and weak fine subangular blocky structure; few coarse roots; strongly to very strongly acid; clear wavy boundary.
A ₁ '2 13611	14 to 20 inches. Brown (10YR 5/3) and grayish brown (10YR 5/2) silt loam with weak thin platy structure; friable; vesicular; few coarse roots; strongly to very strongly acid; clear wavy boundary.
IIA and B' 13612	20 to 25 inches. Dark brown (7.5YR 4/4) and brown (7.5YR 5/4) loam to gritty silt loam (loess-influenced glacial till); weak medium prismatic structure that breaks under pressure to weak medium subangular blocks; intermingling of A ₂ and B ₂ ; thin and weakly expressed grayish brown (10YR 5/2) bleached tongues extend through the horizon; friable; very strongly acid; clear wavy boundary.
IIB'2 13613	25 to 33 inches. Dark brown (7.5YR 4/4) loam (glacial till) with weak medium subangular blocky structure; few thin patchy clay films on some ped faces; firm; strongly to very strongly acid; gradual smooth boundary.
IIB'3 13614	33 to 42 inches. Dark brown (7.5YR 4/4) loam to sandy loam (glacial till) with weak medium to coarse subangular blocky structure; friable; medium acid; abrupt smooth boundary.
IIc1 13615	42 to 54 inches. Pale brown (10YR 6/3) and light yellowish brown (10YR 6/4) loamy sand glacial drift; generally loose and structureless fine sand to loamy sand; horizon occurs as a lense of sandy glacio-fluvium interbedded with the glacial drift; medium acid.

Remarks: Unless otherwise indicated, all soil colors shown in the soil profile description are moist colors.

MINERALOGY:

The following mineralogical observations are for very fine sands; percentages are only rough approximations: 40 percent quartz, 40 percent feldspar, 20 percent altered feldspar aggregates and intergrowths of quartz and altered feldspar. Amphibole, pyroxene, epidote, chlorite, biotite(?), garnet, and an occasional apatite grain are the accessories observed. Coated grains and opaques are fairly common. More pyroxene in the till than in the loess-influenced portion. More quartz and less altered feldspar in the upper part of the solum.

Thin section observations show: interference color is weak, suggestive of amorphous coatings, but only a few bodies would qualify for spodic horizon pellets as described in the 7th Approximation. The horizon has strongly expressed very fine granular structure; most of the mass breaks down into sand granules with subordinate silt. Thin sections were made of the 2- to 1-mm. granules. Some of these granules have weak peripheral clay orientation. Such peripheral clay orientation may increase the durability of the granules. The morphology of the granules is not suggestive of a biological origin.

SOIL * *Tafont silt loam*

SOIL Nos. **8601a-60-4**

LOCATION **Taylor County, Wisconsin**

SOIL SURVEY LABORATORY **Lincoln, Nebraska**

LAB. Nos. **13616-13624**

May 1965

Depth (in.)	Horizon	Size class and particle diameter (mm)											3A2 Coarse fragments										
		3A1											> 2	2 - 19	3B2 19 - 76								
		Total		Sand					Silt							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)		0.05-0.02		Int. III (0.02-0.002)		Int. II (0.2-0.02)		(2-0.1)	
Pct. of < 2 mm											Pct.		Pct. of < 76mm										
0-4	A1	10.5	79.4	10.1	0.4a	1.8a	1.3	2.7	4.3	36.3	41.1	43.9	6.2	Tr.	Tr.	-							
4-8	B1r	7.8	82.6	9.6	0.6b	0.8b	0.8c	1.6	4.0	43.3	39.3	48.1	3.8	Tr.	Tr.	-							
8-14	B3	9.4	83.9	6.7	0.5b	0.8b	1.0c	2.1	5.0	47.6	36.3	53.7	4.4	Tr.	Tr.	-							
14-22	A'2	20.9	71.5	7.6	1.0c	2.3c	3.2c	6.8	7.6	44.0	27.5	55.0	13.3	4	4	-							
22-30	IA and B'	62.9	28.7	8.4	7.5c	11.2c	12.7c	20.9	10.6	13.7	15.0	34.0	52.3	16	16	-							
30-41	IB' 31	65.0	23.2	11.8	8.8	12.0	12.7	21.4	10.1	12.2	11.0	32.7	54.9	15	15	-							
41-51	IB' 32	61.0	26.0	13.0	6.7	11.1	12.4	20.3	10.5	12.8	13.2	32.6	50.5	17	17	-							
51-62	IC	62.3	25.3	12.4	6.7	11.4	12.1	21.1	11.0	13.9	11.4	34.1	51.3	16	16	-							
2-4	d	7.8	84.0	8.2	0.4b	0.8b	1.0c	1.8	3.8	40.1	43.9	44.7	4.0	2	2	-							

Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6E1c Carbonate as CaCO ₃	6C1a Ext. Iron as Fe ₂ O ₃	Bulk density			4M COLE	Water Content					pH	8C1a (1 l)
						4A1a Field-State	4A1c 30-Cm.	4A1h Oven-Dry		4B4 Field-State	4B5 30-Cm.	4B1b 1/3-Bar	4B2 15-Bar	4C1 1/3- to 15-Bar		
	Pct.	Pct.		Pct.	Pct.	g/cc	g/cc	g/cc		Pct.	Pct.	Pct.	Pct.	in. per in.		
0-4	8.41	0.357	24		1.0	1.0									5.7	
4-8	2.07	0.110	19		1.8	1.8									4.8	
8-14	1.40	0.068	17		1.2	1.32	1.32	-		11.8	24.8	23.4	5.2	0.24	4.7	
14-22	0.24	0.022			1.4	1.53	1.52	1.54	0.005	9.2	20.1	13.3	4.1	0.14	4.7	
22-30	0.08	0.010			1.5	1.5	1.90	1.90	0.010	5.3	11.7	11.5	4.3		5.0	
30-41	0.05				1.6	1.6	1.84	1.90	0.010	5.3	11.7	11.5	4.5	0.11	5.6	
41-51	0.03				1.6	1.6							5.2		6.1	
51-62	0.02				1.5	1.95	1.91	1.97	0.010	9.2	11.8	12.0	5.0	0.12	6.3	
2-4	1.33				0.8	0.8							4.9		4.7	

Depth (in.)	Extractable bases				6B1a Ext. Acidity	6C1a Ext. Sum	6D1a Ext. Sum	6E1a Ext. Sum	6F1a Ext. Sum	6G1a Ext. Sum	8D3 Ca/Mg	Base saturation	
	6M2b Ca	6O2b Mg	6P2a Na	6Q2a K								5C3 Sum	5C1 Sum
	meq/100 g											Pct	Pct
0-4	16.5	3.2	0.1	0.3	20.1	17.0	37.1	25.9	-		5.2	54	78
4-8	1.3	0.3	0.1	0.1	1.8	20.9	22.7	12.5	4.3			8	14
8-14	0.2	0.1	Tr.	0.1	0.4	15.1	15.5	9.0	4.1			2	4
14-22	0.4	0.4	Tr.	0.1	0.9	8.9	9.8	6.8	4.3			9	13
22-30	1.9	1.8	0.1	0.1	3.9	4.4	8.3	6.6	1.4		1.0	47	59
30-41	4.6	3.2	0.1	0.1	8.0	2.1	10.1	8.6	0.2		1.4	79	93
41-51	5.7	4.0	0.1	0.1	9.9	1.9	11.8	9.7	-		1.4	84	102
51-62	5.4	3.6	0.1	0.1	9.2	1.6	10.8	8.7	-		1.5	85	106
2-4	2.4	0.9	Tr.	0.1	2.8	10.8	13.6	8.8	4.0		8.0	20	32

Depth (in.)	Ratios to Clay 8M1	
	8M1 Ca	Ext. 15-Bar Iron/Water
0-4	2.56	0.10
4-8	1.30	0.19
8-14	1.34	0.18
14-22	0.89	0.18
22-30	0.78	0.18
30-41	0.73	0.14
41-51	0.75	0.12
51-62	0.70	0.12
2-4	1.07	0.10

a. 25-50% organic matter.
b. 25-50% Fe-Mn nodules.
c. 5-25% Fe-Mn nodules.
d. Special sample - see profile description.
e. Coefficient of linear Extensibility.
Note: See descriptions for mineralogy.

Soil type: *Iafont silt loam

Soil Nos.: S60Wis-60-4

Location: Taylor County, Wisconsin; southeast quarter, southeast quarter, Section 19, T32N, R3W, Cleveland Township.

Position and relief: Undulating to rolling ground moraine; 2 to 5 percent convex slope; west aspect.

Drainage and permeability: Well drained; moderately permeable; no ground water table within the observed 5-foot depth.

Parent material: Loess over reddish brown loam to sandy clay loam glacial till of Cary age and Patrician source.

Vegetation: Woodland, recently clear cut; elm, sumac and ferns remain.

Erosion: Slight to none. Stoniness: None.

Root distribution: Abundant fibrous and some coarse roots in the upper 4 inches; fewer fibrous roots below.

Sampled by: Paul H. Carroll, William DeYoung, Robert Grossman and Jerry Post, July 26, 1960.

Described by: Paul H. Carroll.

Horizon and

Lincoln

Lab. Number

- A1 13616 0 to 4 inches. Very dark brown (10YR 2/2) silt loam with weak fine granular structure; very friable; abundant fibrous roots and some coarse roots; medium acid; abrupt wavy boundary.
- A2 13618 Grayish brown (10YR 5/2) silt loam with weak very thin platy structure; occurs intermittently within the A1 horizon and is expressed as a salt-and-pepper effect or as pronounced bleached layers with thicknesses that range from 1/2 to 2 inches; very friable; abundant fibrous roots and some coarse roots; strongly acid; abrupt wavy boundary.
- B1r 13617 4 to 8 inches. Dark brown (7.5YR 4/4) silt loam with weak very fine granular structure; very friable; few fibrous and few coarse roots; very strongly acid; gradual smooth boundary.
- B3 13618 8 to 14 inches. Dark yellowish brown (10YR 4/4) silt loam with weak fine granular to weak fine sub-angular blocky structure; friable; few coarse roots; very strongly acid; gradual wavy boundary.
- A'2 13619 14 to 22 inches. Brown (10YR 5/3) and grayish brown (10YR 5/2) silt loam with weak thin platy structure; vesicular; friable; few coarse roots; very strongly acid; clear irregular boundary.
- IIA and B' 13620 22 to 30 inches. Dark brown (7.5YR 4/4) gritty silt loam to loam (loess-influenced glacial till); weak medium to coarse subangular blocky structure that displays a very weak medium platiness throughout; intermingling of A2 and B2 horizons; thin bleached tongues of brown (10YR 5/3) to grayish brown (10YR 5/2) extend through the horizon; friable; very strongly acid; clear smooth to wavy boundary.
- IIB'31 13621 30 to 41 inches. Dark brown (7.5YR 4/4) loam (glacial till) with weak coarse platy structure that displays weak evidence of vertical cleavage planes; shows slight textural pickup, somewhat higher than that of the horizon above or below; few thin patchy clay films on ped faces and continuous clay linings in small worm and root cavities; firm; strongly acid; gradual smooth boundary.
- IIB'32 13622 41 to 51 inches. Reddish brown (5YR 4/4) loam (glacial till) with weak medium platy structure that displays weak evidence of vertical cleavage planes; few thin clay films on ped faces; firm; medium acid; gradual smooth boundary.
- IIC 13623 51 to 62 inches. Reddish brown (5YR 4/4) loam glacial till with weak thin to medium platy structure; friable; medium acid.
- A2 13624 2 to 4 inches. The discontinuous A2 horizon was sampled.

Remarks: Unless otherwise indicated, all soil colors shown in the soil profile description are moist colors.

MINERALOGY:

Very fine sand similar in mineralogy to Iafont, Profile S60Wis-60-3.

Thin section observations show: Interference color is weak, suggestive of amorphous coatings, but only a few bodies would qualify for spodic horizon pellets as described in the 7th Approximation. The horizon has strongly expressed very fine granular structure; most of the mass breaks down into sand granules with subordinate silt. Thin sections were made of the 2- to 1-mm. granules. Some of these granules have weak peripheral clay orientation. Such peripheral clay orientation may increase the durability of the granules. The morphology of the granules is not suggestive of a biological origin.

SOIL *Manawa silt loam

SOIL Nos. S60W1s-8-1

LOCATION Calumet County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska

LAB. Nos 13562-13570

April 1966

General Methods: 1A, 1B1a, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm)														Clay		Coarse fragments		
		Total			Sand							Silt				3A1a Carbonate	Non-Carbonate	2A2 > 7 (<19) Pct.	2-19 Pct of < 75mm	19-76 Pct of < 75mm
		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)							
0-5	A1	15.7	58.0	26.3	0.5a	2.5a	2.5a	5.4b	4.8b	24.1	33.9	31.4	10.9			26	-			
5-8	A2	18.5	68.0	13.5	1.9a	2.3a	1.8b	4.3c	8.2c	35.3	32.7	45.6	10.3			14	Tr.			
8-11	A3-B1	20.2	56.9	22.9	0.7a	1.5a	2.5c	6.3c	9.2	30.1	26.8	42.3	11.0			23	Tr.			
11-18	IIB21	35.7	33.4	30.9	0.9a	3.1b	6.2c	5.9	9.6	15.0	18.4	32.7	26.1			31	Tr.			
18-22	IIB22	19.0	35.5	45.5	0.5d	1.5d	2.8d	8.2c	6.0	9.1	26.4	19.5	13.0			46	Tr.			
22-30	IIB3	22.4	39.8	37.8	2.4e	2.2e	2.4e	7.4f	8.0f	13.0	26.8	25.1	14.4			1	37	8		
30-39	IIC1	21.2	42.6	36.2	2.5e	2.1e	2.4e	6.7f	7.5f	13.9	28.7	25.2	13.7			4	32	9		
39-50	IIC2	20.3	44.8	34.9	2.0e	2.1e	2.4e	6.3f	7.5f	14.3	30.5	25.3	12.8			5	30	10g		
50-60+	IIC22a	22.9	43.3	33.8	3.2e	2.5e	2.4e	7.2f	7.6f	13.9	29.4	25.5	15.3			6	28	7		

Depth (in.)	6A1a Organic carbon Pct	6B1a Nitrogen Pct	C/N	6E2a Carbonate as CaCO ₃ Pct.	6C1a Ext. Iron as Fe ₂ O ₃ Pct.	Bulk density			4D1 COLE h	Water content				pH		
						4A1a Field State g/cc	4A1c 30-cm g/cc	4A1h Oven Dry g/cc		4B4 Field State Pct	4B3 30-cm Pct	4B1b 1/3 Bar Pct.	4B2 15-Bar Pct	4C1 1/3-to 15-Bar Pct	8C1a (1.1)	
0-5	10.1	0.713	14		2.0											6.1
5-8	1.11	0.100	11		1.8	1.50	1.47	1.51	0.010	11.1	20.5	17.8	27.8	7.2	0.16	5.7
8-11	0.42	0.045	9		1.8								9.7			5.9
11-18	0.33	0.030	11		2.1	1.72	1.66	1.82	0.032	16.2	19.0	19.3	11.6	0.13		6.4
18-22	0.34	0.029	12		2.3	1.73	1.78	1.78		14.8		23.8	16.7			7.2
22-30	0.28	0.019	15	1	1.9	1.83	1.77	1.88	0.020	15.5	17.0	18.1	14.2	0.07		7.9
30-39	0.29			27	1.4	1.95	1.86	1.98	0.020	11.8	15.9	18.7	12.7	0.11		8.0
39-50	0.28			34	1.2		1.90	2.00	0.017		14.8	17.8	12.3	0.10		8.2
50-60+	0.28			32	1.2							12.0				8.2

Depth (in.)	Extractable bases				5B1a Sum	6H1a Ext. Acidit.	Cat. Exch. Cap.	Exch. Cap.	Cat. Exch. Cap. BaCl ₂ -TEA	5A5	8D3 Ca/Mg	Base saturation	
	6N2b Ca	6O2b Mg	6P2a Na	6Q2a K								5C3 Sum Cations	5C1 NH ₄ OAc Pct
0-5	31.3	10.7	Tr.	0.9	42.9	20.0	62.9	45.0	67.7	20.5	2.9	68	95
5-8	6.6	2.6	Tr.	0.2	9.4	8.2	17.6	12.9	16.5	13.5	2.5	53	73
8-11	8.3	5.2	Tr.	0.3	13.8	5.8	19.6	15.2	17.6	10.3	1.6	70	91
11-18	9.1	6.4	Tr.	0.3	15.8	4.3	20.1	15.9			1.4	79	99
18-22			0.1	0.3				19.7					
22-30			0.1	0.3				14.2					
30-39			0.1	0.2				11.8					
39-50			0.1	0.2				10.7					
50-60+			0.1	0.2				9.9					

Depth (in.)	Ratios to Clay				a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.
	8D1 NH ₄ OAc CEC	8D2 k NH ₄ OAc CEC	8D1 Ext. Iron	8D1 15-Bar Water											
0-5	1.71	1.71	0.08	1.06	> 50% Fe-Mn.	25-50% Fe-Mn.	5-25% Fe-Mn.	5-25% Fe-Mn.	> 50% carbonate.	5-25% carbonate.	Carbonatic fragments; < 2 percent noncarbonate residue in > 2-mm. material.	Coefficient of Linear Extensibility calculated for fine earth fabric (< 2 mm.); if coarse fragments (> 2 mm.) are included, the present values will be reduced approximately 1 part in 10.	Calculated for fine-earth fabric (< 2 mm.).	Air-dry.	Noncarbonate clay.
5-8	0.96	0.96	0.13	0.53											
8-11	0.66	0.66	0.09	0.42											
11-18	0.51	0.51	0.07	0.38											
18-22	0.43	0.43	0.05	0.37											
22-30	0.38	0.38	0.04	0.38											
30-39	0.32	0.37	0.04	0.35											
39-50	0.31	0.36	0.03	0.35											
50-60+	0.29	0.35	0.04	0.36											

Note: See descriptions for mineralogy.

Soil type: *Manawa silt loam
 Soil Nos.: S50Wis-8-1
 Location: Calumet County, Wisconsin; about three miles southeast of the village of Hilbert, southeast quarter of northeast quarter of Section 20, T19N, R20E; photo BHN-4H-17 (1952).
 Vegetation and use: Red oak, ash, elm, basswood, and hard maple woodlot; grazed in recent years.
 Slope and land form: Level, 0 to 1 percent drainage way draining southwest through woodlot; late Wisconsin (Valders) ground moraine.
 Drainage and permeability: Imperfectly to moderately well drained; surface runoff and internal drainage are slow; permeability is moderately slow.
 Parent material: Reddish brown calcareous clay till with a thin silt mantle.
 Collected by: Robert Grossman, G. B. Lee, and William DeYoung, July 19, 1960.
 Described by: William DeYoung.

Horizon and
 Lincoln
 Lab. Number

Aoo	1/4 to 0 inch. Leaves, twigs and other plant remains.
A1 13562	0 to 5 inches. Black (10YR 2/1) silt loam with moderate fine to medium granular structure; very friable when moist; slightly acid.
A2 13563	5 to 8 inches. Light brownish gray (10YR 6/2) silt loam with moderate fine platy structure; very friable when moist; common medium distinct brown (10YR 5/3 to 5/4) mottles; vesicular; strongly acid.
A3-B1 13564	8 to 11 inches. Grayish brown (10YR 5/2) to brown (10YR 5/3) heavy silt loam with dominant moderate coarse or thick platy structure grading to moderate medium angular blocky structure in lower portion of horizon; friable when moist; few fine faint dark grayish brown (10YR 4/2) mottles; light gray (10YR 7/2) coatings; medium acid.
IIE21 13565	11 to 18 inches. Dark brown (7.5YR 4/2 to 4/4) to brown (7.5YR 5/2 to 5/4) silty clay with strong medium to coarse angular blocky structure; very firm when moist; dark brown (7.5YR 3/2) ped surfaces having continuous clay skins; slightly acid.
IIE22 13566	18 to 22 inches. Dark reddish gray (5YR 4/2) gritty clay with strong medium to coarse angular blocky structure; very firm when moist; dark reddish brown (5YR 3/3) ped surfaces with continuous clay skins; few fine faint reddish brown (5YR 5/3) mottles; weak gravel or stone line at 19 to 20 inches; neutral.
IIB3 13567	22 to 30 inches. Reddish brown (5YR 4/3) silty clay with moderate coarse prismatic structure that breaks to moderate coarse subangular blocky structure; firm when moist; dark reddish gray (5YR 4/2) ped surfaces; slight effervescence along root channels.
IIC1 13568	30 to 39 inches. Reddish brown (5YR 4/3) silty clay with moderate coarse prismatic structure; firm when moist; soft segregated lime coatings along vertical cleavage faces; weak effervescence on ped surfaces.
IIC2 13569	39 to 50 inches. Reddish brown (5YR 4/3) silty clay with weak to moderate coarse prismatic structure; greenish gray (5GY 6/1 to 5G 4/1) coatings along cleavage faces; calcareous.
IIC2ca 13570	50 to 60 inches plus. Similar to above horizon with conspicuous soft segregated lime nodules.

Remarks: Unless otherwise indicated all colors are for moist soil. Reaction determined by Hellige-Truog pH kit. B (11 to 30 inches) and C (30 to 50 inches) horizons sampled for Bureau of Public Roads. Roots plentiful to 15 inches.

Mineralogy (Method 7A): The dolomite-to-calcite ratio, determined by X-ray diffraction, is about 3:1 in the IIC2ca horizon. The amount of dolomite is approximately the same as in the carbonate fringe, IIB3 horizon, but calcite is not present. Diffraction patterns suggest the presence of a high-magnesium analogue of both calcite and dolomite. The carbonate-free clay from the IIE22 horizon contains small to moderate amounts of mica (or illite), montmorillonite and kaolinite, a small amount of chlorite and a trace of vermiculite. The minerals are fairly well crystallized. The ratio of fine to coarse clay is approximately 1:4. The fine clay mineralogy is essentially the same as that of the total clay. The mineralogy is mixed.

SOIL *Manawa silt loam SOIL Nos. 859Ms-20-4 LOCATION Fond du Lac County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 11803-11811 April 1966
General Methods: 1A, 1B1a, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1											Clay		Coarse fragments 2A2			
		Total											Clay Carbonate	Non-Carbonate	Coarse fragments			
		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 (<19) Pct.	2-19 Pct.	19-76 Pct.
Pct of < 2 mm																		
0-5	A1	15.1	65.7	19.2	0.4	1.3	2.0	5.3	6.1	27.3	38.4	36.2	9.0			Tr.		
5-9	A2	16.6	64.3	19.1	0.6	1.3	2.3	5.7	6.7	25.1	39.2	34.8	9.9			Tr.		
9-11	A3-B1	15.5	60.7	23.8	0.5	1.3	2.0	5.4	6.3	23.6	37.1	32.8	9.2			Tr.		
11-17	T1B2	14.1	40.1	45.8	0.4	1.1	2.0	5.6	5.0	14.8	25.3	22.8	9.1			Tr.		
17-20	T1B3	26.1	36.3	37.6	4.5a	4.0a	3.0b	7.7b	6.9b	14.6	21.7	25.7	19.2			10		
20-28	T1C1	23.6	38.2	38.2	4.9a	3.4a	2.5b	6.5b	6.3b	13.9	24.3	23.9	17.3			13		
28-35	T1C2	22.2	40.0	37.8	3.6a	3.4a	2.4b	6.4b	6.4b	14.1	25.9	24.1	15.8			13		
35-44	T1C3	22.6	39.3	38.1	4.3a	3.4a	2.5b	6.1b	6.3b	14.5	24.8	24.3	16.3			22c		
44-54+	T1C4	23.4	39.2	37.4	3.1a	3.4a	2.8b	7.1b	7.0b	14.0	25.2	25.0	16.4			22		
pH																		
Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6E1a Carbonate as CaCO ₃ Pct.	6C1a Ext. Iron as Fe ₂ O ₃ Pct.	Bulk density		Water content		pH		8C1a (1:1)						
						4A1a Field-State g/cc	4A1b Oven-Dry g/cc	4B1a Field-State Pct.	4B1b 15-Bar Pct.									
0-5	7.57	0.466	16	Tr(s)	1.1							6.8						
5-9	2.66	0.175	15	Tr(s)	1.2							6.5						
9-11	1.17	0.094	12	Tr(s)	1.6							6.6						
11-17	1.12	0.105	11	3	2.7							7.1						
17-20	0.37	0.031	12	18	1.6							7.7						
20-28	0.24	0.020		24	1.4							7.8						
28-35	0.20			27	1.3	1.84	1.84	6.9				7.9						
35-44	0.16			31	1.2							7.9						
44-54+	0.15			33	1.2							7.9						
Extractable bases 5B1a																		
Depth (in.)	6N2b Ca	6C2b Mg	6P2a Na	6Q2a K	Sum	6H1a Ext. Acidity	5A3a Sum	5A1a NH ₄ OAc	8D3 Ca/Mg	Base saturation								
										5C3 Sum	5C1 NH ₄ OAc							
										Pct.	Pct.							
meq/100 g																		
0-5	28.3	7.7	Tr.	0.4	36.4	8.3	44.7	31.9	3.7	81	114							
5-9	13.4	4.4	Tr.	0.2	18.0	6.2	24.2	16.9	3.0	74	106							
9-11	10.1	4.8	Tr.	0.2	15.1	5.7	20.8	14.6	2.1	72	103							
11-17			0.1	0.5				27.3										
17-20			0.1	0.3				17.8										
20-28			0.1	0.4				16.5										
28-35			0.1	0.3				14.7										
35-44			0.1	0.3				13.1										
44-54+			0.2	0.3				11.4										
Ratios to Clay 8M																		
Depth (in.)	NH ₄ OAc CEC	Ext. Iron	15-Bar Water															
0-5	1.66	0.06	0.86															
5-9	0.88	0.06	0.46															
9-11	0.61	0.07	0.37															
11-17	0.60	0.06	0.39															
17-20	0.47	0.04	0.36															
20-28	0.43	0.04	0.37															
28-35	0.39	0.03	0.38															
35-44	0.34	0.03	0.34															
44-54+	0.30	0.03	0.33															

- a. > 50% carbonate.
- b. 5-25% carbonate.
- c. Carbonatic fragments; < 2 percent noncarbonate residue in > 2-mm. material.

Soil type: *Manawa silt loam

Soil Nos.: S59Wis-20-4

Location: Fond du Lac County, Wisconsin; northwest quarter of southeast quarter of Section 25, T16N, R16E; about three miles northwest of the city of Fond du Lac, along U. S. Highway 41; 150 feet northeast of soft drink sign; photo XF-2B-95 (1941).

Vegetation and use: Maple, elm, basswood, and ash farm woodlot; not grazed in recent years.

Slope and land form: Nearly level, 0 to 1 percent; late Wisconsin (Valders) ground moraine.

Drainage and permeability: Imperfectly to moderately well drained; surface runoff and internal drainage are slow; permeability is moderately slow.

Parent material: Reddish brown calcareous clay till with a thin silt mantle.

Collected by: J. S. Allen, William DeYoung, and G. B. Lee, September 1, 1959.

Described by: E. G. Link.

Horizon and

Lincoln

Lab. Number

A1 11803	0 to 5 inches. Black (10YR 2/1) silt loam with moderate very fine granular structure; soft when dry; mildly alkaline.
A2 11804	5 to 9 inches. Dark gray (10YR 4/1) to very dark gray (10YR 3/1) silt loam with moderate very fine platy structure that breaks to moderate very fine granular structure; slightly hard when dry; neutral.
A3-B1 11805	9 to 11 inches. Dark gray (10YR 4/1) to very dark gray (10YR 3/1) silt loam with weak coarse to medium subangular blocky structure; hard when dry; a few faint mottles; vesicular; slightly acid.
IIB2 11806	11 to 17 inches. Reddish brown (5YR 4/3) silty clay to clay with moderate to strong medium angular blocky structure; slightly hard when dry; common fine and distinct yellowish red (5YR 5/6) mottles; peds have dark reddish brown (5YR 3/2) coatings; slightly acid.
IIB3 11807	17 to 20 inches. Reddish brown (5YR 4/3) silty clay with weak medium subangular blocky structure; very firm when moist; effervescence with HCl.
IIC1 11808	20 to 28 inches. Reddish brown (5YR 4/3) silty clay loam with weak medium prismatic structure that breaks to weak medium subangular blocky structure; very firm when moist; numerous pebbles, most less than 10-mm. in size; effervescence with HCl.
IIC2 11809	28 to 35 inches. Reddish brown (5YR 4/4 to 5/4) silty clay with weak medium prismatic structure that breaks to weak medium subangular blocky structure; very firm when moist; pinkish gray (5YR 7/2) coatings mostly along root channels; a few faint mottles; strong effervescence with HCl.
IIC3 11810	35 to 44 inches. Reddish brown (5YR 4/3) silty clay with weak medium to coarse prismatic structure that breaks to weak medium subangular blocky structure; very firm when moist; zone of maximum pink (5YR 7/3) soft segregated lime; numerous pebbles mostly less than 10-mm. in size; pinkish gray (5YR 7/2) coatings, mostly along root channels; a few faint mottles; violent effervescence with HCl.
IIC4 11811	44 to 54 inches. Reddish brown (2.5YR 4/4 to 5YR 4/3) silty clay with weak medium to coarse prismatic structure that breaks to weak medium subangular blocky structure; very firm when moist; pinkish gray (5YR 7/2) coatings mostly along tree root channels; a few faint mottles; violent effervescence with HCl; numerous pebbles, mostly less than 10-mm. in size.

Remarks: Colors given are for moist soil. Reaction determined by Hellige-Truog pH kit. B and C horizons sampled for Bureau of Public Roads. Gravel and stones present are largely dolomitic. Roots plentiful to a depth of 20 inches. Wavy textural differences in C horizon suggest peri-glacial phenomena. Not modal for series, slightly better drained than typical.

SOIL Marquesan silt loam SOIL Nos. 54Wis-14-20 LOCATION Dodge County, Wisconsin

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 5510 - 5515

Depth (in.)	Horizon	1B1b Size class and particle diameter (mm) 3A1													3B2 Cm	3B1 Coarse fragments		
		Total			Sand					Silt						2A2 > 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)	Int. III (0.05-0.02)	Int. II (0.02-0.002)	(2-0.1)	Pct. of < 76mm					
0-11	A1	65.2	28.6	0.1	0.5	0.8	1.5	3.3 ^a	32.6	36.6				0				
11-15	B1	61.7	31.9	0.2	0.4	0.7	1.5	3.6	31.9	34.2				0				
15-22	B2	61.7	31.0	0.2	0.4	0.8	1.8	4.1	30.7	36.2				0				
22-27	II B3	32.2	15.2	4.6	5.1	5.4	20.3	17.2	13.2	49.8				12				
27-36	II C1	34.5	9.4	7.8	8.0	6.5	16.6	17.2	15.5	47.0				30				
8 Feet	II C2	37.6	11.0	6.7	7.0	6.4	14.5	16.8	17.4	46.2				23				

Depth (in.)	6A1a Organic carbon Pct	Nitrogen Pct	C/N	6E1e Carbonate as CaCO ₃ Pct	Ext. iron as Fe Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH		
						4A1e ½ bar g/cc	4A1h Oven dry g/cc	4D1		4B1c ½ bar Pct.	4B2 15 bar Pct.	8C1c (1:1) KCl		8C1a (1:1) H ₂ O		
0-11	2.61															7.2
11-15	1.32															6.6
15-22	0.91															6.5
22-27	0.55			51												7.8
27-36	0.17			76												8.0
8 Feet	0.09			66												8.2

Depth (in.)	Extractable bases 5B1a					6H2a Ext. acidity	CEC		6G1d Ext Al	Ratios to clay			8D3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	CEC Sum		Ext. iron	15-bar water	5C3 Sum cations Pct		5C1 NH ₄ OAc Pct.	
0-11	15.5	8.5	0.1	0.2		4.9	29.2							83	
11-15	12.2	7.8	0.2	0.3		6.4	26.9							76	
15-22	12.0	7.8	0.2	0.4		5.3	25.7							79	
22-27	b														
27-36	b														
8 Feet	b														

Depth (in.)	Clay Fracton Analysis 7A1b-d							
	Mt.	Chl.	Vm	Mi	Int	Qtz	Kl	Gibbsite
	7A2 X-ray				7A3			

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, s = small, x = moderate, xxx = abundant, xxxx = dominant.

a Undecomposed organic matter in sand fractions.

b Calcareous not analyzed.

Soil Type: Markesan silt loam.
 Soil No.: 54Wis-14-20
 Location: Dodge County, Wisconsin. SE4 SW4 Sec. 18 T11N R15E.
 Vegetation and land use: Blue grass and quack grass.
 Drainage: Well-drained. Collected by and date: G. B. Lee, October 1954.
 Parent Material: Consists of about 24 inches of silt (loess) over dolomitic loam till.

Horizon and
 Beltsville
 Lab. No.

O1 A very small amount of grass, leaves, stems, etc.
 Not Sampled

A1 0 to 11 inches. Black (10YR 2/1) silt loam; moderate, medium granular structure; friable
 5510 when moist, gradual lower horizon boundary. There is a high concentration of roots in this
 horizon. pH is 7.5.^a

B1 11 to 15 inches. Very dark grayish brown (10YR 3/2) heavy silt loam; moderate fine prismatic
 5511 structure in place which breaks down into moderately well developed medium subangular blocky
 aggregates; friable when moist; gradual lower horizon boundary; pH is 6.3.

B2 15 to 22 inches. Dark brown (10YR 3/3) silty clay loam; moderate medium prismatic structure
 5512 in place which breaks down into moderately well developed medium subangular blocky aggregates;
 slightly firm when moist; clear irregular lower horizon boundary; pH is 5.3.

II B3 22 to 27 inches. Dark brown (10YR 4/3) gravelly loam; weak, medium subangular blocky
 5513 structure; friable when moist; clear, irregular lower horizon boundary; pH is 8.

II C1 27 to 36 inches. Yellowish brown (10YR 5/4) slightly calcareous, gravelly loam; massive in
 5514 place; friable when moist; gravel and channery consists mainly of dolomitic fragments;
 effervesces slowly with dilute HCl.

II C2 8 Feet. Light yellowish brown (10YR 6/4) highly calcareous gravelly loam till; compact and
 5515 massive in place; firm when moist, very hard when dry; coarse portion consists mainly of
 dolomitic rock fragments.

Notes: Colors refer to moist soil.

a pH with Truog Kit.

SOIL Markesan silt loam, thick solum SOIL Nos. 53Wis-14-23 LOCATION Dodge County, Wisconsin

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 54664 - 54670

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1			
		1B1b Total				Sand				Silt				2A2 > 2 Pct.	2-19 Pct.	19-76 Pct. of ← < 76mm →	
		Sand (2-0.05) (0.05-0.002)	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)
0-9	Ap	69.4	23.2	0.1	0.4	0.5	1.1	5.3			32.8	42.5					
9-13	A3	73.1	21.1	-	0.1	0.2	0.5	5.0			36.2	42.1					
13-18	B1	73.6	21.1	-	0.1	0.2	0.4	4.6			34.5	44.0					
18-28	B2	66.1	28.5	0.2	0.2	0.2	0.7	4.1			29.8	40.8					
28-33	IIB22	49.5	31.5	1.9	2.3	2.4	6.5	5.9			26.6	32.7					
33-45	IIC1	35.0	8.9	7.7	7.0	4.2	16.3	20.9			15.4	52.5					
45+	IIC2	35.4	9.0	10.0	7.8	4.9	15.8	17.1			18.0	45.4					

Depth (in.)	5A1a Organic carbon	Nitrogen	C/N	6E1e Carbonate as CaCO ₃	Ext. iron as Fe	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH	
						4A1e ½ bar	4A1h Oven dry	g/cc		4B1c ½ bar	4B2 15 bar	Pct.		8C1c (1:1)	8C1a (1:1)
						g/cc	g/cc	g/cc		Pct.	Pct.	Pct.		KCl	H ₂ O
0-9	2.96														6.6
9-13	1.45														5.4
13-18	0.89														5.4
18-28	0.46														5.4
28-33	0.58														6.4
33-45	0.17														8.0
45+	0.13														

Depth (in.)	Extractable bases 5B1a				6H2a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay			8D3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K		Sum	5A3a Sum cations		CEC Sum	Ext. iron	15-bar water		5C3 Sum cations	5C1 NH ₄ OAc
	meq/100 g												Pct.	Pct.
0-9	14.4	6.4	0.1	0.2	6.4	27.5							77	
9-13	7.2	3.2	tr.	0.1	10.4	20.9							50	
13-18	6.6	3.4	tr.	0.2	8.0	18.2							56	
18-28	9.4	6.0	0.1	0.3	7.2	23.0							69	
28-33	13.7	9.2	0.1	0.4	5.3	28.7							82	
33-45	a													
45+	a													

Depth (in.)	Clay Fraction Analysis 7A1b-d						
	Mt.	Chl.	Vm	Mi.	Int.	Qtz.	Kl.
	7A2 X-ray				7A3		

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 Calcareous not analyzed.

Soil Type: Markesan silt loam, thick solum.
 Soil No: 53Wis-14-23
 Location: Dodge County, Wisconsin. SW4 SW4 Sec. 21 T13N R14E.
 Vegetation and land use: Oats field.
 Slope and land form: 5 percent.
 Parent Material: Silty loess overlying highly calcareous loam till.
 Physiographic Position: Mainly on ground moraine slopes that are gently rolling.
 Sampled by: G. B. Lee

Horizon and
 Beltsville
 Lab. No.

Ap
 54664 0 to 9 inches. Dark grayish brown (10YR 4/1.5, dry) to very dark brown (10YR 2/2) silt loam; somewhat lumpy in place, breaks to a fine crumb structure; friable when moist; abrupt lower horizon boundary.

A3
 54665 9 to 13 inches. Brown (10YR 4/3, dry) to dark brown (10YR 3/3) silt loam; aggregates are coated dark grayish brown (7.5YR 4/2, dry); crushed color is dark grayish brown (10YR 4/2); incipient, very coarse and weak platy structure; soil breaks out into moderately well-developed medium, subangular blocky aggregates; friable; gradual lower horizon boundary.

B1
 54666 13 to 18 inches. Dark yellowish brown (10YR 3/4) crushing to brown (10YR 4/3) silt loam; coatings on aggregates as in above horizon; weak coarse prismatic structure in place, prisms break into moderately well developed, fine to medium, subangular blocky aggregates, friable; gradual lower boundary.

B2
 54667 18 to 28 inches. Dark brown (10YR 3/3) crushing to brown (10YR 4/3) silty clay loam; dark grayish brown coatings persist in this layer; weakly developed medium prismatic structure, in place; prisms break into moderately well developed, medium subangular blocky aggregates; friable to slightly firm; lower horizon boundary is gradual.

II B22
 54668 28 to 33 inches. Dark reddish brown (5YR 3/2) and brown (10YR 4/3) heavy silty clay loam to loam. Structure is coarse prismatic becoming massive in lower part. Firm when moist, hard when dry, and sticky when wet; irregular, abrupt lower horizon boundary.

II C1
 54669 33 to 45 inches. Brown (10YR 4.5/3) gravelly loam till; massive in place; friable when moist; gravel and channery consists mainly of angular dolomitic fragments; effervesces slowly with dilute HCL.

II C2
 54670 45 inches plus. Yellowish brown (10YR 5/4) gravelly loam till, massive in place; compact, firm, fragments; till consists mainly of angular dolomitic fragments and rock flour; strongly calcareous.

Notes: Colors refer to moist soils unless indicated otherwise.

SOIL TYPE *Marshfield LOCATION Wood County, Wisconsin
silt loam

SOIL NOS. S61Wis71-2 LAB. NOS. 15938-15945

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS	
		1B1a					3A1						2A2
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY					> 2
		2-1	1-0.5	0.5-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.02	0.02-0.002	($< 9\mu$)		
0-4	A1	0.6a	2.0a	1.6a	2.3a	2.3b	54.4	36.8	22.7	35.0	Tr.	sic1	
4-8	A2g	1.2a	2.0a	1.6a	2.4a	3.6b	71.3	17.9	35.4	40.5	Tr.	sil	
8-14	B1g	0.3a	0.7a	1.2a	1.8b	3.5b	67.8	24.7	37.0	35.1	1	sil	
14-21	B21g	0.4a	0.7a	0.9a	1.5b	3.5b	67.1	25.9	35.8	35.5	Tr.	sil	
21-30	B22g	0.6b	0.9b	1.5	2.5	4.6	67.0	22.9	42.6	30.1	2	sil	
30-34	IIB31	8.0	11.8	12.7	17.9	6.2	27.2	16.2	27.1	13.0	40	sl	
34-45	IIB32	2.4	4.6	5.0	11.2	9.9	39.9	27.0	33.8	22.0	3	1/c1	
45-56	IIC	2.2	3.6	4.8	13.3	10.4	38.8	26.9	33.2	23.4	3	1/c1	
8C1a	6E2a	ORGANIC MATTER				BULK DENSITY				WATER RETENTION			
	CaCO ₃ equiv- alent	6A1a O.C.	6B1a N	C/N	Field 4B4 Water	State 4A1a g/cc	30-Cm. 4B3 Water	A. D. 4A1c g/cc	4A1b g/cc	4B1b 1/3-Bar Pieces	4B2 15-Bar Sieved		
1:1	%	%	%		%	g/cc	%	g/cc	g/cc	%	%		
5.2d		5.42	0.472	11	30.7	1.25	32.2	1.23	1.39	31.8	20.0		
5.0		0.62	0.072	9	21.8	1.56	21.5	1.53	1.57	22.4	8.2		
4.8		0.33	0.048	7						22.2	10.0		
5.1		0.22	0.031							23.3	11.4		
6.1	-(s)	0.18	0.026		21.6	1.54	26.8	1.44	1.62	22.5	10.0		
6.6	-(s)	0.06								13.3	6.2		
6.5	-(s)	0.06								19.5	10.4		
6.9	-(s)	0.06			18.2	1.74	19.3	1.68	1.88	21.8	10.4		
5A1a	EXTRACTABLE CATIONS					5B1a	5C1	5C3	5B1a	8D1	8D3	6G1a	
CATION EXCHANGE CAPACITY	6N2b	6O2b	6H1a	6P2a	6Q2a	Base Sat. %	Base Sat. %	Base Sat. %	Sum Ext. 100g	CEC e	Ext. Ca/Mg	A1 KCl-Ext.	
NH ₄ OAc	Ca	Mg	H	Na	K	NH ₄ OAc	on Sum	on Sum	Bases Clay	me/100g	me/100g	me/100g	
	milliequivalents per 100g. soil						Cations		me/100g				
31.7	17.1	4.4	24.0	0.1	0.6	70	48	22.2	86	3.9	0.2		
12.6	4.7	1.7	10.6	0.1	0.2	53	39	6.7	70	2.8	1.6		
17.4	8.9	3.4	10.0	0.1	0.3	73	56	12.7	70	2.6	1.8		
20.3	13.3	5.4	5.9	0.2	0.4	95	76	19.3	78	2.5	0.3		
18.6	13.4	5.1	4.2	0.1	0.4	102	82	19.0	81	2.6	-		
13.2	9.7	3.4	2.4	0.1	0.2	102	85	13.4	81	2.8	-		
20.9	16.0	5.2	2.6	0.1	0.4	104	89	21.7	77	3.1	-		
20.6	16.1	4.9	2.6	0.1	0.4	104	89	21.5	76	3.3	-		
a.	Many Fe-Mn? nodules.												
b.	Few Fe-Mn? nodules.												
c.	10 Kg/M ² to 60 inches (Method 6A).												
d.	1:5 soil-water ratio because of high organic matter content.												
e.	Derivative, calculated ratio.												

Soil type: *Marshfield silt loam

Soil Nos.: S61Ms-71-2

Location: Wood County, Wisconsin; southwest quarter of southeast quarter of Section 14, T25N, R3E.

Vegetation and use: Pastured woodlot; bluegrass, clover; elm, maple and oak.

Slope and land form: Nearly level to slightly depressional ground moraine.

Drainage and permeability: Poorly drained with very slow surface runoff and slow internal drainage; permeability is slow.

Parent material: Shallow to moderately shallow loess over silty clay loam or clay loam glacial till.

Collected by: R. B. Grosman, Gerald Post, Harvey Strelow, Robert Bartelme, G. B. Lee, Charles Reynolds and Paul H. Carroll, September 19, 1961.

Described by: Paul H. Carroll and G. B. Lee.

Horizon and
Lincoln
Lab. Number

- A1
15938 0 to 4 inches. Very dark gray (10YR 3/1) silt loam with weak fine subangular blocky structure; friable; displays a yellowish red (5YR 5/8) color along many fine fibrous root channels; contains many fine fibrous roots; strongly acid; clear wavy boundary.
- A2g
15939 4 to 8 inches. Grayish brown (2.5Y 5/2) silt loam with weak thin platy structure; very friable; few medium faint light olive brown (2.5Y 5/4) mottles; contains many fine fibrous roots; very strongly acid; clear wavy boundary.
- B1g
15940 8 to 14 inches. Grayish brown (2.5Y 5/2) silt loam which contains somewhat more clay than the horizon above; weak medium platy structure that breaks under slight pressure to weak fine subangular blocks; friable; few medium faint light olive brown (2.5Y 5/4) mottles; very strongly acid; clear wavy boundary.
- B21g
15941 14 to 21 inches. Dark grayish brown (2.5Y 4/2) heavy silt loam to light silty clay loam with moderate medium prismatic structure and includes weak coarse plates that break under disturbance to weak fine subangular blocks; firm; many fine prominent reddish brown (5YR 4/4) mottles; very strongly acid; clear smooth boundary.
- B22g
15942 21 to 30 inches. Olive gray (5Y 5/2) light silty clay loam with weak medium prismatic structure and includes weak coarse plates that break under slight pressure to weak medium subangular blocks; firm; thin patchy clay films on many vertical cleavage planes and clay flows in worm and root channels; few fine prominent yellowish brown (10YR 5/6) mottles; medium acid; clear smooth boundary.
- IIB31
15943 30 to 34 inches. Dark brown (10YR 4/3) gravelly and stony sandy loam with weak coarse subangular blocky structure; friable; clay flows of very dark gray (10YR 3/1) occur in worm and rootlet channels; common medium faint dark yellowish brown (10YR 4/4) mottles; neutral; clear smooth boundary.
- IIB32
15944 34 to 45 inches. Brown (7.5YR 5/4) slightly pebbly silty clay loam with weak medium subangular blocky structure; plastic; root channels and wormholes display very dark gray (10YR 3/1) clay flows and marginal gley color of grayish brown (2.5Y 5/2); many large distinct strong brown (7.5YR 5/6 - 5/8) mottles; mildly alkaline; gradual smooth boundary.
- IIC
15945 45 to 56 inches. Dark brown (7.5YR 4/4) slightly pebbly silty clay loam glacial till which contains slightly less clay than horizon above; has generally massive to weak very fine subangular blocky structure; common large fine mottles of strong brown (7.5YR 5/6) color; mildly alkaline.

Remarks: All colors given are for moist conditions.

Mineralogy: (Method 7B1) The very fine sand from the particle-size analysis was examined under the petrographic microscope. Quartz is the most common mineral. A substantial percentage of feldspar is present. Highly altered feldspar is common; a portion of the altered grains is essentially aggregates of clay minerals. Some of the feldspar grains appear quite fresh. Quartz and possibly fresh feldspar increase towards the surface.

SOIL TYPE Marshfield LOCATION Wood County, Wisconsin
silt loam

SOIL NOS. S61W1s71-3 LAB. NOS. 15946-15953

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS
		1B1a		3A1						2A2		
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY	0.2-0.02	0.02-0.002 (< 9µm)	> 2	
0-5	A1	1.5a	2.7a	2.3a	4.4	3.8	55.0	30.3	26.7	34.2	Tr.	sic1
5-9	A21g	1.3	1.7	2.2	2.6	2.1	69.6	20.5	32.3	40.4	Tr.	sil
9-16	A22g	0.7	1.4	1.6	2.3	4.0	66.9	23.1	38.4	33.4	Tr.	sil
16-24	B1g	1.1	2.1	2.5	3.7	4.4	63.8	22.4	39.4	30.2	2	sil
24-34	IIB21g	2.6	7.4	10.6	14.3	5.3	39.8	20.0	31.7	18.5	2	l
34-50	IIB22g	1.4	5.0	7.7	11.0	3.6	44.4	26.9	28.8	23.0	1	l/cl
50-58	IIB3g	0.8	2.8	4.2	5.5	2.2	55.0	29.5	28.4	30.7	1	sic1
58-66	IIC	0.3	0.7	1.3	2.0	1.0	66.6	28.1	27.6	40.7	Tr.	sic1

pH	ORGANIC MATTER			BULK DENSITY				WATER RETENTION		
	6A1a	6B1a	C/N	Field State		30-Cm.		A. D.	4B1b	15-Bar Sieved
	O.C.	N		4B4	4A1a	4B3	4A1c	4A1b	1/3-Bar Pieces	
4.9	10.16	0.673	15	77.3	0.62					22.3
4.6	2.18	0.181	12						24.2	10.2
4.4	0.32	0.042	8	25.4	1.44	27.7	1.42	1.50	22.6	9.8
4.4	0.22	0.028							21.1	10.0
4.6	0.10	0.011							13.6	7.9
4.8	0.09			17.4	1.70	22.6	1.56	1.85	22.2	12.2
5.3	0.08								23.6	13.5
6.0	0.06								26.7	12.9

5A1a CATION EXCHANGE CAPACITY NH ₄ OAc	EXTRACTABLE CATIONS					5B1a	5C1	5C3	5B1a	8D1	8D3	6C1a	6G1a
	6N2b	6O2b	6H1a	6P2a	6Q2a	Base Sat. %	Base Sat. %	Sum Ext. Bases	CEC c/100g Clay	Ext. Ca/Mg	Free Iron as Fe ₂ O ₃	Al KCl ₄ Ext.	
	Co	Mg	H	Na	K	NH ₄ OAc	on Sum Cations	me/100g	me/100g	me/100g	%	me/100g	
35.1	15.8	5.2	28.4	0.1	1.0	63	44	22.1	116	3.0	0.6	0.3	
16.6	4.6	2.1	17.0	0.1	0.2	42	29	7.0	81	2.2	0.6	3.1	
16.0	5.4	3.3	12.2	0.1	0.2	56	42	9.0	69	1.6	1.0	3.7	
17.7	7.2	4.7	10.6	0.1	0.3	69	54	12.3	79	1.5	1.1	2.6	
15.3	7.4	5.0	6.6	0.1	0.2	83	66	12.7	76	1.5	0.9	1.1	
21.3	11.8	8.1	5.9	0.2	0.3	96	78	20.4	79	1.4	1.0	0.7	
23.5	14.0	9.6	4.5	0.1	0.4	102	84	24.1	80	1.4	1.1	0.2	
23.6	14.6	9.8	3.3	0.2	0.4	106	88	25.0	84	1.5	1.3	-	

← milliequivalents per 100g. soil →

a. Many organic matter fragments.
 b. 13 Kg/M² to 60 inches (Method 6A).
 c. Derivative, calculated ratio.

Soil type: *Marshfield silt loam

Soil Nos.: S61Ms-71-3

Location: Wood County, Wisconsin; southwest quarter of northeast quarter of Section 22, T25N, R3E.

Vegetation and use: Woodlot; black ash, elm, soft maple, aspen and red oak.

Slope and land form: Nearly level to slightly depressional ground moraine with slope of approximately 1 percent.

Drainage and permeability: Poorly drained with very slow surface runoff and slow internal drainage; permeability is slow.

Parent material: Shallow to moderately shallow loess over silty clay loam or clay loam glacial till.

Collected by: Robert Grossman, Gerald Post, Harvey Strelow, Robert Bartelme, G. B. Lee, Charles Reynolds, and Paul H. Carroll, September 19, 1961.

Described by: Paul H. Carroll and G. B. Lee.

Horizon and
Lincoln
Lab. Number

A1
15946 0 to 5 inches. Black (10YR 2/1) and very dark brown (10YR 2/2) silt loam with strong fine granular structure; friable; abundant fibrous roots; strongly acid; clear smooth boundary.

A21g
15947 5 to 9 inches. Grayish brown (2.5Y 5/2) silt loam with weak thin platy structure; friable; common medium prominent strong brown (7.5YR 5/6) mottles; abundant fine fibrous roots but somewhat less than in horizon above; very strongly acid; abrupt smooth boundary.

A22g
15948 9 to 16 inches. Grayish brown (2.5Y 5/2) silt loam with weak medium platy structure; friable; common medium prominent strong brown (7.5YR 5/6) mottles; very strongly acid; clear smooth boundary.

B1g
15949 16 to 24 inches. Grayish brown (2.5Y 5/2) heavy silt loam with weak coarse platy structure that breaks under pressure to weak medium subangular blocks; firm; common fine prominent strong brown (7.5YR 5/6) mottles; very strongly acid; clear smooth boundary.

IIB21g
15950 24 to 34 inches. Grayish brown (2.5Y 5/2) gritty silty clay loam with weak medium and coarse subangular blocky structure; firm; thin sand coats occur along some vertical cleavage planes toward upper horizon boundary; few thin gray (10YR 5/1) clay films on blocky ped faces; common medium and large prominent yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; very strongly acid; clear smooth boundary.

IIB22g
15951 34 to 50 inches. Olive gray (5Y 5/2) slightly pebbly, gritty silty clay loam with weak medium prismatic structure that breaks under slight pressure to weak fine and medium subangular blocks; very firm; dark gray (10YR 4/1) and very dark gray (10YR 3/1) clay films occur on some vertical cleavage planes and clay flows are found in root and worm channels, increasing in numbers toward the lower horizon boundary; many fine to medium prominent strong brown (7.5YR 5/6) mottles; strongly acid; gradual smooth boundary.

IIB3g
15952 50 to 58 inches. Olive gray (5Y 5/2) and olive (5Y 5/3) silty clay loam with weak coarse subangular blocky structure; firm; contains few thin patchy gray (10YR 5/1) clay films along vertical cleavage planes; many large prominent strong brown (7.5YR 5/6) mottles occupy approximately 40 percent of the horizon body; medium acid; gradual smooth boundary.

IIC
15953 58 to 66 inches. Olive gray (5Y 5/2) and olive (5Y 5/3) silt loam; generally massive; contains thin lateral textural bands of very dark gray (10YR 3/1) and dark gray (10YR 4/1); many large prominent yellowish brown (10YR 5/6) mottles occupy approximately 40 percent of the horizon body; slightly acid becoming alkaline at 66 inches.

Remarks: All colors given are for moist conditions.

Mineralogy: (Method 7B1) The very fine sand from the particle-size analysis was examined under the petrographic microscope. Quartz is the most common mineral. A substantial percentage of feldspar is present; highly altered feldspar is common; a portion of the altered grains is essentially aggregates of clay minerals. Some of the feldspar grains appear quite fresh. The sands as examined under the stereoscopic microscope are rather rounded. Quartz and possibly fresh feldspar increase towards the surface. Clay mineralogy as follows: (Methods 7A2, 7A3)

(By Beltsville Laboratory)

Horizon	'Montmorillonite-'		'Montmorillonite-'		'% Kaolinite (by DTA)
	'Montmorillonite'	Interlayer	'Vermiculite'	'Mica Interlayer'	
A1	xx	-	-	xx	t
A22g	xxx	-	-	x	t
IIB21g	xxxx	-	-	-	t
IIB22g	xxxx	-	-	-	t
IIC	xxxx	-	-	-	t

dash, none detected; t, trace; x, small; xx, moderate; xxx, abundant; xxxx, dominant

SOIL McHenry silt loam SOIL Nos. 52Wis-14-24 LOCATION Dodge County, Wisconsin
SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 54611 - 54619

Depth (in.)	Horizon	1B1b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments		
		Total		Sand					Silt					2A2 > 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)				
Pct. of < 2 mm																
0-3 1/2	A1	74.1	15.0	0.2	0.9	1.6	3.6	4.6		36.2	44.6			0		
3 1/2-8	A2-A22	75.5	14.3	0.4	1.0	1.6	3.1	4.1		36.7	44.5			tr.		
8-10	A3	73.5	18.7	0.3	0.7	1.0	1.7	4.1		37.0	41.4			tr.		
10-16 1/2	B1	64.8	29.2	0.6	0.8	0.8	1.5	2.3		31.3	36.7			tr.		
16 1/2-25	B21	57.3	32.1	1.2	1.4	1.4	2.8	3.8		28.8	33.8			tr.		
25-32	I-IB22	28.4	28.5	1.8	4.4	7.9	18.0	11.0		14.7	34.6			12		
32-36	IB3	26.9	22.4	2.1	4.6	7.9	21.2	14.9		13.6	41.2			20		
36-48	IIC1	29.0	12.8	3.3	5.2	7.2	21.5	21.0		11.9	52.2			16		
48+	IIC2	34.2	7.7	4.2	5.9	8.0	20.4	19.6		13.7	52.9			26		

Depth (in.)	6A1e Organic carbon	Nitrogen	C/N	6E1e Carbonate as CaCO ₃	Ext. iron as Fe	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH	
						4A1e % bar	4A1h Oven dry			4B1c % bar	4B2 15 bar			8C1c (1:1) KCl	8C1a (1:1) H ₂ O
						g/cc	g/cc	g/cc		Pct.	Pct.	Pct.			
0-3 1/2	3.24														6.4
3 1/2-8	1.97														6.0
8-10	0.62														5.4
10-16 1/2	0.53														5.5
16 1/2-25	0.43														5.6
25-32	0.26														6.4
32-36	0.38														7.2
36-48	0.25			32											7.8
48+	0.12			41											8.0

Depth (in.)	Extractable bases 5B1a					6H2a Ext. acidity	CEC	6D1d Ext. Al	Ratios to clay			8D3 Ca/Mg	Base saturation		
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum				5A3a Sum cations	CEC Sum	Ext. iron		15-bar water	5C3 Sum cations Pct.	5C1 NH ₄ OAc Pct.
	meq/100 g														
0-3 1/2	13.8	4.6	tr.	0.3		5.3	24.0							78	
3 1/2-8	9.2	3.0	tr.	0.2		5.5	17.9							69	
8-10	6.7	3.0	tr.	0.2		5.5	15.4							64	
10-16 1/2	10.6	6.2	tr.	0.4		6.1	23.3							74	
16 1/2-25	11.8	7.4	tr.	0.4		6.1	25.8							76	
25-32	10.5	6.9	tr.	0.3		3.8	21.5							82	
32-36	10.5	7.1	tr.	0.3		2.2	20.1							89	
36-48	b														
48+	b														

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt	Chl.	Vm.	Mi.	Int.	Qtz.	Kl.	Gibbsite
	7A2 X-ray				7A3			

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 Undecomposed organic matter in sand fractions.

b Calcareous not analyzed.

Soil Type: McHenry silt loam
 Soil No.: 52Wis-14-24
 Location: Dodge County, Wisconsin. NW4 NE4 Sec. 19 T11N R14E.
 Vegetation and land use: A virgin stand of red and white oak, and basewood and ash, and maple occupied the area.
 Slope and land form: 14 percent.
 Sampled by: G. B. Lee

Horizon and
 Beltsville
 Lab. No.

01
 Not Sampled Hardwood leaves.

02 A very thin layer of partially decomposed organic matter, earthworm casts, etc.
 Not Sampled

A1 0 to 3-1/2 inches. Dark gray (10YR 4/1, dry) to very dark gray (10YR 3/1) silt loam; well developed medium crumb structure; friable; pH is 6.4.
 Not Sampled

A21^a 3-1/2 to 6 inches. Grayish brown (10YR 5/2, dry) to dark grayish brown (10YR 4/2) silt loam; moderate medium crumb structure; friable. pH is 5.5.
 Not Sampled

A22^a 6 to 8 inches. Grayish brown (10YR 5/2, dry) to dark grayish brown (10YR 4/2) silt loam; medium platy structure; friable. pH is 5.4.
 54611

A3 8 to 10 inches. Brown (10YR 5/3, dry, 4/3) silt loam; coarse crumb to weak platy structure, friable; pH is 5.0.
 54612

B1 10 to 16-1/2 inches. Dark yellowish brown (10YR 3/4) silt loam; subangular blocky structure; gray coatings on peds; friable; pH is 5.2.
 54613

B21 16-1/2 to 25 inches. Dark yellowish brown (10YR 3/4) silty clay loam; subangular blocky structure; firm; pH is 5.4.
 54614

I-II B22 25 to 32 inches. Very dark brown (10YR 2/3) silty clay loam; subangular blocky structure; firm; pH is 5.7.
 54615

II B3 32 to 36 inches. Dark yellowish brown (10YR 3/4) loam; blocky to massive structure; firm; pH is 6.5.
 54616

II C1 36 to 48 inches. Brown (7.5YR 4/4) gravelly loam till; massive; friable; pH is 7.1; calcareous in spots at 40 inches.
 54617

II C2 48 inches plus. Yellowish brown (10YR 5/4) gravelly loam till; calcareous.
 54618

Notes: Colors refer to moist soil unless indicated otherwise.

a A21 and A22 horizons were combined to make one sample.

SOIL McHenry silt loam SOIL Nos. 54Wis-14-19 LOCATION Dodge County, Wisconsin

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 551 - 559

Depth (in)	Horizon	1B1b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments		
		Total												2A2 > 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)	Silt		Int. III (0.02-0.002)		Int. II (0.2-0.02)	(2-0.1)	Pct.
Pct. of < 2 mm																
0-3	A1	67.2	12.3	0.4	4.4	6.1	5.5	4.1		38.8	34.9			0		
3-9	A2	71.4	12.3	0.6	3.5	5.2	3.8	3.2		39.4	36.8			0		
9-12 4	A3	66.6	20.5	0.5	2.4	3.9	3.4	2.7		37.9	32.8			0		
12 4 -16 4	B1	58.2	28.0	0.5	2.0	4.1	4.3	2.9		31.2	31.8			0		
16 4 -24	B21	50.7	30.5	0.6	2.8	6.0	6.2	3.2		26.6	29.8			tr.		
24-32	IB22	23.3	29.3	2.7	11.2	16.2	13.4	3.9		12.2	20.3			10		
32-36	IB33	23.2	19.3	2.9	11.5	17.8	16.8	8.5		11.0	28.1			12		
36-44	IIC1	20.5	11.8	5.9	16.4	19.0	17.5	8.9		8.1	29.1			26		
72	IIC2	24.9	6.8	4.1	14.7	18.2	19.9	11.4		11.6	34.4			15		

Depth (in)	6A1a Organic carbon	Nitrogen	C/N	6B1e Carbonate as CaCO ₃	Ext. iron as Fe	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH	
						4A1e 1/2 bar	4A1h Oven dry			4B1c 1/2 bar	4B2 15 bar			8C1c (1:1)	8C1a (1:1)
						g/cc	g/cc	g/cc		Pct	Pct	Pct		NCl	H ₂ O
0-3	4.42														6.6
3-9	0.53														4.8
9-12 4	0.36														4.8
12 4 -16 4	0.35														4.8
16 4 -24	0.33														4.8
24-32	0.28														5.1
32-36	0.35			9											6.9
36-44	0.21			20											7.8
72	0.08			34											8.2

Depth (in)	Extractable bases 5B1a					6H2a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay			8D3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations			CEC Sum	Ext. Iron	15-bar water		5C3 Sum cations	5C1 NH ₄ OAc Pct.
	meq/100 g														
0-3	15.5	4.5	tr.	0.4		6.6	27.0							76	
3-9	1.3	0.6	tr.	0.2		7.1	9.2							23	
9-12 4	2.2	2.6	tr.	0.3		5.4	10.5							48	
12 4 -16 4	4.6	5.1	tr.	0.4		9.6	19.7							51	
16 4 -24	6.5	6.3	tr.	0.4		9.6	22.8							58	
24-32	7.0	6.1	0.1	0.4		7.7	21.3							64	
32-36	a														
36-44	a														
72	a														

Depth (in)	Clay Fraction Analysis 7A1b-d							
	Mt	Chl	Vm.	Mi.	Int.	Qtz.	Kl.	Gibbsite
	7A2 X-ray				7A3			

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. Calcareous not analyzed

Soil Type: McHenry silt loam.

Soil No.: 54Wis-14-19

Location: Dodge County, Wisconsin. NW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 34 T10N R17E.

Vegetation and land use: Mainly of young maple, basswood, and oak.

Drainage: Well-drained.

Collected by and date: G. B. Lee and S. Pollack, September 1954.

Parent Material: Consisted of silt and calcareous gravelly sandy loam till which contains some sorted materials.

Horizon and
Beltsville
Lab. No.

O1	A few hardwood leaves, twigs, and etc.
Not Sampled	
O2	1/2 inch or less of partially decomposed leaves, twigs, etc.
Not Sampled	
A1	0 to 3 inches. Very dark gray (10YR 3/1) silt loam; moderate fine to medium crumb structure; friable; lower horizon boundary is abrupt; pH is 6.8.
551	
A2	3 to 9 inches. Grayish brown (10YR 5/2.5) silt loam; moderately well developed fine and very fine platy structure; aggregates are coated light gray (10YR 7/2, dry); friable; lower horizon boundary is gradual; pH is 5.0.
552	
A3	9 to 12-1/2 inches. Brown (10YR 5/3.5) silt loam; weak, coarse platy structure breaks easily to moderately well developed, fine subangular blocky aggregates; these aggregates are coated very pale brown (10YR 7/3, dry); friable; pH is 4.8.
553	
B1	12-1/2 to 16-1/2 inches. Brown (10YR 5/3, dry; 4/3) heavy silt loam; moderately well developed fine subangular blocky structure; aggregates are coated light gray (10YR 7/2, dry); slightly firm; pH is 4.8.
554	
B21	16-1/2 to 24 inches. Brown (7.5YR 4.5/2, dry; 3.5/2) silty clay loam; moderate to strong medium subangular blocky structure; aggregates are coated light gray (10YR 7/2, dry); firm; pH is 5.0.
555	
II B22	24 to 32 inches. Dark reddish brown (5YR 3/3, coated 3/2) clay loam; strong medium subangular blocky structure; very firm moist, sticky to plastic when wet, and very hard when dry; pH is 5.2.
556	
II B3	32 to 36 inches. Dark reddish brown and dark brown (5YR 3/4 and 7.5YR 4/3) gravelly clay loam; moderately well developed medium subangular blocky structure; sticky when wet and hard when dry; pH is 7.0.
557	
II C1	36 to 44 inches. Yellowish brown (10YR 5/4) gravelly sandy loam; massive, friable; pH is 8.2.
558	
II C2	72 inches. Brown (10YR 5/3) calcareous, gravelly sandy loam till.
559	

Notes: Colors refer to moist soil unless indicated otherwise.

SOIL McHenry silt loam SOIL Nos 54Wis-14-23 LOCATION Dodge County, Wisconsin

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 5527 - 5535

Depth (In.)	Horizon	1B1b Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1			
		Total		Clay (< 0.002)	Very coarse (2-1)	Sand					Silt			3B2 Pct	2A2 > 2	2-19	19-76
		Sand (2-0.05)	Silt (0.05-0.002)			Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Int III (0.05-0.02)	Int II (0.02-0.002)	Int II (2-0.1)					
		Pct of < 2 mm															
0-2 1/2	A1	58.4	16.9	0.2	4.0	8.0	9.8	2.7			31.7	33.1		0			
2 1/2-9	A2	64.0	18.3	0.2	2.5	5.2	7.2	2.6			35.2	34.2		0			
9-15	B1	63.2	27.6	0.1	1.0	2.4	3.5	2.2			33.5	33.3		0			
15-25	B21	54.3	34.1	0.2	1.2	3.2	5.2	1.8			29.4	29.0		0			
25-28	IIB22	41.6	29.5	0.5	3.0	8.4	13.8	3.2			21.2	29.4		tr.			
28-34	IIB23	18.6	22.8	0.5	6.0	16.7	28.7	6.7			8.8	28.8		tr.			
34-40	IIB3	12.6	17.8	1.1	6.5	20.1	35.5	6.4			5.5	28.3		tr.			
40-50	IIC1	15.4	7.3	1.3	6.4	19.3	38.7	11.6			5.8	38.2					
50+	IIC2	16.2	6.4	2.0	7.1	20.4	37.4	10.5			6.4	36.7					

Depth (In.)	6A1a Organic carbon	Nitrogen	C/N	6E1e Carbonate as CaCO3	Ext. iron as Fe	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH	
						4A1e 1/2 bar	4A1h Oven dry	4B1c 1/2 bar		4B2 15 bar	8C1c (1:1) KCl	8C1a (1:1) H2O			
														g/cc	g/cc
0-2 1/2	4.8														
2 1/2-9	0.60														5.9
9-15	0.41														5.2
15-25	0.29														5.5
25-28	0.26														5.3
28-34	0.17														5.2
34-40	0.13														5.3
40-50	0.11			15											5.8
50+	0.08			21											7.6
															8.0

Depth (In.)	Extractable bases 5B1a					6H2a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay			8D3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	Ext. Al		CEC Sum	Ext. iron	15-bar water		8C3 Sum cations	8C1 NH4OAc
0-2 1/2	14.8	3.5	0.1	0.3		11.2	29.9							62	
2 1/2-9	4.8	2.5	tr.	0.1		6.4	13.8							54	
9-15	8.4	4.6	0.1	0.3		5.7	19.1							70	
15-25	10.4	6.9	0.2	0.4		7.9	25.8							69	
25-28	8.2	6.0	0.1	0.4		8.0	22.7							65	
28-34	6.6	4.9	tr.	0.3		5.7	17.5							67	
34-40	4.8	3.7	0.1	0.2		3.4	12.2							72	
40-50	b														
50+	b														

Depth (In.)	Clay Fraction Analysis 7A1b-d							
	Mt	Chl	Vm	Mi	Int	Qtz	Kl	Gibberite
	7A2 X-ray				7A3			

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 Undecomposed organic matter in sand fractions.

b Calcareous not analyzed

Soil Type: McHenry silt loam.

Soil No.: 54Wis-14-23

Location: Dodge County, Wisconsin. SE⁴ NE⁴ Sec. 31 T9N R13E.

Vegetation and land use: Consisted mainly of oak.

Drainage: Well-drained. Collected by and date: G. B. Lee, October 1954.

Parent Material: In shallow silts and calcareous gravelly sandy loam till which contains lenses and pockets of sorted materials.

Horizon and
Beltsville
Lab. No.

O1 A few oak leaves, twigs, etc.

Not Sampled

A1 0 to 2-1/2 inches. Black (10YR 2/1) light silt loam; moderate medium and fine crumb structure; friable; lower horizon boundary is abrupt except for some earth worm mixing; pH is 5.8.

A2 2-1/2 to 9 inches. Pale brown to brown (10YR 6/3, dry; 4/3) silt loam; weakly developed fine platy structure in place which breaks down into moderate, medium crumbs; these aggregates are coated with very pale brown (10YR 7/3, dry); friable; lower horizon boundary is clear; pH is 4.8.

B1 9 to 15 inches. Brown (10YR 5/3, dry; 4/3) heavy silt loam; moderately well developed, fine subangular blocky structure; aggregates are coated with very pale brown (10YR 7/3, dry); slightly firm; lower horizon boundary is gradual; pH is 5.5.

B21 15 to 25 inches. Brown (9YR 5/3, dry; 4/3) light silty clay loam; weak medium subangular blocky structure which breaks into moderate to strong fine to medium subangular blocky aggregates; aggregates are slightly coated with very pale brown; firm moist and hard when dry; pH is 5.2.

II B22 25 to 28 inches. Brown (8YR 5/3; 4/3, dry) silty clay loam containing some cherty gravel and sand; structure as in above horizon; becomes very hard when dry; pH is 5.3.

II B23 28 to 34 inches. Brown to dark brown (7.5YR 4/4, dry; 3/4) sandy clay loam containing some cherty gravel and sand; moderate, coarse subangular blocky structure; very hard when dry; pH is 5.3.

II B3 34 to 40 inches. Brown to dark brown (7.5YR 4/4, dry; 3/4) heavy loam; moderate coarse subangular blocky to massive structure; slightly hard when dry; pH is 5.5.

II C1 40 to 50 inches. Light brown to brown (7.5YR 6/4, dry; 5/4) gravelly sandy loam; massive to single grained; firm to loose; pH is 8.

II C2 50 inches plus. Brown (8YR 5/3) calcareous gravelly sandy loam till.

Notes: Colors refer to moist soil unless indicated otherwise.

SOIL Mecan loamy sand SOIL Nos. 862Wis-24-1 LOCATION Green Lake County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 17840-17849 May 1966
General Methods: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm)											3A1					
		Total											Clay		Coarse fragments			
		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)	3A1a Carbonate	Non-Carbonate	3B2 > 2 Vol. Pct.	3B1 > 2 Pct. of	2-19
0-6	A ₁	85.2	11.6	3.2	1.6	14.4	26.2	35.6	7.4	4.6	7.0	26.8	77.8					5
6-13	A ₂	82.7	13.2	4.1	1.8	14.2	24.6	34.2	7.9	5.5	7.7	28.0	74.8					4
13-16	B ₁	76.5	13.3	10.2	1.4	12.1	22.2	32.4	8.4	6.0	7.3	28.6	68.1			5	8	8
16-21	B ₂₁	68.6	12.4	19.0	1.2	10.7	20.3	28.8	7.6	5.3	7.1	25.5	61.0					3
21-26	B ₂₂	66.0	14.0	20.0	1.0	9.8	18.7	28.1	8.4	6.6	7.4	27.3	57.6					5
26-34	B ₂₃	73.8	11.9	14.3	2.5	16.1	23.1	25.7	6.4	5.2	6.7	22.1	67.4			4	6	6
34-39	B ₃	72.6	14.6	12.8	2.3	12.9	21.2	27.9b	8.3b	6.6	8.0	27.3	64.3	-	13			3
39-48	TIBC	71.3	19.1	9.6	2.4c	11.8d	20.0d	26.7c	10.4c	9.6	9.5	31.9	60.9	1	9	13	18	12
48-60	TIC1	80.3	10.2	9.5	2.8c	12.9d	25.0d	31.9c	7.7c	5.3	4.9	25.7	72.6	1	9	13	18	11
60-75	TIC2	79.6	10.8	9.6	3.2c	13.7d	24.4d	29.9c	8.4c	5.2	5.6	26.5	71.2	tr	10	21	27	12
48-60	a	86.0	7.1	6.9	1.6	12.7	28.5	36.6	6.6	3.8	3.3	24.0	79.4					

Depth (in.)	6A1a Organic carbon e Pct.	6B1a Nitrogen Pct.	C/N	6C2a Ext. Iron as Fe Pct.	6E1b Carbonate as CaCO ₃ Pct.	Bulk density				4M COLE $\frac{1}{1}$	Water content				8C1a (1:1)	
						4A1a Field State g/cc	4A1g 1/10-Bar g/cc	4A1g 1/10-Bar g/cc	4A1b Air-Dry g/cc		4B4 Field-State Pct.	4B1c 1/10-Bar Pct.	4B2 15-Bar Pct.	4C2 1/10-to-15-Bar in./in.		
0-6	0.32	0.036	9	0.2		1.73		1.72	1.73	0.003	4.6	6.6	1.4	0.09		6.0
6-13	0.12	0.013		0.3		1.72		1.71	1.71		4.0	6.5	1.1	0.09		5.8
13-16	0.09	0.013		0.6		1.75f	1.64	1.73f	1.75f	0.003			3.0			5.6
16-21	0.19	0.020		1.0		1.78		1.75f	1.78	0.007	8.4	12.0j	6.0	0.10k		5.6
21-26	0.12	0.013		1.0		1.74f		1.70f	1.73f	0.007			6.5			5.6
26-34	0.12	0.012		0.9		1.70	1.59	1.65	1.68	0.007	5.9	12.7	4.8	0.12		5.8
34-39	0.11	0.013		0.6	1	1.61		1.52	1.56	0.010	4.9	12.8	4.2	0.13		6.6
39-48	0.09	0.003		0.3	20	1.84	1.52	1.76	1.79	0.006	2.8		3.1	0.10		8.0
48-60	0.06			0.2	19	1.88f	1.59	1.83f	1.85f				2.5			8.2
60-75	0.02			0.2	20	1.92	1.50	1.90	1.91	0.002	3.7	7.3	2.8	0.07		8.2

Depth (in.)	Extractable bases 5B1a				Sum	6H1a Ext. Acidity	Cat. Sum	5A3a NH ₄ OAc	5A1a NH ₄ OAc	KCl-Ext. Al	8D3 Ca/Mg	Base saturation	
	6N2a Ca	6O2a Mg	6P2a Na	6Q2a K								5C3 Sum	5C1 NH ₄ OAc
0-6	1.4	0.6	tr	0.1	2.1	1.1	3.2	2.3				66	91
6-13	0.8	0.5	tr	0.1	1.3	0.9	2.2	1.6				59	81
13-16	1.6	1.2	tr	0.1	2.9	3.6	6.5	3.6			1.3	45	80
16-21	3.8	2.2	tr	0.2	6.2	4.8	11.0	7.2				1.7	56
21-26	3.7	1.7	tr	0.2	5.6	4.6	10.2	6.7				2.2	55
26-34	3.7	1.6	tr	0.2	5.5	4.0	9.5	6.2				2.3	58
34-39	3.4m	2.0n	tr	0.1	5.5	2.1	7.6	5.2				1.7	72
39-48	2.7m	1.9n	tr	0.1	4.7			2.8				1.4	168
48-60	2.2m	1.5n	tr	0.1	3.8			1.8				1.5	211
60-75	2.3m	1.3n	tr	0.1	3.7			1.7				1.8	218

Depth (in.)	Ratios to Clay 3B1			a. Analysis after carbonate removal (Method 1B3).	b. 1/3-Bar (Method 4A1d).
	NH ₄ OAc CEC	Ext. Iron	15-Bar Water		
0-6	0.72	0.06	0.44	b. 0-5% carbonate.	i. Coefficient of linear Extensibility.
6-13	0.39	0.07	0.27	c. > 50-100% carbonate.	j. 1/3-Bar.
13-16	0.35	0.06	0.29	d. 5-25% carbonate.	k. 1/3-Bar (Method 4C1).
16-21	0.33	0.05	0.32	e. 3.1 kg/m ² to 60 inches (Method 6A).	m. NH ₄ Cl-ETOH extraction (Method 6N3a).
21-26	0.34	0.05	0.32	f. Estimated.	n. NH ₄ Cl-ETOH extraction (Method 6O3a).
26-34	0.43	0.06	0.34	g. Calculated to include volume but not weight of > 2-mm. material. (Method 3B2).	
34-39	0.41	0.05	0.33		
39-48	0.29	0.03	0.32		
48-60	0.19	0.02	0.26		
60-75	0.18	0.02	0.29		

p. One or more horizons has relatively low cation exchange capacity. As cation exchange capacity decreases, the relative error of base saturation increases. Trace quantities are omitted from the sum of bases. For very low CEC values, this omission contributes significantly to the relative error of base saturation.

Soil Type: *Mecan loamy sand
 Soil Nos.: 86241s-24-1
 Location: SE 1/4 SE 1/4, Sec. 10, T16N, R11E, Green Lake County, Wisconsin.
 Position and Relief: Broad ridge of a recessional moraine; 3 to 5 percent convex slope.
 Drainage and Permeability: Well drained; moderately permeable; ground water below 6-foot observed depth.
 Parent Material: Calcareous, brown loamy sand glacial till.
 Vegetation: Alfalfa.
 Erosion: Slight.
 Stoniness: Many cobbles and stones below 40 inches.
 Root Distribution: Many fibrous roots to a depth of 12 inches; fewer below.
 Sampled by: P. Carroll, G. Lee, B. Watson, R. Grossman and D. McMurtry.
 Described by: P. H. Carroll and G. Lee.

Horizon and
 Lincoln
 Lab. No.

Ap 17840	0 to 6 inches. Very dark grayish brown (10YR 3/2) to dark grayish brown (10YR 4/2) loamy sand with weak fine crumb structure; very friable; neutral; clear smooth boundary.
A2 17841	6 to 13 inches. Yellowish brown (10YR 5/4) loamy sand with weak fine subangular blocky structure; very friable; medium acid; clear smooth boundary.
B1 17842	13 to 16 inches. Dark brown (7.5YR 4/4) sandy loam with weak medium subangular blocky structure; friable; medium acid; clear wavy boundary.
B21 17843	16 to 21 inches. Reddish brown (5YR 4/4) loam to sandy clay loam with weak to moderate medium subangular blocky structure; firm; medium acid; clear wavy boundary.
B22 17844	21 to 26 inches. Reddish brown (5YR 4/4) loam with moderate medium subangular blocky structure; friable; common small patchy fabric color in peds of dark reddish brown (5YR 3/2 to 3/3); medium acid; clear wavy boundary.
B23 17845	26 to 34 inches. Dark reddish brown (5YR 3/4) loam that is reddish brown (5YR 4/4) when rubbed; moderate medium and coarse subangular blocky structure; friable; neutral; clear wavy boundary.
B3 17846	34 to 39 inches. Dark reddish brown (5YR 3/4) loam to light loam that is reddish brown (5YR 4/4) when rubbed; moderate medium and coarse subangular blocky structure; friable; mildly alkaline; clear wavy boundary.
I1B0 17847	39 to 48 inches. Reddish brown (5YR 4/4) light sandy loam with 5 to 7 percent by volume of stones, cobbles, and pebbles whose diameters exceed 3/4 inch; weak thin platy structure; friable to very friable; weak effervescence with HCl; gradual wavy boundary.
I1C1 17848	48 to 60 inches. Brown (7.5YR 5/4) loamy sand with 5 to 7 percent by volume of stones, cobbles and pebbles whose diameters exceed 3/4 inch; weak thin platy structure; friable; few small areas of carbonate accumulation, primarily along root channels and on rock faces; strong effervescence with HCl; diffuse smooth boundary.
I1C2 17849	60 to 75 inches. Brown (7.5YR 5/4) loamy sand with 10 to 15 percent by volume of stones, cobbles and pebbles whose diameters exceed 3/4 inch; weak thin platy structure; friable; strong effervescence with HCl.

SOIL Mecan loamy fine sand SOIL Nos. 662WIS-24-2 LOCATION Green Lake County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 17850-17858 May 1966
General Methods: 1A, 1E1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm)													3A1				
		Total				Sand				Silt				Clay	2A2 Coarse fragments				
		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)		3A1a Carbonate	Non-Carbonate	3B2 > 2 Vol. Pct.	3B1 > 2 Pct.	2-19 of < 19
0-7	Ap	80.1	15.4	4.5	0.3	6.7	21.2	41.2	10.7	7.6	7.8	37.9	69.4					1	
7-14	A2	79.2	15.5	5.3	0.8	8.3	22.9	37.9	9.3	7.1	8.4	33.7	69.9					3	
14-18	B1	74.8	13.9	11.3	1.1	10.0	23.1	32.9	7.7	6.4	7.5	28.2	67.1					3	
18-25	B21	68.5	13.9	17.6	0.8	6.8	19.4	32.1	9.4	6.8	7.1	31.1	59.1					3	
25-31	B22	70.7	14.7	14.6	0.6	6.4	18.7	34.5	10.5	7.5	7.2	33.8	60.2					3	
31-43	B3	76.2	13.9	9.9	0.8	7.7	21.1	36.4	10.2	7.1	6.8	33.3	66.0					2	
43-62	IIIC1	73.6	18.9	7.5	1.9a	7.2b	18.4c	33.0c	13.1b	10.5	8.4	39.2	60.5	2	6	13	18	12	
62-73	IIIC2	71.9	19.8	8.3	1.7a	7.7b	18.7c	31.6c	12.2b	10.4	9.4	37.3	59.7	2	6	15	20	14	
73-84	IIIC3	72.1	19.2	8.7	1.6a	7.7b	18.4c	31.4c	13.0b	9.8	9.4	37.4	59.1	2	7	16	21	15	

Depth (in.)	6A1a	6B1a	C/N	6C2a	6E1b	Bulk density				4D1	Water content					8C1a (1.1)
	Organic carbon	Nitrogen		Ext. Iron as Fe	Carbonate as CaCO ₃	4A1a Field State	4A1g 1/10-Bar	4A1G 1/10-Bar	4A1B Air-Dry		4B4 Field State	4B1c 1/10-Bar	4B2 15-Bar	4C2 1/10-to 15-Bar	pH	
	d Pct	Pct		Pct.	Pct.	g/cc	f g/cc	g/cc	g/cc	h	Pct	Pct	Pct.	in/in.		
0-7	0.44	0.053	8	0.3		1.60		1.59	1.60	0.003	7.6	10.5	2.2	0.13	5.8	
7-14	0.12	0.013		0.3		1.61		1.60	1.61	0.003	6.4	10.1	1.6	0.14	6.0	
14-18	0.16	0.015		0.7		1.67e		1.64e	1.67e				3.7	5.9		
18-25	0.17	0.017		1.3		1.72		1.68g	1.72	0.007	7.4	16.4i	6.4	0.17j	5.4	
25-31	0.12	0.013		1.1		1.78		1.73	1.77	0.007	5.2	11.4	4.6	0.12	5.3	
31-43	0.10	0.009		0.7	1	1.64		1.58	1.62	0.007	4.0	9.2	3.4	0.09	6.7	
43-62	0.05			0.3	21	1.85		1.58	1.82	0.003	5.8	9.9	2.5	0.11	8.0	
62-73	0.02			0.3	23	1.86		1.57	1.84	0.003	5.5	9.6	3.0	0.10	8.2	
73-84	0.04			0.3	25	1.90		1.59	1.90	0.003	5.8	8.8	3.2	0.09	8.2	

Depth (in.)	Extractable bases				5B1a	6H1a	Ext. Acidity	5A3a	5A1a	6G1b	8D3	Base saturation	
	6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	Sum	Ext. Acidity	Sum Cations	Sum NH ₄ OAc	KCl-Ext. Al	Ca/Mg		5C3 Sum Cations	5C1 NH ₄ OAc
	meq/100 g											Pct	Pct.
0-7	2.3	0.7	tr	0.1	3.1	3.0	6.1	4.0				51	78
7-14	1.2	0.5	tr	tr	1.7	1.2	2.9	2.2				59	77
14-18	2.4	1.1	tr	0.1	3.6	2.9	6.5	4.6			2.2	55	78
18-25	3.6	1.8	tr	0.2	5.6	4.8	10.4	7.7	0.1			54	73
25-31	2.4	1.8	tr	0.1	4.3	3.9	8.2	6.0	0.1			52	72
31-43	2.3r	1.9m	tr	0.1	4.3	1.9	6.2	4.4				69	98
43-62	2.3k	1.6m	tr	0.1	4.0			2.4				1.4	167
62-73	2.4k	1.8m	tr	0.1	4.3			2.2				1.3	195
73-84	2.4k	1.5m	tr	0.1	4.0			2.1				1.6	190

Depth (in.)	Ratios to Clay 8D1			a. > 50-100% carbonate.	h. Coefficient of Linear Extensibility.
	NH ₄ OAc CEC	Ext. Iron	15-Bar Water		
0-7	0.89	0.07	0.49	b. 5-25% carbonate.	i. 1/3-Bar.
7-14	0.42	0.06	0.30	c. 0-5% carbonate.	j. 1/3-Bar (Method 4C1).
14-18	0.41	0.06	0.33	d. 3.5 kg/m ² to 60 inches (Method 6A).	k. NH ₄ Cl-EtOH extraction (Method 6N3a).
18-25	0.44	0.07	0.36	e. Estimated.	m. NH ₄ Cl-EtOH extraction (Method 6O3a).
25-31	0.41	0.08	0.32	f. Calculated to include volume but not weight of > 2-mm. material. (Method 3B2)	
31-43	0.44	0.07	0.34	g. 1/3-Bar (Method 4A1d).	
43-62	0.32	0.04	0.33		
62-73	0.26	0.04	0.36		
73-84	0.24	0.03	0.37	n. One or more horizons has relatively low cation exchange capacity. As cation exchange capacity decreases, the relative error of base saturation increases. Trace quantities are omitted from the sum of bases. For very low CEC values, this omission contributes significantly to the relative error of base saturation.	

Soil Type: Mecan loamy fine sand
 Soil Nos.: S62WIs-24-2
 Location: SW 1/4 NE 1/4, Sec. 2, T16N, R11E, Green Lake County, Wisconsin.
 Position and Relief: Rolling ground moraine; 3 to 5 percent convex slope.
 Drainage and Permeability: Well drained; moderately permeable; no ground water within the 7-foot observed depth.
 Parent Material: Calcareous brown loamy sand glacial till.
 Vegetation: Corn, small grains, hay.
 Erosion: Slight.
 Stoniness: Many cobbles and stones below 40 inches depth.
 Root Distribution: Many fibrous roots to 12 inches depth; fewer below.
 Sampled by: P. Carroll, G. Lee, B. Watson, R. Grossman, and D. McMurtry.
 Described by: P. H. Carroll and G. Lee.

Horizon and
 Lincoln
 Lab. No.

A_p 0 to 7 inches. Dark brown (10YR 3/3) loamy fine sand with weak fine subangular blocky structure; very friable; slightly acid; abrupt smooth boundary.
 17850

A₂ 7 to 14 inches. Dark brown (7.5YR 4/4) loamy fine sand with weak thick platy structure that separates on disturbance to weak fine subangular blocks; very friable; slightly acid; clear wavy boundary.
 17851

B₁ 14 to 18 inches. Reddish brown (5YR 4/4) light loam with weak to moderate fine subangular blocky structure; friable; slightly acid; clear wavy boundary.
 17852

B₂₁ 18 to 25 inches. Reddish brown (5YR 4/4) loam with moderate medium subangular blocky structure; friable; slightly acid; clear wavy boundary.
 17853

B₂₂ 25 to 31 inches. Yellowish red (5YR 4/6) light loam that displays a slightly higher value (5YR 5/6) when rubbed; weak to moderate medium subangular blocky structure; friable; common small patchy fabric color in peds of dark reddish brown (5YR 3/2 to 3/3); slightly acid; clear wavy boundary.
 17854

B₃ 31 to 43 inches. Dark reddish brown (5YR 3/4) sandy loam that is reddish brown (5YR 4/4) when rubbed; common small patchy fabric color in peds of dark reddish brown (5YR 3/2 to 3/3); weak coarse subangular blocky structure; friable; contains few slightly weathered dolomitic pebbles with thin clay rinds; slightly acid; gradual wavy boundary.
 17855

IIC₁ 43 to 62 inches. Dark brown (7.5YR 4/4) to reddish brown (5YR 4/4) light sandy loam with approximately 5 percent by volume of stones, cobbles and pebbles whose diameters exceed 3/4 inch; weak thick platy structure that separates under slight pressure to weak fine angular blocks; very friable; weak effervescence with HCl; gradual smooth boundary.
 17856

IIC₂ 62 to 73 inches. Brown (7.5YR 5/4) light sandy loam with approximately 5 percent by volume of stones, cobbles and pebbles whose diameters exceed 3/4 inch; weak thick platy structure that separates under slight pressure to weak fine angular blocks; very friable; strong effervescence with HCl; diffuse smooth boundary.
 17857

IIC₃ 73 to 84 inches. Brown (7.5YR 5/4) light sandy loam with approximately 5 percent by volume of stones, cobbles and pebbles whose diameters exceed 3/4 inch; weak thick platy structure that separates under slight pressure to weak fine angular blocks; very friable; strong effervescence with HCl; diffuse smooth boundary.
 17858

SOIL Meridian fine sandy loam SOIL Nos. S54Wis-52-1 LOCATION Richland County, Wisconsin

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 5562 - 5566

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1		
		Total			Sand					Silt				2A2 ≥ 2 Pct	2-19 Pct	19-76 Pct. of ← < 76mm →
		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)	Int III (0.05-0.02)	Int II (0.02-0.002)	(2-0.1)				
0-8	Ap	20.1	4.8	0.2	3.9	13.0	50.2	7.8	10.6	45.2		-				
8-13	A2	27.1	7.6	0.1	3.4	10.9	42.5	8.4	15.0	44.2		-				
13-21	B2	26.8	12.8	0.1	3.2	9.6	39.8	7.7	15.5	42.5		-				
21-25	B3	15.7	5.6	-	3.3	11.3	54.4	9.7	8.1	48.6		-				
25-42	C1	8.4	2.8	0.1	2.9	11.5	64.8	9.5	3.2	54.1		-				

Depth (in.)	6A1e Organic carbon Pct	Nitrogen Pct.	C/N	Carbonate as CaCO ₃ Pct.	Ext iron as Fe Pct	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH		
						4A1a 1/2 bar g/cc	4A1h Oven dry g/cc	4D1 g/cc		4B1c 1/2 bar Pct.	4B2 15 bar Pct.	4C1 in/in		8C1c (1:1) KCl	8C1a (1:1) H ₂ O	
						0-8	0.61									
8-13	0.21															5.9
13-21	0.18															5.6
21-25	0.04															5.3
25-42	0.06															5.8

Depth (in.)	Extractable bases 5B1a					6H2a Ext acidity	CEC		6G1d Ext. Al	Ratios to clay			8D3 Ca/Mg	Base saturation		
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	Ext. Al		CEC Sum	Ext. iron	15-bar water		Ca/Mg	5C3 Sum cations Pct.	5C1 NH ₄ OAc Pct.
	0-8	2.5	0.8	tr.	0.2		meq/100 g	2.5		6.0						
8-13	2.3	0.6	tr.	0.1		2.4	5.4						56			
13-21	4.2	0.4	tr.	0.2		2.1	6.9						70			
21-25	1.5	0.1	tr.	0.1		1.7	3.4						50			
25-42	0.8	0.1	tr.	tr.		0.8	1.7						53			

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt	Chl	Vm	Mi.	Int.	Qtz.	Kl.	Gibbsite
	7A2 X-ray				7A3			

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 Type: Meridian fine sandy loam.

Soil No.: 54Wis-52-1

Location: Richland County, Wisconsin. T9N, R2E, SE of NE sec. 7, 50 feet in from Hwy. No. 14.

Horizon and
Beltsville
Lab. No.

Ap 5562	0 to 8 inches. Very dark grayish brown to dark brown (10YR 3/2 - 3/3) very friable fine sandy loam with weak medium subangular blocks which break down readily into fine weak granules; worm casts and roots are numerous; pH 7.0; this breaks abruptly with a sharp boundary into -
A2 5563	8 to 13 inches. Dark brown (10YR 4/3) firm in place but very friable when disturbed. Fine sandy loam with fine to medium well developed platy structure; very vesicular and contains many earthworm casts and plant roots; pH 6.0; grades with a clear but wavy boundary into -
B2 5564	13 to 21 inches. Dark brown (7.5YR 4/4) friable loam with fine to medium well developed angular to subangular blocky structure; roots are common and a few worm casts were noted; pH 5.8; this grades with a clear wavy boundary into -
B3 5565	21 to 25 inches. Dark brown (7.5YR 4/4) friable fine sandy loam with fine to medium weak subangular blocky structure. pH 5.5; this grades clearly with a wavy boundary into -
C1 5566	25 to 42 inches. Yellowish brown (10YR 5/6) loose single grained fine sand; many small (1/2 - 1-1/2 inch in diameter) dark brown (7.5YR 4/4) clayey spots or balls with sandy clay loam texture occur within this horizon; pH 5.8; this breaks abruptly with a wavy boundary into -
C2 Not Sampled	42 to 47 inches. Dark brown (7.5YR 4/4) slightly plastic massive loam; pH 5.8; this grades clearly with a wavy boundary into -
C3 Not Sampled	47 inches plus. Yellowish brown (10YR 5/6) loose single grained fine sand.

Notes: Colors refer to moist soil.

SOIL Meridian fine sandy loam SOIL Nos S54Wis-52-2 LOCATION Richland County, Wisconsin

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 5567 - 5573

Depth (In.)	Horizon	Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1			
		1B1b Total			Sand					Silt				2A2 ≥ 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)
0-8	Ap	15.2	3.6	0.2	14.8	25.8	34.5	5.9		7.5	29.4						
8-13	A2	24.1	7.9	0.5	14.1	21.0	27.3	5.1		13.8	28.3						
13-20	B21	25.6	12.2	0.8	13.2	18.9	24.6	4.7		14.2	27.8						
20-25	B22	17.5	7.7	0.9	14.6	22.3	31.0	6.0		8.8	29.7						
25-33	B3	15.1	4.6	0.8	14.1	23.5	34.5	7.4		4.9	34.5						
33-42	C1	30.2	13.6	0.4	8.3	14.2	22.4	10.9		7.6	46.1						
42+	C2	11.2	3.4	-	0.2	0.4	53.6	31.2		2.7	90.7						

Depth (In.)	6A1a Organic carbon Pct	Nitrogen Pct	C/N	Carbonate as CaCO ₃ Pct	Ext iron as Fe Pct	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH		
						4A1e ½ bar g/cc	4A1h Oven dry g/cc	4A1i g/cc		4B1c ½ bar Pct	4B2 15 bar Pct	8C1c (1:1) KCl		8C1a (1:1) H ₂ O		
0-8	0.60															6.5
8-13	0.18															6.5
13-20	0.15															6.4
20-25	0.12															5.6
25-33	0.06															5.4
33-42	0.09															5.1
42+	0.02															5.6

Depth (In.)	Extractable bases 5B1a					6H2a Ext acidity	CEC		6G1d Ext Al	Ratios to clay			8D3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	Ext Al		CEC Sum	Ext iron	15-bar water		5C3 Sum cations Pct.	5C1 NH ₄ OAc Pct.
	meq/100 g														
0-8	2.4	0.6	tr.	0.1		1.4	4.5						69		
8-13	2.5	1.1	tr.	0.1		1.7	5.4						68		
13-20	4.0	1.0	tr.	0.2		2.4	7.6						68		
20-25	2.5	0.4	tr.	0.1		2.0	5.0						60		
25-33	1.4	0.3	tr.	tr.		1.4	3.1						55		
33-42	3.7	1.2	tr.	0.2		4.1	9.2						55		
42+	1.3	0.2	tr.	0.1		1.4	3.0						53		

Depth (In.)	Clay Fraction Analysis 7A1b-d							
	Mt	Chl	Vm	Mi	Int	Qtz	Kl	Gibbsite
	7A2 X-ray				7A3			

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 Type: Meridian fine sandy loam.

Soil No. 54Wis-52-2

Location: Richland County, Wisconsin. T10N, R1E, SE of NE Sec. 35, 150 feet W. of Hwy. No. 14.

Horizon and
Beltsville
Lab. No.

Ap 5567	0 to 8 inches. Very dark grayish brown to dark brown (10YR 3/2 - 3/3) very friable fine sandy loam with fine weak subangular blocks which break down readily into fine weak granular structure; worm casts and roots numerous throughout; pH 6.0; breaks abruptly and sharply into -
A2 5568	8 to 12 inches. Dark brown (10YR 4/3) firm in place, very friable when disturbed fine sandy loam with well developed medium to coarse platy structure; vesicular with many earth worm casts throughout; roots common; pH 6.0; clear but wavy boundary into -
B21 5569	13 to 20 inches. Dark brown (7.5YR 4/4) slightly plastic loam or sandy clay loam with well developed medium sized angular blocky structure; roots common; pH 6.0; grades clearly with a wavy boundary into -
B22 5570	20 to 25 inches. Dark brown to strong brown (7.5YR 4/4 - 4/6) friable fine sandy loam with weak medium subangular blocks; roots common; pH 5.8; grades clearly with wavy boundary into -
B3 5571	25 to 33 inches. Dark brown to strong brown (7.5YR 4/5) friable loamy fine sand with weak medium subangular blocky structure; roots common; pH 5.5; grades clearly with wavy boundary to -
C1 5572	33 to 42 inches. Dark brown (7.5YR 4/4) slightly plastic massive loam or sandy clay loam; few roots; pH 5.5; clear but wavy boundary into -
C2 5573	42 inches plus. Yellowish brown (10YR 5/4) loose single grained very fine sand; thin layers and streaks of sandy clay loam (7.5YR 4/4) throughout; many common small distinct mottles of dark brown and pinkish gray below 4 feet.

Notes: All colors refer to moist soil.

SOIL Meridian fine sandy loam SOIL Nos. S54Wis-61-1 LOCATION Trempealeau County, Wisconsin
SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 5574 - 5578

Depth (in.)	Horizon	1B1b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments		
		Total												2A2 ≥ 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)	Silt (0.05-0.02)		Int. III (0.02-0.002)				
Pct of $<$ 2 mm														Pct	Pct. of $<$ 76mm	
0-8	Ap		22.8	6.1	0.2	16.9	25.3	26.3	2.4		11.3	23.4	-			
8-11	A2		31.0	8.4	0.3	15.5	21.7	21.7	1.4		15.4	24.6	-			
11-19	B2		32.1	11.3	0.2	13.8	19.7	20.6	2.3		17.3	24.2	-			
19-28	B3		21.3	9.3	0.2	14.2	23.8	29.0	2.2		10.2	23.6	-			
28-34	C1		3.6	3.7	0.6	20.9	31.6	37.6	2.0		1.1	18.3	-			

Depth (in.)	6A1a Organic carbon	Nitrogen	C/N	Carbonate as CaCO ₃	Ext iron as Fe	Bulk density			4D1 COLE	Water content			4C1 WRD m/in	pH			
						4A1a ½ bar	4A1b Oven dry	g/cc		4B1c ½ bar	4B2 15 bar	Pct		Pct.	Pct.	8C1c (1:1) KCl	8C1e (1:1) H ₂ O
0-8	0.79																
8-11	0.37														6.2		
11-19	0.30														6.5		
19-28	0.18														5.3		
28-34	0.08														5.0 5.1		

Depth (in.)	Extractable bases 5B1a					6H2a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay			8D3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	Ext. Al		CEC Sum	Ext. iron	15-bar water		Sum cations Pct	5C3 NH ₄ OAc Pct
0-8	3.5	1.1	tr.	0.1		2.5	7.2						65		
8-11	3.3	1.2	tr.	tr.		2.7	7.2						62		
11-19	3.2	0.5	tr.	0.1		3.9	7.7						49		
19-28	2.0	0.4	tr.	tr.		4.1	6.5						37		
28-34	0.6	0.2	tr.	tr.		1.4	2.2						36		

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt	Chl.	Vm.	Mi	Int.	Qtz.	Kl.	Gibbsite
	7A2 X-ray				7A3			

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 Type: Meridian fine sandy loam.

Soil No.: 54Wis-61-1

Location: Trempealeau County, Wisconsin. T21N, R9W, NE of NE Sec. 2.

Horizon and
Beltsville
Lab. No.

Ap 5574 0 to 8 inches. Very dark grayish brown to dark brown (10YR 3/2 - 3/3) very friable fine sandy loam with fine weak subangular blocky structure which breaks down readily into well developed fine granules; roots and worm casts abundant; pH 6.5; a sharp and abrupt boundary between plowed layer and -

A2 5575 8 to 11 inches. Dark brown (10YR 3/3 - 4/3) slightly firm in place but very friable when disturbed fine sandy loam with weak medium plates; vesicular throughout with many worm casts in the upper portion; roots common; pH 6.2; clear and sharp boundary between this and -

B2 5576 11 to 19 inches. Dark brown (7.5YR 3/4 - 4/4) firm in place friable when disturbed heavy loam with well developed medium angular blocks; roots common; pH 5.7; grades clearly with wavy boundary into -

B3 5577 19 to 28 inches. Dark brown (7.5YR 4/4) friable fine sandy loam with weak medium angular blocky structure; roots common; pH 5.5; grades clearly and sharply into -

C1 5578 28 to 34 inches. Strong brown (7.5YR 5/6) loose single grain fine sand; pH 5.5; a few spots and streaks of finer textured materials which are (7.5YR 4/4) dark brown in color; clear but wavy boundary into -

C2 Not Sampled 34 inches plus. Brownish yellow (10YR 6/6) loose single grained fine sand with many streaks and spots of dark brown (7.5YR 4/4) sandy clay loam; finer textured spots and streaks are not continuous; pH 5.5.

Notes: Colors refer to moist soil.

SOIL Meridian fine sandy loam SOIL Nos. S54W1e-61-2 LOCATION Trempealeau County, Wisconsin

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 5579 - 5584

Depth (in)	Horizon	1B1b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments		
		Total			Sand				Silt					2A2 ≥ 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)	Int. III (0.05-0.02)	Int. II (0.02-0.002)	Int. I (2-0.1)				
Pct. of $<$ 2 mm													Pct. of $<$ 76mm			
0-8	Ap	25.7	8.1	0.1	6.7	14.0	39.4	6.0	10.3	42.8			tr.			
8-11	A2	34.0	12.4	-	6.6	11.6	30.9	4.5	17.0	37.4			-			
11-20	B2	34.2	11.2	0.2	6.2	12.2	31.3	4.7	15.6	40.0			-			
20-25	B31	17.0	7.1	0.1	7.0	15.2	48.1	5.5	6.8	41.3			-			
25-31	B32	11.5	5.4	-	7.1	15.9	53.0	7.1	3.6	44.5			-			
31+	C1	3.9	3.2	-	5.7	14.5	64.8	7.9	0.2	48.1			-			
Depth (in)	6A1a Organic carbon Pct.	Nitrogen Pct.	C/N	Carbonate as CaCO ₃ Pct.	Ext iron as Fe Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD m/m	pH		
						4A1a ½ bar g/cc	4A1b Oven dry g/cc	4A1c g/cc		4B1c ½ bar Pct.	4B2 15 bar Pct.	8C1c (1:1) KCl		8C1a (1:1) H ₂ O		
						Pct.		Pct.		Pct.	Pct.	Pct.		Pct.		
0-8	0.84														6.9	
8-11	0.40														6.1	
11-20	0.20														5.6	
20-25	0.09														5.2	
25-31	0.06														5.1	
31+	0.06														5.2	
Depth (in)	Extractable bases 5B1a					6H2a Ext. acidity	CEC		6G1d Ext Al	Ratios to clay			8D3 Ca/Mg	Base saturation		
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	5A3a Sum cations	Ext Al	CEC Sum	Ext. iron	15-bar water	Ca/Mg	5C3 Sum cations Pct.	5C1 NH ₄ OAc Pct.			
	meq/100 g															
0-8	4.2	0.7	tr.	0.2		1.9	7.0						73			
8-11	3.2	1.0	tr.	tr.		3.4	7.6						55			
11-20	3.6	1.9	tr.	0.1		3.4	9.0						62			
20-25	1.4	0.2	tr.	tr.		2.5	4.1						39			
25-31	1.0	0.2	tr.	tr.		2.0	3.2						60			
31+	0.5	tr.	tr.	tr.		1.4	1.9						26			
Depth (in)	Clay Fraction Analysis 7A1b-d															
	Mt	Chl	Vm	Mi	Int.	Qtz.	Kl.	Gibbsite								
	7A2 X-ray				7A3											

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 Type: Meridian fine sandy loam.

Soil No.: 54Wis-61-2

Location: Trempealeau County, Wisconsin. T20N, R9W, NE of NE Sec. 5.

Horizon and

Beltville

Lab. No.

Ap 5579	0 to 8 inches. Very dark grayish brown to dark brown (10YR 3/2 - 3/3) very friable fine sandy loam with weak fine subangular blocks which break down into fine well developed granular structure; abundance of plant roots and earth worm casts; pH 7.0; breaks abruptly and sharply into -
A2 5580	8 to 11 inches. Dark brown (10YR 3/3 - 4/3) slightly firm in place very friable when removed fine sandy loam with weak fine to medium plates; highly vesicular with many worm casts; plant roots common; pH 6.5; clear but wavy boundary to -
B2 5581	11 to 20 inches. Dark brown (7.5YR 4/4) firm in place, friable when disturbed loam with well developed medium angular blocky structure; roots common; pH 6.0; grades clearly with wavy boundary into -
B31 5582	20 to 25 inches. Dark yellowish brown (10YR 4/4) friable loamy fine sand with weak medium subangular blocky structure; plant roots common to few with depth; pH 5.7; grades clearly with wavy boundary into -
B32 5583	25 to 31 inches. Yellowish brown (10YR 5/6) very friable loamy fine sand with weak medium subangular blocks; pH 5.7; grades clearly with a wavy boundary into -
C1 5584	31 inches plus. Brownish yellow (10YR 6/6) loose single grained fine sand with clayey spots and streaks (7.5YR 4/4) which are not continuous; pH 5.7.

Notes: Colors refer to moist soil.

SOIL Miami silt loam SOIL Nos. 53Wis-14-21 LOCATION Dodge County, Wisconsin

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 54620 - 54629

Depth (in.)	Horizon	1B1b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments		
		Total												2A2 ≥ 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)				
Pct of <= 2 mm														Pct	Pct. of <= 76mm	
0-1	A11	76.5	11.4	0.3	1.1	1.8	3.7	5.2 ^a		38.6	45.2		0			
1-3 ^{1/2}	A12	78.0	11.4	0.1	0.9	1.4	3.1	5.1		40.9	43.9		0			
3 ^{1/2} -8	A2	80.1	10.8	0.3	0.7	1.2	2.4	4.5		40.4	45.5		0			
8-11	A3	76.2	15.1	0.1	0.6	1.1	2.4	4.5		40.0	42.1		0			
11-15	B1	70.0	22.9	0.2	0.5	0.8	1.9	3.7		35.9	39.1		0			
15-23	I-ITB21	57.0	31.3	0.3	1.1	2.2	4.4	3.7		30.7	32.6		0			
23-31	ITB22	27.3	36.5	1.4	4.4	8.1	14.3	8.0		15.4	27.4		4			
31-38	ITB3	27.0	24.6	2.5	5.1	8.2	18.8	13.8		14.2	37.8		15			
38-48	IIC1	35.3	15.9	4.9	6.7	7.8	15.9	13.5		17.6	40.3		20			
70-80	IIC2	38.2	12.0	3.8	6.2	7.9	17.3	14.6		19.0	44.0		23			
Depth (in.)	6A1a Organic carbon	Nitrogen	C/N	6E1e Carbonate as CaCO ₃	Ext. iron as Fe	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH		
						4A1a % bar	4A1h Oven dry			4B1c % bar	4B2 15 bar			8C1c (1:1) KCl	8C1a (1:1) H ₂ O	
0-1	3.39														6.2	
1-3 ^{1/2}	2.56														5.4	
3 ^{1/2} -8	0.87														4.6	
8-11	0.41														4.8	
11-15	0.28														4.8	
15-23	0.35														5.0	
23-31	0.32														5.4	
31-38	0.35			22											7.5	
38-48	0.15			39											7.8	
70-80	0.09			50											8.2	
Depth (in.)	Extractable bases 5B1a					6H2a Ext. acidity	CEC		6G1d Ext Al	Ratios to clay			8D3 Ca/Mg	Base saturation		
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations			CEC Sum	Ext. iron	15-bar water		5C3 Sum cations Pct.	5C1 NH ₄ OAc Pct.	
0-1	11.0	4.5	tr.	0.4		7.0	22.9							69		
1-3 ^{1/2}	5.8	3.0	tr.	0.2		10.3	19.3							47		
3 ^{1/2} -8	5.9	2.5	tr.	0.2		8.0	16.6							52		
8-11	3.2	2.3	0.3	0.2		6.3	12.3							49		
11-15	4.3	3.8	tr.	0.2		9.4	17.7							47		
15-23	7.8	6.6	tr.	0.3		9.6	24.3							60		
23-31	10.6	8.4	tr.	0.4		6.8	26.2							74		
31-38	b															
38-48	b															
70-80	b															
Depth (in.)	Clay Fraction Analysis 7A1b-d															
	Mt	Chl.	Vm.	Mi.	Int	Qtz.	Kl.	Gibbsite								
	7A2 X-ray				7A3											

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, xxxz = dominant.

a Undecomposed organic matter in sand fraction.

b Calcareous not analyzed

Soil Type: Miami silt loam
Soil No.: 53Wis-14-21
Location: Dodge County, Wisconsin. NE4 SW4 Sec. 14 T10N R14E.
Sampled by: G. B. Lee

109

Horizon and
Beltsville
Lab. No.

- O1 2 to 6 inches. Leaves, twigs, and other undecomposed recent organic litter.
Not Sampled
- O2 1/4 inch or less of decomposed organic remains. Earthworm activity is intense in this layer.
Not Sampled
- All 0 to 1 inch. Gray (10YR 5/1, dry) to dark grayish brown (10YR 4/2) silt loam; lumpy but
54620 breaks easily to well developed fine crumbs; friable; clear lower horizon boundary; earthworm
activity is intense; many worm casts and much mixing; pH is 6.4.
- A12 1 to 3-1/2 inches. Grayish brown (10YR 5/2, dry) to very dark grayish brown (10YR 3.5/1.5)
54621 silt loam; lumpy but crushes easily to a fine crumb structure; friable; earthworm activity
intense; lower horizon boundary fairly abrupt; pH is 6.2.
- A2 3-1/2 to 8 inches. Grayish brown, coated with light gray (10YR 5/2 - 7/2, dry) to pale
54622 brown (10YR 6/3) silt loam; a few, fine, low contrast brown mottles are present. Moderate,
coarse platy structure breaks into weak, fine subangular aggregates; friable; abrupt wavy
lower horizon boundary; pH is 4.8.
- A3 8 to 11 inches. Brown coated with very pale brown (10YR 4/3 - 7/3, dry) to brown (10YR 5/3)
54623 silt loam that is slightly variegated with dark brown (7.5YR 3/2); weak coarse platy structure
breaks to weak, medium, subangular blocky; friable; gradual lower horizon boundary; pH is 4.9.
- B1 11 to 15 inches. Brown (10YR 4/3) heavy silt loam having gray coatings on the peds; moderate
53624 coarse subangular blocky; slightly firm; gradual lower horizon boundary; pH is 4.6.
- I-II B21 15 to 23 inches. Dark brown (7.5YR 3/3) silty clay loam; peds are slightly coated with gray;
53625 well developed, medium blocky structure; firm; gradual lower horizon boundary; pH is 4.8.
- II B22 23 to 31 inches. Dark brown (7.5YR 3/4) gritty silty clay loam; well developed coarse blocky
53626 structure; firm; fairly well defined, somewhat irregular lower horizon boundary; pH is 5.5.
- II B3 31 to 38 inches. Dark yellowish brown (10YR 4/4) mixed silty clay loam and loam; coarse
53627 blocky to massive structure; firm to friable; fairly well defined irregular lower horizon
boundary; slowly calcareous locally; pH is 7.5.
- II C1 38 to 48 inches. Yellowish brown (10YR 5/4) gravelly loam; massive; friable; gradual lower
53628 boundary; slowly calcareous.
- II C2 70 to 80 inches. Pale brown (10YR 5.5/3) light gravelly loam till; compact, massive in place
53629 but breaks out in crude platy aggregates; coarse fraction of till contains many ice and water
worm cobbles and boulders, most of which are dolomitic but including many erratics; highly
calcareous.

Notes: Colors refer to moist soil unless indicated otherwise.

SOIL Milaca loam SOIL Nos. 47W1s-3-12 LOCATION Barron County, Wisconsin
SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 471422-471427

Depth (in.)	Horizon	IB1b Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1			
		Total												2A2 > 2	2-19	19-76	
		Sand (2-0.05)	Silt (0.05-0.002)	Clay (\leq 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)	Silt 0.05-0.02 Int III (0.02-0.002)		Int II (0.2-0.02)					(2-0.1)
0-1	A1	37.5	53.5	9.0	2.2	10.8	12.0	9.5	3.0	23.9	29.6	30.7	34.5		7		
1-3	A21	38.4	52.9	8.7	1.1	10.7	13.1	10.2	3.3	25.2	27.7	32.6	35.1		2		
3-10	A22	45.0	46.5	8.5	1.5	12.4	15.2	12.4	3.5	22.1	24.4	30.6	41.5		6		
10-16	A3	49.3	36.8	13.9	1.9	12.8	16.0	13.4	3.4	17.5	19.3	28.1	44.1		4		
16-22	B2t	72.1	12.9	15.0	4.6	20.9	26.0	17.6	3.0	6.2	6.7	16.0	69.1		10		
22+	C																

Depth (in.)	6A1a Organic carbon Pct	Nitrogen Pct	C/N	Carbonate as CaCO ₃ Pct	Ext. iron as Fe Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH	
						4A1a 1/2 bar g/cc	4A1b Oven dry g/cc	4A1c g/cc		4B1c 1/2 bar Pct.	4B2 15 bar Pct.	8C1c (1:1) KCl		8C1a (1:1) H ₂ O	
0-1	15.32														5.5
1-3	2.12														5.0
3-10	0.59														5.3
10-16	0.34														5.7
16-22	0.22														5.3
22+	0.2C														5.5

Depth (in.)	Extractable bases 5B1a					6H2a Ext acidity	CEC		6G1d Ext Al	Ratios to clay			8U3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	CEC Sum		Ext. iron	15-bar water	5C3 Sum cations Pct		5C1 NH ₄ OAc Pct	
	meq/100 g														
0-1	3.6	0.8	0.1	0.2		10.0	14.7						32		
1-3	2.0	0.7	0.1	0.1		6.1	9.0						32		
3-10	2.4	0.8	tr.	0.2		3.8	7.2						47		
10-16	3.4	1.2	tr.	0.3		4.8	9.7						51		
16-22	4.2	1.4	0.2	0.3		4.4	10.5						58		
22+															

Depth (in.)	Clay fraction Analysis 7A1b-d							
	Mt	Chl	Vm	Mi	Int	Qtz	Kl	Gibbsite
	7A2 X ray				7A3			

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 type: Milaca silt loam

Soil No.: 47Wis-3-12

Location: Barron County, Wisconsin. NE corner NE 1/4 of SE 1/4 section 30, township 34 N., range 10W

Horizon and
Beltsville
lab. Nos.

A1 471422	0 to 1 inch. Black organic material.
A21 471423	1 to 3 inches. Gray weak platy loam.
A22 471424	3 to 10 inches. Pale brown platy loam.
A3 471425	10 to 16 inches. Brown weak blocky with a tendency toward platy structure, loam.
B2t 471426	16 to 22 inches. Reddish brown blocky sandy clay loam.
C	22+ inches. Dark reddish brown massive sandy clay loam till.

SOIL SURVEY LABORATORY Lincoln, Nebr. May 1959

SOIL TYPE Morley silt loam LOCATION Kenosha County, Wisconsin

SOIL NOS. 858Wis-30-3 LAB. NOS. 9339-9345

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS
		1B1a										
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY	3A1		2A2	
2-1	1-0.5	0.5-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.02	0.02-0.002	< 0.075mm			
0-8	A11p	0.6a	1.7a	3.4a	12.2a	8.1a	54.3	19.7	32.5	36.7	Tr.	sil
8-11	A12p	0.8a	1.4a	3.0a	11.6a	8.0a	53.4	21.8	32.0	35.9	Tr.	sil
11-16	B1	0.5a	1.0a	2.0a	7.6a	6.0a	39.7	43.2	22.4	27.7	Tr.	c/sic
16-25	IIB2	1.2a	0.8a	1.8a	7.6a	6.2a	37.5	44.9	22.5	25.6	Tr.	c
25-31	IIB3	0.8b	1.1b	2.2b	7.2b	8.0b	51.2	29.5	31.7	32.0	Tr.	sic1
31-42	IIC1	0.9b	1.2b	2.1b	7.1b	8.0b	54.3	26.4	33.5	33.3	2.1	sil
42-57+	IIC2	1.0b	1.5b	2.2b	7.2b	8.2b	54.2	25.7	35.5	31.5	2.9	sil

8C1a	pH		ORGANIC MATTER			6C1a	ELECTRICAL CONDUCTIVITY	6E1a	MOISTURE TENSIONS		
	1:5	1:10	6A1a	6B1a	C/N	Free Iron	EC x 10 ³	CaCO ₃ equiv. amt	1/10 ATMOS.	1/3 ATMOS.	15 ATMOS.
			ORGANIC CARBON %	NITROGEN %		Fe ₂ O ₃ %	MILLIMOS PER CM @ 25°C.	%	%	%	%
6.1			1.64	0.142	12	1.5					7.8
6.2			1.48	0.128	12	1.5					8.3
6.2			0.54	0.054	10	2.6					14.5
7.2			0.51	0.053	10	2.6					16.1
7.9			0.39			1.4		2			11.9
8.0			0.28			1.2		33			10.6
8.1			0.24			1.1		33			10.1

5A1a	EXTRACTABLE CATIONS					5B1a	5C1	5B1a	5A3a	8D3	4B4	4A1a
	6N2b	6O2b	6H1a	6P2a	6Q2a	BASE SAT. %	Base Sat. %	Sum Bases	Sum Cations	Ca/Mg	Field State Water %	Vol. Wt. g/cc
	Ca	Mg	H	No	K	NH ₄ Ac EXCH.	on Sum Cations	me/100g	100g			
11.8	7.0	3.0	5.6	0.1	0.3	88	65	10.4	15.9	2.3		
12.0	7.2	3.2	4.8	0.1	0.3	90	69	10.8	15.6	2.2		
17.5	10.4	5.6	6.0	0.1	0.3	94	73	16.4	22.4	1.8		
19.5		8.6	3.6	0.1	0.4						16.6	1.64
11.0				0.1	0.2							
8.6				0.1	0.2						12.1	1.94
7.6				0.1	0.2							

a. Few smooth brown to black coner. (Fe-Mn?)
 b. Few smooth brown to black coner. (Fe-Mn?), few CaCO₃ coner.

Soil type: Morley silt loam
 Soil Nos.: S58Wis-30-3
 Location: NW of SE, Section 17, T1N, R22E, Kenosha County, Wisconsin.
 Vegetation: Oak and hickory forests.
 Parent material: Thin loess over silty clay loam till.
 Physiographic position: Glacial till plain.
 Topography: Sloping.
 Slope: 3 percent convex.
 Salt or alkali: None.
 Drainage: Well.
 Described by: A. J. Klingelhoets, October 7, 1958.

Horizon and
 Lincoln
 Lab. Number

- A11p
9339 0 to 8 inches. Dark grayish brown (10YR 4/2) silt loam with moderate medium subangular blocky structure which breaks down readily into moderate medium granules; friable when moist; plant roots plentiful; some earthworm holes and casts; developed in loess; medium acid; abrupt smooth boundary, 7 to 9 inches thick.
- A12p
9340 8 to 11 inches. Dark grayish brown (10YR 4/2) to dark gray (10YR 4/1) silt loam with moderate medium subangular structure which breaks down into moderate medium granular; friable when moist; plant roots plentiful; earthworm casts and holes few; developed in loess; medium acid; abrupt smooth boundary, 2 to 4 inches thick.
- B1
9341 11 to 16 inches. Dark brown (10YR 4/3) to dark yellowish brown (10YR 3/4) light silty clay loam with moderate fine angular blocky structure; slightly hard when dry and plastic when wet; plant roots plentiful; few earthworm holes and krotovinas filled with surface soil from A horizon; few wide cracks with light gray (10YR 7/2) silty clay matrix and black (10YR 2/0) organic staining originate in this horizon and carry down to over 3 feet in depth; developed in loess; medium acid; clear wavy boundary, 3 to 6 inches thick.
- IIB2
9342 16 to 25 inches. Dark yellowish brown (10YR 3/4) heavy silty clay loam with compound moderate medium prismatic and moderate to strong medium angular blocky structure; slightly hard when dry and plastic when wet; plant roots plentiful; clay skins and some very dark grayish brown (10YR 3/2) organic stains on peds; developed in till; few dolomitic pebbles present; slightly acid in reaction; clear wavy boundary, 7 to 10 inches thick.
- IIB3
9343 25 to 31 inches. Dark brown (10YR 4/3) silty clay loam with moderate medium prisms which break down to moderate medium angular blocks; slightly hard when dry and plastic when wet; few plant roots; clay skins and prominent very dark grayish brown (10YR 3/2) organic stains on peds; few distinct fine 7.5YR 5/6 mottles; slight effervescence; gradual irregular boundary, 4 to 9 inches thick.
- IIC1
9344 31 to 42 inches. Yellowish brown (10YR 5/4) silty clay loam till with compound weak coarse platy and moderate medium angular blocky structure; slightly hard when dry and plastic when wet; few plant roots in upper 6 inches; clay skins and organic stains on vertical faces of peds; few soft lime concretions; many distinct fine 7.5YR 5/6 mottles; few shale chips and dolomitic pebbles; strong effervescence; gradual irregular boundary, 8 to 12 inches thick.
- IIC2
9345 42 to 57 inches plus. Brown (10YR 5/3) silty clay loam till with moderate coarse platy structure; slightly plastic when wet and hard when dry; white (10YR 8/2) lime coatings on peds between the plates; many distinct fine 7.5YR 5/6 and 4/4 mottles; few dolomitic pebbles and shale chips; violent effervescence; till many feet thick.

Remarks: Profile extremely dry when sampled.

SOIL SURVEY LABORATORY Lincoln, Nebr. May 1959

SOIL TYPE Morley LOCATION Racine County, Wisconsin
silt loam

SOIL NOS. 958Wis-51-4 LAB. NOS. 9346-9352

DEPTH INCHES	HORIZON	1B1a PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2 > 2 ($< 9\mu$)	TEXTURAL CLASS	
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY					
		2.1	1-0.5	0.5-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.02	0.02-0.002			
0-8	Ap	0.4a	1.4a	3.4a	5.6a	5.5a	66.9	16.8	35.3	40.1	Tr.	sil	
8-9	A2p	0.3a	1.5a	3.4a	5.8a	5.4a	66.2	17.4	35.9	38.8	Tr.	sil	
9-16	B1	0.2a	0.8a	1.6a	2.3a	2.3a	52.4	40.4	21.3	34.6	Tr.	sic/sic	
16-25	IIIB2	1.0a	2.8a	5.3a	7.3a	2.8a	37.6	43.2	17.6	26.1	1.4	c	
25-37	IIIB3	0.6b	0.7b	1.6b	5.1b	3.7b	48.7	39.6	20.6	34.9	4.4	sicl/sic	
37-45	IIIC1	0.1b	0.1b	0.2b	2.4b	5.5b	54.9	36.8	21.5	40.9	Tr.	sicl	
45-58+	IIIC2	0.1b	0.2b	0.2b	0.6b	0.9b	58.3	39.7	10.9	48.7	Tr.	sicl/sic	
pH		ORGANIC MATTER				6C1a	ELECTRICAL CONDUCTIVITY EC-10 ³ MILLIMHGS PER CM @ 25°C.	6E1a	MOISTURE TENSIONS				
8C1a		6A1a ORGANIC CARBON		6B1a NITROGEN	C/N	Free Iron Fe ₂ O ₃ %		CaCO ₃ equiv. atom %	GYPSUM me./100g. SOIL	1/10 ATMOS.	1/3 ATMOS.	4B2 15 ATMOS.	
1:1		%		%						%	%	%	
6.3		1.42		0.125	11	1.2						7.0	
6.1		1.18		0.105	11	1.2						6.7	
5.1		0.45		0.050	9	2.4						13.2	
5.8		0.44		0.043	10	2.7						15.4	
7.7		0.33				1.9		11				14.8	
7.8		0.24				1.6		22				14.2	
7.9		0.24				1.4		27				15.9	
5A1a		EXTRACTABLE CATIONS					5B1a	5C3	5B1a	5A3a	8D3	4B4	4A1a
CATION EXCHANGE CAPACITY NH ₄ Ac		6N2b	6O2b	6H1a	6P2a	6Q2a	BASE SAT. % NH ₄ Ac EXCH.	Base Sat. % on Sum Cations	Sum Bases me/100g	Sum Cations	Ca/Mg	Field State Water %	Vol. Wt. g/cc
		Co	Mg	H	No	K							
		milliequivalents per 100g. soil					5C1						
10.8	7.2	3.0	4.4	0.1	0.2	97	70	10.5	14.9	2.4			
10.4	6.1	2.8	4.8	0.1	0.2	88	66	9.2	14.0	2.2			
16.6	8.2	5.2	7.6	0.1	0.3	83	64	13.8	21.4	1.6			
19.4	10.4	7.3	6.0	0.1	0.4	94	75	18.2	24.2	1.4	16.3	1.68	
16.2				0.2	0.3								
13.6				0.1	0.3						14.2	1.74	
13.0				0.1	0.2								

a. Few smooth brown to black coner. (Fe-Mn?)
 b. Few smooth brown to black coner. (Fe-Mn?), few CaCO₃ coner.

Soil type: Morley silt loam
 Soil Nos.: 858Wis-51-4
 Location: SW of SW, Section 34, T3N, R20E, Racine County, Wisconsin.
 Vegetation: Oak and hickory forest.
 Parent material: Thin loess over silty clay loam till.
 Physiographic position: Glacial till plain.
 Topography: Sloping.
 Slope: 3 percent convex.
 Salt or alkali: None.
 Drainage: Moderate to well.
 Described by: A. J. Klingelhoets, October 8, 1958.

Horizon and

Lincoln

Lab. Number

Ap 9346 0 to 8 inches. Very dark grayish brown (10YR 3/2) to dark grayish brown (10YR 4/2) silt loam with moderate fine subangular blocky structure which breaks down into moderate medium granules; friable when moist; plant roots plentiful; some earthworm casts and holes; developed in loess; medium acid; abrupt smooth boundary, 7 to 9 inches thick.

A2p 9347 8 to 9 inches. Dark grayish brown (10YR 4/2) silt loam with moderate medium platy structure; friable when moist; evidence of cultivation in past; plant roots plentiful; few earthworm holes and casts; developed in loess; medium acid; abrupt smooth boundary, 1 to 2 inches thick.

B1 9348 9 to 16 inches. Dark brown (10YR 4/3) light silty clay loam with moderate medium subangular blocky structure; firm when moist; grayish brown (10YR 5/2) silica coatings on peds; plant roots plentiful; developed in loess; strongly acid; gradual wavy boundary, 4 to 7 inches thick.

IIB2 9349 16 to 25 inches. Dark brown (10YR 4/3) heavy silty clay loam with moderate medium prismatic structure which breaks down into moderate medium angular blocks; hard when dry and slightly plastic when wet; developed in till; clay skins and black (10YR 2/1) organic stains on peds; cracks extend through this horizon with light gray (10YR 7/2) silty clay matrix and some organic stains to a depth of 4 feet in the profile; lens of clay loam 2 inches thick--composed of old eroded surface material--at contact between this horizon and IIB3; plant roots plentiful; medium acid; gradual wavy boundary, 6 to 9 inches thick.

IIB3 9350 25 to 37 inches. Dark brown (10YR 4/3) silty clay loam with compound moderate medium prismatic and moderate medium angular blocky structure; hard when dry and slightly plastic when wet; few plant roots; clay skins and black (10YR 2/1) organic stains on peds; very thick clay skins on some of vertical ped faces; few fine distinct 7.5YR 5/6 mottles; developed in till; slight effervescence; gradual irregular boundary, 7 to 13 inches thick.

IIC1 9351 37 to 45 inches. Yellowish brown (10YR 5/4) silty clay loam (washed till) with weak coarse platy structure which breaks down into weak medium angular blocks; hard when dry, slightly plastic when wet; few plant roots; few soft lime concretions becoming more abundant with depth; many fine 7.5YR 5/6 mottles; some clay skins on vertical faces of peds; light gray lime coatings on horizontal faces of plates; few shale chips and glacial pebbles; strong effervescence; gradual irregular boundary, 10 to 15 inches thick.

IIC2 9352 45 to 58 inches plus. Brown (10YR 5/3) silty clay loam (washed till) having moderate coarse platy structure; hard when dry and slightly plastic when wet; mottled same as horizon above; light gray lime segregations between plates on horizontal surface of ped; few shale chips and dolomitic pebbles; strong effervescence; till many feet thick.

Remarks: Some evidence of reworked till in substratum; this is quite common in the till soils on the Cary Drift. Profile extremely dry when sampled.

SOIL Norden loam, steep, eroded SOIL Nos. 45W18-52-2 LOCATION Richland County, Wisconsin
SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 531 - 537

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1		
		Total				Sand				Silt				2A2 ≥ 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)				
Pct. of < 2 mm																
0-3	A1		40.4	11.1	0.3	3.4	7.2	22.5	15.1		20.3			0		
3-8	A2		41.5	6.9	0.3	3.4	7.4	22.9	15.6		19.9			0		
8-11	A3		40.7	8.4	0.5	3.2	7.1	23.4	16.7		19.7			8		
11-16	B1		35.0	11.7	0.5	3.1	6.3	20.5	22.9		16.1			5		
16-32	B2		23.4	20.1	0.3	2.8	5.4	18.4	23.4		14.0			0		
32-40	B3		30.4	19.6	1.1	3.5	4.1	17.7	34.5		16.2			10		
40+	C1		11.4	9.6	0.3	1.6	5.9	51.6	21.4		7.1			0		

Depth (in.)	6A1a Organic carbon Pct	Nitrogen Pct	C/N	Carbonate as CaCO ₃ Pct.	Ext. iron as Fe Pct	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH	
						4A1e ½ bar g/cc	4A1h Oven dry g/cc	4B1c ½ bar Pct.		4B2 15 bar Pct.	8C1a (1:1) KCl	8C1e (1:1) H ₂ O			
														8C1e (1:1) H ₂ O	
0-3	5.40														
3-8	0.96														6.6
8-11	0.34														6.2
11-16	0.90														5.7
16-32	0.23														5.5
32-40	0.08														5.4
40+	0.09														5.4

Depth (in.)	Extractable bases 5B1a					6H2a Ext. acidity	CEC		6G1d Ext Al	Ratios to clay			8D3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	Ext		CEC Sum	Ext. iron	15-bar water		8C3 Sum cations Pct	8C1 NH ₄ OH Pct.
0-3	19.1	3.4	0.6	0.2		7.2	30.5						76		
3-8	4.2	1.0	0.1	0.1		4.8	10.2						53		
8-11	2.1	0.8	0.1	0.1		4.0	7.1						44		
11-16	2.1	1.3	0.1	0.1		3.6	7.2						50		
16-32	3.1	2.2	0.1	0.1		5.1	10.6						52		
32-40	2.4	1.5	0.1	0.2		4.2	8.4						50		
40+	2.6	1.6	0.2	0.1		1.3	5.8						78		

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt	Chl.	Vm	Mi.	Int	Qtz	Kl.	Gibbsite
	7A2 X-ray				7A3			

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 Type: Norden loam, steep, eroded.
 Soil No.: 48Wis52-2
 Location: Richland County, Wisconsin. N. center Sec. 10, T. 10N., R. 1E.
 Sampled by: Glenn H. Robinson Slope: 30 percent

Horizon and
 Beltsville
 Lab. No.

A1 531	0 to 3 inches. Dark gray (10YR 4/1) fine sandy loam that has a well developed granular structure and numerous fine roots. pH 7.0.
A2 532	3 to 8 inches. Grayish brown (10YR 5/2) fine sandy loam that is platy in place breaking to a soft crumb structure. Contains many roots. pH 6.5.
A3 533	8 to 11 inches. Light brownish gray (10YR 6/2) fine sandy loam that is platy, subangular blocky and breaks into soft crumbs. Contains several roots and worm casts. pH 6.0.
B1 534	11 to 16 inches. Yellowish brown (10YR 5/4) fine sandy loam that has weakly developed blocky structure, subangular blocky and contains several roots. pH 5.5.
B2 535	16 to 32 inches. Dark yellowish brown crushing to yellowish brown (10YR 4/4, 5/8) loam with moderately developed blocky structure and several worm casts and root channels. pH 5.5.
B3 536	32 to 40 inches. Dark yellowish brown to brownish yellow decomposed fine sandstone with some glauconite. pH 5.5.
C1 537	40 inches plus. Partially decomposed glauconitic sandstone. pH 7.2.

SOIL SURVEY LABORATORY Lincoln, Nebr. Dec. 1958

SOIL TYPE Omega loamy sand LOCATION Marathon County, Wisconsin

SOIL NOS. S57Wis-37-1 LAB. NOS. 7014-7019

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS	
		1B1a					3A1						2A2 > 2 ($< 9\mu$)
		VERY COARSE SAND 2.1	COARSE SAND 1.0-5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	0.002-0.0002		
0-2 1/2	A1 A2	2.4	29.0	35.9	16.7	0.9	10.7	4.4	6.5	8.0	Tr.	lcos	
2 1/2-6	B1rh	2.1	25.2	37.4	20.0	0.8	9.1	5.4	6.3	6.8	Tr.	lcos	
6-18	B1r	2.4	20.6	38.7	23.5	1.1	9.0	4.7	8.6	6.1	3	ls	
18-25	B3	2.0	18.3	46.0	26.6	0.8	4.4	1.9	6.4	3.2	2	s	
25-31	C1	4.7	42.8	36.9	12.9	0.8	1.7	0.2	3.7	1.6	8	cos	
31-54+	C2	1.0	27.2	47.7	23.0	0.5	0.4	0.2	3.5	0.8	1	cos	
pH		ORGANIC MATTER				6C1a	4A3a						
8C1a		6A1a	6B1a			Free Iron Fe ₂ O ₃ %	Vol. Wt. g/cc.						
1:1	1:5	1:10	ORGANIC CARBON %	NITRO-GEN %	C/N								
5.0			3.11	0.149	21	0.7							
5.6			0.52	0.036	14	0.9	1.44						
5.5			0.28	0.026	11	0.9							
5.6			0.12	0.008		0.6							
5.6			0.06			0.4							
5.8			0.04			0.3	1.60						
5A1a	EXTRACTABLE CATIONS 5B1a					BASE SAT. %	5C3	5B1a	5A3a				
CATION EXCHANGE CAPACITY NH ₄ Ac	6N2b	6O2b	6H1a	6P2a	6Q2a	NH ₄ Ac EXCH.	Base Sat. % on Sum Cations	Sum Ext. Bases	Sum Ext. Cations	MOISTURE AT SATURATION %			
	Ca	Mg	H	No	K			me/100g.					
	← milliequivalents per 100g. soil →					5C1							
13.7	4.0	0.8	13.9	<0.1	0.1	36	26	4.9	18.8				
4.8	0.9	0.1	5.5	<0.1	0.1	23	17	1.1	6.6				
3.6	0.3	0.2	4.7	<0.1	0.1	17	11	0.6	5.3				
1.6	<0.1	<0.1	3.2	<0.1	<0.1				3.2				
0.9	<0.1	<0.1	1.6	<0.1	<0.1				1.6				
0.6	<0.1	0.3	0.8	<0.1	<0.1	50	27	0.3	1.1				

Soil type: Omega loamy sand

Soil Nos.: S97Wis-37-1

Location: Marathon County, Wisconsin; 3 miles east of southwest corner of Section 4, T27N, R7E.

This profile was sampled in a virgin site, except for burns which occurred in this area as late as in the 1930's. This site occurred on a sandy glacial outwash plain associated with glacial Lake Wisconsin along the Wisconsin River. Parent materials consisted of dominantly quartz sands with some glacial gravel. It was estimated that approximately 8 to 10 percent by volume of the parent materials was composed of minerals other than quartz. Jack pine and black oak, with an understory of blueberry, sweetfern grasses and wild rose, constituted present vegetative cover. Relief is very gently undulating with 1- and 2-percent slopes dominating. Drainage is excessive, ground water deep, and permeability rapid. Characteristics of this profile are very similar to those of the Brown Podzolic soils and therefore this soil has been included in with the Omega series in Wisconsin; it also has some characteristics of a weak Podzol, namely the A1, A2 and B1r horizon sequence. In this vicinity as well as in other large areas where this profile is found, it is not uncommon to find weak Podzol development and Brown Podzolic profiles without any evidence of an A2 horizon occurring side by side in a soil association. This association of weak Podzol and Brown Podzolic profiles has been noted in all of the sandy glacial outwash in Wisconsin with the exception of an area in the northwestern part of the state. Note: Weak Podzol and Brown Podzolic are considered here to be separate identities whereas in some other places Brown Podzolic has been equated with weak Podzol.

Sampled by: A. J. Klingelhoets, G. B. Lee, William DeYoung, and R. H. Jordan, October 30, 1957.

Described by: A. J. Klingelhoets.

Horizon and

Lincoln

Lab. Number

Aoo and Ao	3/4 to 0 inch. One-half inch of oak leaves and grass over a black (10YR 2/0) well decomposed organic layer 1/4-inch thick; pH 5.0.
A1 7014	0 to 1 1/2 inches. Black (10YR 2/1) loamy sand with weak fine granular structure; very friable when moist; high content of organic matter; plant roots plentiful; many bleached quartz grains; temperature 5.3 degrees C.; pH 5.2; abrupt smooth boundary; 1 to 3 inches thick.
A2	1 1/2 to 2 1/2 inches. (Included with sample above.) Very dark gray (10YR 3/1) to very dark grayish brown (10YR 3/2) loamy sand having weak coarse platy structure; very friable when moist; plant roots plentiful; temperature 5.0 degrees C.; pH 5.6; clear wavy boundary; 1/2 to 1-1/2 inches thick.
B1r 7015	2 1/2 to 6 inches. Dark brown (7.5YR 3/4) to dark reddish brown (5YR 3/4) loamy sand which is massive in place and has weak medium subangular blocks when disturbed; very friable when moist; tree roots plentiful; temperature 5.5 degrees C.; pH 5.7; clear wavy boundary; 3 to 5 inches thick. (Two core samples at 3 to 6 inches.)
B1r 7016	6 to 18 inches. Dark brown (7.5YR 3/4 to 4/4) loamy sand to medium sand with weak medium subangular blocky structure; very friable when moist; gravel band at lower limit of horizon with gravel of 1/2- to 1-1/2-inch diameter; tree roots plentiful; temperature 6.3 degrees C.; pH 5.7; clear wavy boundary; 9 to 15 inches thick.
B3 7017	18 to 25 inches. Dark brown (7.5YR 4/4) to dark yellowish brown (10YR 4/4) medium sand having very weak medium subangular blocky structure; loose; few tree roots; temperature 7.1 degrees C.; pH 5.7; abrupt smooth boundary; 5 to 8 inches thick.
C1 7018	25 to 31 inches. Yellowish brown (10YR 5/4) coarse sand, single grained; loose; gravel layer at bottom of horizon; temperature 7.2 degrees C.; pH 6.0; abrupt smooth boundary; 5 to 11 inches thick.
C2 7019	31 to 54 inches plus. Light yellowish brown (10YR 6/4) medium sand; single grained; loose; stratified with layers of fine sand below 54 inches; temperature 8.7 degrees C.; pH 6.0. (Two core samples at 37 to 40 inches.)

Remarks: All pH readings by use of Hellige-Truog kit. All colors were taken under moist field conditions. Air temperature 5.7 degrees C.

SOIL TYPE Omega LOCATION Marathon County, Wisconsin
loamy sand

SOIL NOS. S57Wis-37-2 LAB. NOS. 7020-7026

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)									TEXTURAL CLASS	
		1B1a					3A1					
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY	2A2	> 2		
2.1	1.0-5	0.5-0.75	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.02	0.02-0.002	(< 9mm)			
0-2	A1	1.6	17.4	35.6	24.7	3.4	12.4	4.9	14.2	8.2	Tr.	ls
2-3 1/2	A2	2.0	20.2	38.2	23.7	2.4	9.8	3.7	11.7	6.3	Tr.	s
3 1/2-8	B1rh	1.5	15.8	35.9	28.0	4.0	9.6	5.2	15.5	5.9	Tr.	ls
8-18	B1r	1.8	14.0	36.9	32.7	3.3	7.5	3.8	14.9	4.9	4	s
18-26	B3	6.8	21.2	34.3	29.1	3.6	3.5	1.5	14.7	1.6	14	cos
26-32	C1	9.5	28.1	35.2	22.8	2.2	1.6	0.6	9.4	0.6	19	cos
32-53+	C2	1.1	21.7	50.2	23.8	2.2	0.8	0.2	7.5	0.5	Tr.	cos
pH		ORGANIC MATTER				6C1a	4A3a					
8C1a	1:5	1:10	6A1a	6B1a		Free Iron	Vol.					
			ORGANIC CARBON	NITROGEN	C/N	Fe ₂ O ₃	Wt.					
			%	%		%	g/cc					
			4.21	0.212	20	0.7						
4.9			1.32	0.071	19	0.8						
4.9			0.80	0.045	18	1.0	1.40					
5.2			0.41	0.020	20	0.9						
5.7			0.13	0.005		0.5						
5.8			0.09			0.4						
6.0			0.05			0.7	1.60					
6.2												
5A1a	EXTRACTABLE CATIONS					5B1a	BASE SAT. %	5C3	5B1a	5A3a		
CATION EXCHANGE CAPACITY NH ₄ Ac	6N2b	6O2b	6H1a	6P2a	6Q2a		Base Sat. %	Base Sat. %	Sum Ext.	Sum Ext.		MOISTURE AT SATURATION %
	Ca	Mg	H	Na	K		NEH ₄ Ac EXCH.	on Sum	Bases	Cations		
	← milliequivalents per 100g. soil →					5C1		Cations	me/100g.			
14.7	4.8	1.4	14.0	<0.1	0.2	44	31	6.4	20.4			
7.7	1.3	0.4	8.7	<0.1	0.1	23	17	1.8	10.5			
5.5	0.8	0.2	6.7	<0.1	0.1	20	14	1.1	7.8			
3.3	0.5	0.2	5.1	<0.1	0.2	27	15	0.9	6.0			
1.5	0.1	<0.1	2.4	<0.1	<0.1	7	4	0.1	2.5			
1.0	0.1	<0.1	1.6	<0.1	<0.1	10	6	0.1	1.7			
0.7	<0.1	0.2	1.2	<0.1	<0.1	28	14	0.2	1.4			

Soil type: Omega loamy sand
 Soil Nos.: S57WIs-37-2
 Location: Marathon County, Wisconsin; southeast corner Section 6, T27N, R7E.

A sixty-year-old stand of red and white pine with some evidence of ground fires in the past twenty years was selected for this sample site. Sandy glacial outwash along the Wisconsin River comprised the parent material. Over 10 percent of the parent material by volume was comprised of minerals other than quartz. This particular profile had a high percent of granite which occurs locally as bedrock outcrops. Very gently undulating relief with 1- and 2-percent slopes dominate. The profile sampled was on a 1-percent convex slope. Drainage was excessive, ground water at approximately 12 feet, and permeability was rapid. The profile was moist at time of sampling. Characteristics of this profile are very similar to those of the Brown Podzolic soils and therefore this soil has been included in with the Omega series in Wisconsin; it also has some characteristics of a weak Podzol, namely the A1, A2 and B1h horizon sequence. In this vicinity as well as in other large areas where this profile is found, it is not uncommon to find weak Podzol development and Brown Podzolic profiles without any evidence of an A2 horizon occurring side by side in a soil association. This association of weak Podzol and Brown Podzolic profiles has been noted in all of the sandy glacial outwash in Wisconsin with the exception of an area in the northwestern part of the state. Note: Weak Podzol and Brown Podzolic are considered here to be separate identities whereas in some other places Brown Podzolic has been equated with weak Podzol.

Sampled by: A. J. Klingelhoets, G. E. Lee, William DeYoung, and R. H. Jordan, October 30, 1957.
 Described by: A. J. Klingelhoets.

Horizon and
 Lincoln
 Lab. Number

A ₀₀ and A ₀	3/4 to 0 inch. One-half inch mat of pine needles, bracken ferns and hardwood leaves underlain by black (10YR 2/1) well decomposed organic matter 1/4-inch thick; pH 5.5.
A1 7020	0 to 2 inches. Black (10YR 2/1) loamy sand with weak fine granular structure; very friable when moist; many bleached quartz grains; plant roots plentiful; temperature 6.0 degrees C.; pH 5.2; abrupt smooth boundary; 1 to 2 inches thick.
A2 7021	2 to 3 1/2 inches. Dark brown (7.5YR 3/2) to very dark gray (10YR 3/1) loamy sand having weak coarse platy structure; very friable when moist; plant roots plentiful; temperature 5.3 degrees C.; pH 5.5; clear wavy boundary; 1 to 3 inches thick.
B1h 7022	3 1/2 to 8 inches. Dark brown (7.5YR 3/4) to dark reddish brown (5YR 3/4) loamy sand which appears massive in place but breaks into weak medium subangular blocks; very friable when moist; tree roots plentiful; temperature 6.0 degrees C.; pH 5.8; gradual wavy boundary; 3 to 6 inches thick. (Two core samples taken at 3 1/2 to 6 1/2 inches.)
B1r 7023	8 to 18 inches. Dark brown (7.5YR 3/4 to 4/4) medium sand to loamy sand having weak medium subangular blocky structure; very friable when moist; tree roots plentiful; temperature 6.9 degrees C.; pH 5.8; clear wavy boundary; 8 to 13 inches thick.
B3 7024	18 to 26 inches. Strong brown (7.5YR 4/6) medium sand and fine gravel with very weak medium subangular blocks which break down into single grained; loose; few tree roots; temperature 7.6 degrees C.; pH 5.9; abrupt wavy boundary; 6 to 10 inches thick.
C1 7025	26 to 32 inches. Yellowish brown (10YR 5/4) gravelly sand, single grained; loose; stratified; temperature 8.3 degrees C.; pH 5.8; abrupt smooth boundary; 7 to 10 inches thick.
C2 7026	32 to 53 inches plus. Light yellowish brown (10YR 6/4) medium sand, single grained, loose; strata of fine sands below 53 inches; iron discolorations in lower part which are yellowish brown (10YR 5/8); temperature 8.4 degrees C.; pH 5.8. (Two core samples taken at 33 to 36 inches.)

Remarks: All pH readings by use of Hellige-Truog kit. All colors were taken under moist field conditions. Air temperature 6.2 degrees C.

SOIL Onanda loam SOIL Nos. 47W16-3-7 LOCATION Barron County, Wisconsin
SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 471416-471421

Depth (in.)	Horizon	181b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments 3B1				
		Total		Clay (< 0.002)	Very coarse (2-1)	Sand			Silt			Int. II (0.2-0.02)		(2-0.1)	2A2 > 2	2-19	19-76	
		Sand (2-0.05)	Silt (0.05-0.002)			Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Int. III (0.02-0.002)	Pct. of < 2 mm							Pct. of < 76mm
0-1/2	A1	45.6	47.2	7.2	5.0	19.0	14.3	5.9	1.4	22.9	24.3	25.9	44.2				1	
1/2-4	A21	41.4	51.3	7.3	3.1	16.2	14.2	6.1	1.8	25.4	25.9	28.9	39.6				2	
4-10	A22																	
10-14	B1	36.1	54.9	9.0	3.4	12.9	12.1	5.7	2.0	29.2	25.7	32.9	34.1				3	
14-24	B2t	45.8	34.5	19.7	5.9	14.2	14.5	9.0	2.2	18.9	15.6	23.9	43.6				21	
24+	C	87.6	6.0	6.4	6.9	29.2	37.8	13.0	0.7	3.4	2.6	7.1	86.9				4	

Depth (in.)	6A1a Organic carbon	Nitrogen	C/N	Carbonate as CaCO ₃	Ext. iron as Fe	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH		
						4A1e 1/2 bar	4A1h Oven dry	4D1		4B1c 1/2 bar	4B2 15 bar	4C1c (1.1)		4C1e (1.1)		
						g/cc	g/cc	g/cc		Pct.	Pct.	KCl		H ₂ O		
0-1/2	11.04															5.9
1/2-4	1.86															5.5
4-10	0.51															5.3
10-14	0.20															5.0
14-24	0.29															5.0
24+	0.11															5.2

Depth (in.)	Extractable bases 5B1a					6H2a Ext acidity	CEC		6G1d Ext Al	Ratios to clay			8D3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	CEC Sum		Ext. iron	15-bar water	5C3 Sum cations Pct.		5C1 NH ₄ OAc Pct.	
	mg/100 g														
0-1/2	4.8	1.3	tr.	0.2		7.8	14.1						45		
1/2-4	1.2	0.3	tr.	tr.		4.8	6.3						24		
4-10															
10-14	1.8	0.9	0.1	tr.		4.0	6.8						41		
14-24	4.6	0.2	0.1	0.1		8.0	15.0						47		
24+	1.9	1.0	0.1	tr.		2.7	5.7						53		

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt.	Chl.	Vm	Mi	Int.	Qtz	Kl	Gibbsite
	7A2 X-ray				7A3			

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, xxxxx = dominant.

Soil type: Onamia loam

Soil No.: 47Wis-3-7

Location: Barron County, Wisconsin. East side SE 1/4 of SE 1/4 section 15, township 35 N., range 11W.

Horizon and

Beltsville

Lab. Nos.

A1 471416	0 to 1/2 inch. Black organic loam.
A21 471417	1/2 to 4 inches. Light gray loam which has a granular structure.
A22 471418	4 to 10 inches. Very pale brown loam with granular structure.
B1 471419	10 to 14 inches. Very pale brown heavy loam with weak blocky structure.
B2t 471420	14 to 24 inches. Yellowish red sandy clay loam with blocky structure.
C 471421	24+ inches. Yellowish red sand that is loose and stratified with gravel below 30 inches.

Soil type: Onaway loam
 Soil Nos.: S59Wts-42-2
 Location: Oconto County, Wisconsin; northwest quarter of southeast quarter of Section 21, T28N, R18E; about one-half mile west of the city of Gillette; 100 feet west and 75 feet north of the southwest corner of Kasten woodlot; photo BIC-8-147 (1938).
 Vegetation and use: Beech and maple woodlot; not grazed in recent years.
 Slope and land form: Gently undulating complex slopes of 3 to 5 percent; Late Wisconsin (Valders) ground moraine.
 Drainage and permeability: Well drained; surface runoff and internal drainage are medium; permeability is moderate.
 Parent material: Calcareous glacial till.
 Collected by: J. S. Allen, William DeYoung, and G. B. Lee, September 3, 1959.
 Described by: E. G. Link.

Horizon and
 Lincoln
 Lab. Number

Aoo	1 to 0 inch. Forest litter.
A1 11841	0 to 2 inches. Very dark gray (10YR 3/1) silt loam to loam with moderate medium to fine granular structure; very friable when moist; neutral reaction.
A2 11842	2 to 4½ inches. Brown (7.5YR 5/2) to grayish brown (10YR 5/2) loam with weak medium granular structure; very friable when moist; neutral reaction.
B1r 11843	4½ to 12 inches. Dark brown (7.5YR 4/4, 7.5YR 5/4 crushed) loam with weak medium subangular blocky structure that breaks to weak medium granular structure; friable when moist; slightly acid.
A2m 11844	12 to 19 inches. Brown (7.5YR 5/2) to pinkish gray (7.5YR 6/2, 7.5YR 5/4 crushed) sandy loam; massive; very firm when moist; dark brown (7.5YR 4/4) streaks or blotches; slightly acid.
IIA2m-Bt 11845	19 to 27 inches. Dark brown (7.5YR 4/4, 7.5YR 5/4 crushed) sandy loam; massive; very firm when moist; brown (7.5YR 5/2 to 5/4) coatings that also permeate much of the soil mass; medium acid.
IIBt1 11846	27 to 32 inches. Reddish brown (5YR 4/4 to 4/3, 5YR 4/6 crushed) sandy clay loam that appears massive in place but breaks to weak medium subangular blocky structure; firm when moist; mildly alkaline.
IIBt2 11847	32 to 41 inches. Reddish brown (5YR 4/4) to yellowish red (5YR 5/6, 5YR 5/4 crushed) sandy loam with weak medium granular structure; friable when moist; mildly alkaline; horizon also includes pockets of massive yellowish red (5YR 4/6) loam with gravel of various types to 3 inches in diameter, mostly less than 15-mm.; firm when moist; moderately alkaline.
IIC1 11848	41 to 59 inches. Reddish brown (5YR 4/4, 7.5YR 5/4 crushed) loam that appears massive in place but breaks to weak medium platy structure; firm when moist; gravel of various types to 3 inches in diameter but mostly less than 15-mm.; horizon includes pockets of well-sorted silts up to 4 inches thick in upper portion; effervescence with HCl.
IIC2 11849	59 to 71 inches. Reddish brown (5YR 4/4) loam that includes various types of gravel to 3 inches in diameter, mostly less than 15-mm.; friable when moist; effervescence with HCl.

Remarks: Colors given are for moist soil. Reaction determined by Hellige-Truog pH kit. Roots plentiful to a depth of 15 inches.

SOIL Onaway loam SOIL Nos. S59W1s-44-1 LOCATION Outagamie County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 11812-11820 April 1966
General Methods: 1A, 1B1a, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1											Clay			Coarse fragments 2A2						
		Total			Sand					Silt			Clay Carbonate	Non-Carbonate	> 2 (<19) Pct	2-19 (<76) Pct	19-76 (<76) Pct					
		Sand (2-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Vary coarse (2-1)	Coarse (1 0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Int. III (0.05-0.02)	Int. II (0.2-0.02)	Int. I (2-0.1)										
0-3	A1	61.4	31.2	7.4	2.2	11.4	23.2	19.3	5.3	17.1	14.1	28.6	56.1			Tr.						
3-11	B1r	55.9	36.3	7.8	1.4	7.2	16.6	21.1	9.6	17.0	19.3	35.3	46.3			Tr.						
11-14	A2m	57.3	33.9	8.8	1.3	5.9	13.8	23.8	12.5	15.0	18.9	38.4	44.8			Tr.						
14-18	IIA2-B1t	50.9	29.8	19.3	1.7	5.3	11.0	21.3	11.6	11.7	18.1	33.2	39.3			Tr.						
18-23	IIA2t	44.6	27.0	28.4	2.3a	4.1a	8.0a	18.7a	11.6	15.4	15.4	32.5	33.1			Tr.						
23-28	IIC1	49.4	29.9	20.7	4.0b	5.6a	8.8a	18.7a	12.3a	13.4	16.5	35.2	37.1			20						
28-38	IIC2	50.2	31.8	18.0	5.0b	5.5a	8.0a	19.1a	12.6a	14.1	17.7	36.6	37.6			17						
38-49	IIC3	48.7	32.8	18.5	3.3b	5.3a	7.9a	19.5a	12.7a	13.8	19.0	36.7	36.0			15c						
49-60	IIC4	48.7	31.5	19.8	2.4b	4.4a	7.9a	20.5a	13.5a	14.3	17.2	38.6	35.2			12						
Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6E1a Carbonate as CaCO ₃	6C1a Ext. Iron as Fe ₂ O ₃ Pct.	Bulk density			Water content			pH	8C1a (1)									
						4A1a Field State	4A1c 30-cm	4A1h Oven Dry	4B4 Field State	4B3 30-cm	4B2 15-Bar											
0-3	3.25	0.232	14		1.0									5.5								
3-11	1.21	0.091	13		1.2									5.2								
11-14	0.30	0.020	15		1.1	1.79	1.79	1.77	4.6	10.3				5.7								
14-18	0.32	0.029	11		1.7									5.8								
18-23	0.52	0.041	13	5	2.0	1.67		1.65	5.8					7.6								
23-28	0.30	0.025	12	17	1.2									8.0								
28-38	0.23			20	1.1									8.1								
38-49	0.27			18	1.1									8.1								
49-60	0.35			12	1.4	1.67	1.57	1.65	3.8	18.8	7.2			8.0								
Depth (in.)	Extractable bases 5B1a					6H1a Ext. Acidity	Cat. 5A3a Sum Cations	Exch. Cap. 5A1a NH ₄ OAc Not Heated	Cat. Exch. Cap. BaCl ₂ -TEA 9A5	Cat. Exch. Cap. Heated 240°C	6G1d KCl-Ext.	8D3 Ca/Mg	Base saturation									
	6N2b Ca	6O2b Mg	6P2a Na	6Q2a K	Sum								5C3 Sum Cations	5C1 NH ₄ OAc								
0-3	7.2	1.8	Tr.	0.2	9.2	9.6	18.8	12.2	17.0	10.8	0.8	4.0	49	75								
3-11	2.0	0.6	Tr.	0.1	2.7	9.3	12.0	6.8	10.4	7.0		3.3	22	40								
11-14	1.6	0.6	Tr.	0.1	2.3	3.5	5.8	3.2				2.7	40	72								
14-18	4.3	2.2	Tr.	0.1	6.6	4.5	11.1	7.8				2.0	59	85								
18-23			Tr.	0.2				12.6														
23-28			Tr.	0.2				8.3														
28-38			Tr.	0.2				7.0														
38-49			Tr.	0.2				7.2														
49-60			Tr.	0.2				8.8														
Depth (in.)	Ratios to Clay 8D1			NH ₄ OAc OEC	Ext. Iron	15-Bar Water	a. 5-25% carbonate.				b. > 50% carbonate.				c. Carbonatic fragments; 5 percent noncarbonate residue in > 2-mm. material.				d. Air-dry.			
	0-3	1.65	0.14				1.05															
3-11	0.87	0.15	0.51																			
11-14	0.36	0.12	0.26																			
14-18	0.40	0.09	0.30																			
18-23	0.44	0.07	0.35																			
23-28	0.40	0.06	0.35																			
28-38	0.39	0.06	0.36																			
38-49	0.39	0.06	0.36																			
49-60	0.44	0.07	0.36																			

Soil type: Onaway loam
 Soil Nos.: S59WIs-44-1
 Location: Outagamie County, Wisconsin; northeast quarter of northeast quarter of Section 26, T24N, R17E; about three and one-half miles west of the city of Seymour, Jurgens woodlot; 300 feet south of town highway along Jurgens woodlot road; photo BIE-1H-01 (1953).
 Vegetation and use: Beech, maple, and oak woodlot; ungrazed woodlot with removal by selective cutting.
 Slope and land form: Gently undulating to undulating complex slopes of 5 to 8 percent; late Wisconsin (Valders) ground moraine.
 Drainage and permeability: Well drained; surface runoff and internal drainage are medium; permeability is moderate to moderately slow.
 Parent material: Calcareous glacial till.
 Collected by: J. S. Allen, William DeYoung, and G. B. Lee, September 2, 1959.
 Described by: E. G. Link.

Horizon and
 Lincoln
 Lab. Number

Aoo	1½ to 0 inch. Recent deposition of leaves, twigs and grasses.
A1 11812	0 to 3 inches. Very dark brown (10YR 2/2) to black (10YR 2/1) loam with moderate medium granular structure; very friable when moist; medium acid.
B1r 11813	3 to 11 inches. Dark brown (10YR 4/3 to 3/3, 7.5YR 4/2 crushed) loam with moderate medium granular structure; friable when moist; very strongly acid.
A2m 11814	11 to 14 inches. Dark brown (10YR 4/3 to 7.5YR 4/2, 10YR 5/3 crushed) sandy loam; appears massive in place but breaks to moderate medium granular structure; firm when moist; medium acid.
IIA2-B1t 11815	14 to 18 inches. Dark reddish brown (5YR 3/4) to yellowish red (5YR 3/6, 5YR 4/3 crushed) clay loam with weak medium prismatic structure that breaks to weak medium subangular blocky structure; very firm when moist; reddish brown (5YR 5/3) coatings; strongly acid.
IIB2t 11816	18 to 23 inches. Dark reddish brown (5YR 3/4, 5YR 5/3 crushed) clay to clay loam with weak medium prismatic structure that breaks to weak medium to coarse subangular blocky structure; very firm when moist; numerous mixed size gravel, mostly less than 20-mm.; reddish yellow (7.5YR 6/6) coloring around weathered dolomitic gravel; neutral.
IIc1 11817	23 to 28 inches. Reddish brown (5YR 4/3 to 4/4) clay loam to sandy clay loam that appears massive in place but breaks to very weak medium subangular blocky structure; firm when moist; numerous gravel of varied size, mostly less than 20-mm.; violent effervescence with HCl.
IIc2 11818	28 to 38 inches. Reddish brown (5YR 4/3 to 4/4) clay loam that appears massive in place but breaks to very weak medium subangular blocky structure; firm when moist; numerous gravel of varied size, mostly less than 20-mm.; violent effervescence with HCl.
IIc3 11819	38 to 49 inches. Reddish brown (5YR 4/4) clay loam that appears massive in place but breaks to very weak medium subangular blocky structure; firm when moist; numerous gravel of varied size, mostly less than 20-mm.; violent effervescence with HCl; 8 to 15 inches thick.
IIc4 11820	49 to 60 inches. Dark reddish brown (5YR 3/4) to reddish brown (5YR 4/4) clay loam that appears massive in place but breaks to very weak medium subangular blocky structure; firm when moist; numerous gravel of varied size, mostly less than 20-mm.; violent effervescence with HCl.

Remarks: Colors are given for moist soil. Reaction determined by Hellige-Truog pH kit. B (14 to 23 inches) and C (49 to 60 inches) horizons sampled for Bureau of Public Roads. Roots abundant to a depth of 18 or 20 inches.

SOIL Onaway loam SOIL Nos. S59W18-44-2 LOCATION Outagamie County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 11821-11830 April 1966

General Methods: 1A, 1E1a, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm)											Clay		Coarse fragments 2A2			
		Total		Sand					Silt				Clay (2-0.1)	Non-Carbonate (2-0.1)	> 2 (<19) Pct	2-19 Pct	19-76 Pct	
		Sand (2-0.05)	Silt (0.05-0.002)	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)	Carbonate						Non-Carbonate
Pct. of < 2 mm																		
0-5	A1	57.6	33.7	8.7	0.4	5.4	13.8	27.0	11.0	18.0	15.7	41.3	46.6					
5-7 1/2	Al-B1r	66.5	27.7	5.8	3.4	7.9	15.6	28.5	11.1	14.3	13.4	37.9	55.4					
7 1/2-11	B1r	68.0	26.1	5.9	1.8	6.8	15.4	31.0	13.0	13.5	12.6	40.4	55.0					
11-13	A2m	64.1	29.5	6.4	1.2	5.4	12.3	30.2	15.0	13.5	16.0	42.9	49.1					
13-16 1/2	IA2m-Bd1	49.1	30.4	20.5	0.8	4.3	9.1	22.2	12.7	12.3	18.1	36.0	36.4					
16 1/2-23	II2Bt2	44.2	26.6	29.2	1.5	4.1	7.9	19.4	11.3	11.2	15.4	32.3	32.9					
23-26	II2Bt3	50.4	27.7	21.9	1.4a	4.4b	8.6b	22.0b	14.0b	12.3	15.4	37.6	36.4					
26-31	IIc1	51.6	30.7	17.7	3.2a	4.7b	7.9b	21.1b	14.7b	14.4	16.3	40.1	36.9					
31-45	IIc2	51.7	32.7	15.6	4.2a	5.4b	8.0b	20.3b	13.8b	14.1	18.6	38.3	37.9					
45-57	IIc3	51.7	32.4	15.9	4.7a	6.4b	8.4b	19.9b	12.3b	13.6	18.8	36.3	39.4					

Depth (in.)	6A1a Organic carbon	6E1a Nitrogen	C/N	6E1a Carbonate as CaCO ₃	6C1a Ext. Iron as Fe ₂ O ₃ Pct.	Bulk density			Water content				pH	8C1a (1:1)	
						4A1a Field State	4A1c 30-cm.	4A1h Oven- Dry	4B4 Field- State	4B3 30-cm.	4B2b 1/10 Bar	4B2 15- Bar			
						g/cc	g/cc	g/cc	Pct.	Pct.	Pct.	Pct.			
0-5	4.39	0.246	18	Tr(s)	0.9										
5-7 1/2	1.56	0.103	15		1.0										6.2
7 1/2-11	0.38	0.032	12		1.0	1.70	1.68	1.67	7.3	12.0	24.5	4.1			6.0
11-13	0.19	0.017	11		1.0						10.7	1.7			6.2
13-16 1/2	0.35	0.025	14		1.9	1.70	1.67	1.70	12.8	15.4		6.7			5.9
16 1/2-23	0.44	0.040	11	-(s)	2.3	1.54	1.49	1.55	11.2	14.5		10.7			7.0
23-26	0.38	0.032	12	9	1.7							8.5			8.0
26-31	0.20			17	1.2							6.6			8.1
31-45	0.08			27	0.8	1.95	1.94	1.94	7.8	12.2		5.5			8.2
45-57	0.06			28	0.7							5.5			8.3

Depth (in.)	Extractable bases				5B1a Sum	6M1a Ext. Acidity	Cat. Cap. 5A3a Sum	Ech. 5A1a NH ₄ OAc	8D3 Ca/Mg	Base saturation d	
	6N2b Ca	6O2b Mg	6P2a Na	6Q2a K						5C3 Sum	5C1 NH ₄ OAc
	meq/100 g									Cations	
0-5	12.0	2.9	Tr.	0.3	15.2	6.2	21.4	14.6	4.1	71	104
5-7 1/2	4.6	1.1	Tr.	0.2	5.9	5.0	10.9	7.3	4.2	54	81
7 1/2-11	1.9	0.5	Tr.	0.2	2.6	3.5	6.1	3.5	3.8	43	74
11-13	1.4	0.4	Tr.	0.2	2.0	2.1	4.1	2.5	3.5	49	80
13-16 1/2	4.8	2.4	Tr.	0.3	7.5	4.8	12.3	8.9	2.0	61	84
16 1/2-23	8.8	4.8	Tr.	0.2	13.8	3.8	17.6	13.1	1.8	78	105
23-26			Tr.	0.2				10.3			
26-31			Tr.	0.1				7.6			
31-45			Tr.	0.1				4.9			
45-57			0.1	0.1				4.4			

Depth (in.)	Ratio to Clay 8D1		
	NH ₄ OAc CEC	Ext. Iron	15-Bar Water
0-5	1.68	0.10	1.14
5-7 1/2	1.26	0.17	0.71
7 1/2-11	0.59	0.17	0.36
11-13	0.39	0.16	0.26
13-16 1/2	0.43	0.09	0.33
16 1/2-23	0.45	0.08	0.37
23-26	0.47	0.08	0.39
26-31	0.43	0.07	0.37
31-45	0.31	0.05	0.35
45-57	0.28	0.04	0.34

a. > 50% carbonate.
b. 5-25% carbonate.
c. Carbonatic fragments; 5-10 percent noncarbonate residue in > 2-mm. material.
d. One or more horizons has relatively low cation exchange capacity. As cation exchange capacity decreases, the relative error of base saturation increases. Trace quantities are omitted from the sum of bases. For very low CEC values, this omission contributes significantly to the relative error of base saturation.

Note: See descriptions for mineralogy.

Soil type: Onaway loam

Soil Nos.: S59W1s-44-2

Location: Outagamie County, Wisconsin; northeast quarter of southeast quarter of Section 1, T24N, R17E; Bibolz woodlot about four miles northwest of the city of Seymour; photo BIE-1H-77 (1953).

Vegetation and use: Hard maple, white birch, beech and ironwood woodlot; pastured.

Slope and land form: Gently undulating complex slopes of 2 to 5 percent; Late Wisconsin (Valders) ground moraine.

Drainage and permeability: Well drained; surface runoff and internal drainage are medium; permeability is moderate to moderately slow.

Parent material: Calcareous glacial till.

Collected by: J. S. Allen, William DeYoung, and G. B. Lee, September 2, 1959.

Described by: E. G. Link.

Horizon and

Lincoln

Lab. Number

Aoo	1/2 to 0 inch. Recent deposition of leaves, twigs, and grasses.
A1 11821	0 to 5 inches. Very dark gray (10YR 3/1) to dark reddish brown (5YR 2/2) loam with moderate medium granular structure; very friable when moist; slightly acid.
Al-B1r 11822	5 to 7 1/2 inches. Dark reddish brown (5YR 3/2) loam with moderate medium granular structure; very friable when moist; slightly acid.
B1r 11823	7 1/2 to 11 inches. Dark brown (7.5YR 4/2, 5YR 4/2 crushed) sandy loam with weak medium to coarse subangular blocky structure; friable when moist; medium acid.
A2m 11824	11 to 13 inches. Dark reddish gray (5YR 4/2, 10YR 5/3 crushed) sandy loam that is massive in place but breaks to weak medium subangular blocky structure; some evidence of iron cementation at upper boundary; firm when moist; medium acid.
IIA2m-Bt1 11825	13 to 16 1/2 inches. Reddish brown (5YR 4/3, 7.5YR 4/4 to 5/4 crushed) clay loam with weak medium to coarse subangular blocky structure; friable when moist; medium acid; about 35 percent of the horizon consists of pockets of dark brown (7.5YR 4/2) sandy loam that has weak medium prismatic structure; friable when moist; medium acid.
IIBt2 11826	16 1/2 to 23 inches. Dark reddish brown (5YR 3/4, 5YR 4/3 crushed) clay loam with weak medium prismatic structure that breaks to moderate medium subangular blocky structure; firm when moist; neutral in reaction.
IIBt3 11827	23 to 26 inches. Reddish brown (5YR 4/4 to 4/3, 5YR 4/4 crushed) clay loam with weak medium prismatic structure that breaks to weak medium subangular blocky structure; firm when moist; dark reddish brown (5YR 3/2) coatings and reddish yellow (7.5YR 6/6) colors around weathered dolomitic gravels; vesicular; mildly alkaline.
IIC1 11828	26 to 31 inches. Reddish brown (5YR 5/4 to 4/4) clay loam with very weak medium subangular blocky structure; firm when moist; numerous gravel of various types, mostly less than 20-mm.; effervescence with HCl.
IIC2 11829	31 to 45 inches. Reddish brown (5YR 5/4 to 5/3) sandy clay loam to clay loam with very weak medium subangular blocky structure; firm when moist; light brown (7.5YR 6/4) soft segregated lime; violent effervescence with HCl.
IIC3 11830	45 to 57 inches. Reddish brown (5YR 5/4) sandy clay loam to clay loam with very weak medium subangular blocky structure; firm when moist; numerous gravel of various types, most less than 20-mm. size; violent effervescence with HCl.

Remarks: Horizons B (16 1/2 to 26 inches) and C (31 to 57 inches) sampled for Bureau of Public Roads. Colors given are for moist soil. Reaction determined by Hellige-Truog pH kit. Roots plentiful to a depth of 24 inches.

Mineralogy (Methods 7B1, 7A): The B1r horizon contains about 40 percent quartz and the carbonate-free material of the IIC2 horizon contains about 50 percent quartz. The dolomite-to-calcite ratio, determined by X-ray diffraction, is about 2:1 in the IIC3 horizon and in the carbonate fringe, IIB3t, although the amount of both is less in the fringe zone. A few handpicked coarse to very coarse sand particles have a dolomite-to-calcite ratio of 8:1. A high-magnesium calcite is apparent in the IIB3t.

SOIL *Oshkosh silt loam SOIL Nos. S59W1s-70-2 LOCATION Winnebago County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 11850-11858 April 1966
General Methods: 1A, 1B1a, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm)											Clay		Coarse fragments			
		Total				Sand				Silt			3A1a Carbonate	Non-Carbonate	> 2 (<19) Pct	2-19 Pct	19-76 Pct of < 76mm	
		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)
0-3 1/2	A1	4.8	58.0	37.2	0.1a	1.4a	1.3a	1.4a	0.6a	6.0	52.0	7.2	4.2					
3 1/2-6 1/2	A2-A3	4.7	57.3	38.0	0.2a	1.5a	1.3a	1.2a	0.5a	5.7	51.6	6.7	4.2					
6 1/2-8	TTR1	2.7	45.1	52.2	0.1a	0.6a	0.7a	0.9a	0.4a	3.9	41.2	4.7	2.3					
8-15	1B1	1.1	32.8	66.1	-	0.1a	0.2a	0.4a	0.4a	0.3	32.5	0.9	0.7					
15-19	1B2	0.8	42.8	56.4	-	0.1a	0.2a	0.4a	0.1a	-	42.8	0.3	0.7					
19-23	1C1	0.7	37.1	62.2	0.1b	0.1b	0.1b	0.2b	0.2b	-	37.1	0.3	0.5	16	46			
23-35	1C2	0.1	24.5	75.4	-	-	-	-	0.1	0.3	24.2	0.4	-	25	50			
35-51	1C3	0.1	24.8	75.1	-	-	-	-	0.1	0.2	24.6	0.3	-	23	52			
51-62	1C4	0.2	32.3	67.5	-	-	-	-	0.2a	-	32.3	0.2	-	20	48			

Depth (in.)	6A1a Organic carbon Pct	6B1a Nitrogen Pct	C/N	6E1a Carbonate as CaCO3 Pct	6C1a Iron as Fe2O3 Pct	Bulk density			4M COLE c	Water content			pH	8C1a (1:1)
						4A1a Field-State g/cc	4A1b 30-cm. g/cc	4A1h Oven-Dry g/cc		4B1 Field-State Pct	4B3 30-cm. Pct	4B2 15-Bar Pct		
0-3 1/2	5.55	0.346	16		Tr(s)	1.8								7.0
3 1/2-6 1/2	1.73	0.134	13		2.0									6.3
6 1/2-8	0.94	0.077	12		2.2									5.2
8-15	0.60	0.052	12		2.2									6.0
15-19	0.45	0.039	12		2	1.9								7.5
19-23	0.30	0.026	12		2.9	1.4								8.0
23-35	0.24	0.018			34	1.3								8.1
35-51	0.20				33	1.5	1.77	1.59	1.75	0.032	15.7	24.8		8.3
51-62	0.24				31	1.6								8.3

Depth (in.)	Extractable bases				6H1a Acidity	Cat. Exch. Cap.		Cat. Exch. Cap. 5A1a	8D3 Ca/Mg	Base saturation		
	6N2b Ca	6O2b Mg	6P2a Na	6Q2a K		Sum	5A3a Sum			5A1a NH4OAc	5C3 Sum	5C1 NH4OAc
0-3 1/2	21.6	7.1	0.1	0.6	29.4	6.1	35.5	24.4		3.0	83	120
3 1/2-6 1/2	9.2	4.0	0.1	0.3	13.6	7.2	20.8	15.8		2.3	65	86
6 1/2-8	9.0	5.5	0.1	0.3	14.9	10.9	25.8	20.1		1.6	58	74
8-15	19.0	11.7	0.2	0.6	31.5	7.4	38.9	32.0		1.6	81	98
15-19			0.2	0.5				27.6				
19-23			0.1	0.3				18.8				
23-35			0.2	0.4				17.4				
35-51			0.3	0.4				16.0				
51-62			0.5	0.4				14.5				

Depth (in.)	Ratio to Clay			
	8D1 NH4OAc CEC	8D2 f NH4OAc	8D1 Ext. Iron	8D1 15- Bar Water
0-3 1/2	0.66	0.66	0.05	0.54
3 1/2-6 1/2	0.42	0.42	0.05	0.29
6 1/2-8	0.38	0.38	0.04	0.28
8-15	0.48	0.48	0.03	0.34
15-19	0.49	0.49	0.03	0.38
19-23	0.30	0.41	0.02	0.31
23-35	0.23	0.35	0.02	0.28
35-51	0.21	0.31	0.02	0.29
51-62	0.21	0.30	0.02	0.32

- a. > 50% Fe-Mn nodules.
- b. > 50% Fe-Mn nodules. < 5% carbonate.
- c. Coefficient of Linear Extensibility.
- d. Analysis after carbonate removal (See Method 1B3).
- e. Calculated for noncarbonate sample.
- f. Noncarbonate clay.

Soil type: *Oshkosh silt loam

Soil Nos.: S59Wis-70-2

Location: Winnebago County, Wisconsin; northwest quarter of southwest quarter of Section 33, T20N, R17E; west center of Galligan woodlot across U. S. Highway 41 from wayside park; photo AIW-2B-105 (1941).

Vegetation and use: Hickory, maple, elm and oak woodlot.

Slope and land form: Level to nearly level, 0 to 1 percent slopes; late Wisconsin (Valders) lacustrine plain.

Drainage and permeability: Moderately well drained; surface runoff and internal drainage are slow; permeability is moderately slow.

Parent material: Reddish brown calcareous glaciolacustrine clay; may have a thin silt mantle.

Collected by: J. S. Allen, William DeYoung, and G. E. Lee, September 4, 1959.

Described by: E. G. Link.

Horizon and

Lincoln

Lab. Number

Aoo	1/2 to 0 inch. Forest litter.
A1 11850	0 to 3½ inches. Dark gray (10YR 4/1) to very dark gray (10YR 3/1) silt loam with weak coarse to medium granular structure; slightly hard when dry; extensive mixing by earthworms; moderately alkaline.
A2-A3 11851	3½ to 6½ inches. Brown (7.5YR 5/2) silt loam with weak medium to thick platy structure; peds thicker with depth in horizon; slightly hard when dry; strongly acid.
I1B1 11852	6½ to 8 inches. Reddish brown (5YR 4/3, 5YR 6/3 crushed) clay with moderate coarse to medium subangular blocky structure; hard when dry; pinkish gray (7.5YR 7/2 dry) coatings on individual peds; very strongly acid.
I1B21 11853	8 to 15 inches. Reddish brown (5YR 4/3, 5YR 4/3 crushed) clay with weak coarse prismatic structure that breaks to moderate to strong medium angular blocky structure; very firm when moist; complete clay skins; slightly acid.
I1B22 11854	15 to 19 inches. Reddish brown (5YR 4/3) to dark reddish gray (5YR 4/2, 5YR 4/3 crushed) clay with weak medium prismatic structure that breaks to moderate to strong medium angular blocky structure; very firm when moist; complete clay skins; neutral reaction.
I1C1 11855	19 to 23 inches. Reddish brown (5YR 5/3) clay with weak to moderate medium angular blocky structure; very firm when moist; some soft lime segregation; strong effervescence with HCl.
I1C2 11856	23 to 35 inches. Reddish brown (5YR 5/3) clay with moderate coarse prismatic structure that breaks to weak coarse angular blocky structure; firm when moist; maximum soft lime segregation; dark coatings along root channels; violent effervescence with HCl.
I1C3 11857	35 to 51 inches. Reddish brown (5YR 5/3) clay with moderate coarse prismatic structure that breaks to weak coarse angular blocky structure; firm when moist; common medium faint yellowish red (5YR 5/6) mottles; light reddish brown (5YR 6/3, 5YR 8/3 dry) segregated lime along horizontal cleavage planes; violent effervescence with HCl.
I1C4 11858	51 to 62 inches. Reddish brown (5YR 5/3) clay with moderate coarse prismatic structure that breaks to weak coarse angular blocky structure; firm when moist; common medium faint yellowish red (5YR 5/6) mottles; light reddish brown (5YR 6/3, 5YR 8/3 dry) segregated lime along vertical cleavage planes; violent effervescence with HCl.

Remarks: Unless otherwise indicated colors are for moist soil. Reaction determined by Hellige-Truog pH kit. B (6½ to 19 inches) and C (23 to 51 inches) horizons sampled for Bureau of Public Roads. Roots plentiful to a depth of 18 inches.

SOIL *Oshkosh silt loam SOIL Nos. 8601s-70-1 LOCATION Winnebago County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 13552-13561 April 1966

General Methods: 1A, 1B1a, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm)											3A1		Clay		Coarse fragments			
		Total			Sand					Silt			Int. III	Int. II	(2-0.1)	3A1a Carbonate	Non-Carbonate	2A2 > 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	0.02-0.002	0.2-0.02								
Pct of < 2 mm																				
0-3	A1	5.6	62.7	31.7	0.3b	2.1b	1.3b	1.3b	0.6b	6.0	56.7	7.1	5.0				32	-		
3-5 1/2	A2	6.6	62.6	30.8	0.5b	2.6b	1.5b	1.5b	0.5b	5.8	56.8	7.0	6.1				31	-		
5 1/2-7 1/2	A1	3.8	47.5	48.7	0.1b	0.9b	1.0b	1.3b	0.5b	2.7	44.8	3.8	3.3				49	-		
7 1/2-14	IIB2	1.0	33.3	65.7	-	0.2b	0.2b	0.4b	0.2b	0.4	32.9	0.8	0.8				66	-		
14-21	IIB3	0.4	30.4	69.2	-	-	-	-	0.4c	0.8	29.6	1.2	-			14	55	-		
21-27	IIC1	0.2	28.6	71.2	-	-	-	-	0.2c	0.2	28.4	0.4	-			22	49	-		
27-40	IIC21	0.1	28.2	71.7	-	-	-	-	0.1c	0.4	27.8	0.5	-			24	48	-		
40-50	IIC22	0.1	28.5	71.4	-	-	-	-	0.1c	0.3	28.2	0.4	-			23	48	-		
50-60	IIC23	0.1	25.2	74.7	-	-	-	-	0.1c	0.3	24.9	0.4	-			21	54	-		
3-5 1/2	a	7.6	70.2	22.2	1.2b	3.8b	1.2b	1.0b	0.4b	9.3	60.9	10.1	7.2				22	-		

Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6E1a Carbonate as CaCO3	6E2a Ext. Iron as Fe2O3	Bulk density			4D1 COLE	Water content			pH	8C1a (1)	
						4A1a Field State	4A1c 30-cm.	4A1h Oven-Dry		4B4 Field State	4B3 30-cm	4B1b 1/3-Bar			4B2 15-Bar
0-3	7.30	0.435	17	Tr (s)	1.9										6.5
3-5 1/2	1.44	0.112	13		2.4	1.64	1.61	1.65	0.007	16.3	20.9	22.3	18.4	0.20	6.3
5 1/2-7 1/2	0.88	0.074	12		2.4								15.4		5.7
7 1/2-14	0.62	0.051	12	(s)	2.3	1.50	1.48	1.72	0.052	23.6	24.4	29.1	20.1	0.13	6.7
14-21	0.36	0.030	12		1.5	1.65d	1.52	1.72	0.044	19.8	25.1	28.1	19.7	0.13	7.8
21-27	0.26	0.020	13		1.3								19.5		8.0
27-40	0.21				34	1.72	1.59	1.78	0.040	19.9	24.7	27.3	20.3	0.11	8.2
40-50	0.19				34								21.6		8.2
50-60	0.18				30	1.65	1.54	1.74	0.044	22.8	27.2	31.5	22.7	0.14	8.2
3-5 1/2	0.56	0.048	12		2.6								5.8		6.3

Depth (in.)	Extractable bases				6H1a Ext. Acidity	Cat. Exch. Cap.		Cat. Exch. Cap.		8D3 Ca/Mg	Base saturation		
	6N2b Ca	6O2b Mg	6P2a Na	6Q2a K		5A3a Sum Cations	5A1a NH4OAc	f NH4OAc	g		5C3 Sum Cations	5C1 NH4OAc	
0-3	22.7	8.0	Tr.	0.6	31.3	9.0	40.3	29.5			2.8	78	106
3-5 1/2	8.2	4.4	Tr.	0.3	12.9	6.8	19.7	15.8			1.9	65	82
5 1/2-7 1/2	9.4	7.9	0.1	0.4	17.8	8.4	26.2	20.9			1.2	68	85
7 1/2-14	15.4	13.6	0.1	0.5	29.6	4.6	34.2	28.3			1.1	86	104
14-21			0.1	0.4				20.0					
21-27			0.2	0.4				17.0					
27-40			0.3	0.3				15.0					
40-50			0.5	0.4				15.3					
50-60			0.6	0.4				15.8					
3-5 1/2	3.4	2.0	Tr.	0.1	5.5	5.2	10.7	9.2			1.7	51	60

Depth (in.)	Ratios to Clay			
	8D1 NH4OAc CEC	8D2 h NH4OAc CEC	8D1 Ext. Iron	8D1 15-Bar Water
0-3	0.93	0.93	0.06	0.58
3-5 1/2	0.51	0.51	0.08	0.33
5 1/2-7 1/2	0.43	0.43	0.05	0.32
7 1/2-14	0.43	0.43	0.04	0.30
14-21	0.29	0.36	0.02	0.28
21-27	0.24	0.35	0.02	0.27
27-40	0.21	0.31	0.02	0.28
40-50	0.21	0.32	0.02	0.30
50-60	0.21	0.29	0.02	0.30
3-5 1/2	0.41	0.41	0.12	0.26

- a. See Remarks Section of description.
 - b. > 50% Fe-Mn.
 - c. > 50% Fe-Mn. 5-25% carbonate.
 - d. Range is 0.14 g/cc.
 - e. Coefficient of Linear Extensibility.
 - f. Analysis after carbonate removal (See Method 1B3).
 - g. Calculated for noncarbonate sample.
 - h. Noncarbonate clay.
- Note: See descriptions for mineralogy.

Soil type: *Oshkosh silt loam

Soil Nos.: S60Wis-70-1

Location: Winnebago County, Wisconsin; northeast quarter of southwest quarter of Section 9, T20N, R17E; woodlot about two miles northwest of the city of Neenah; photo AIW-2B-109 (1941).

Vegetation and use: White oak, elm, hickory and basswood woodlot; grazed at present time.

Slope and land form: Level to nearly level, 0 to 1 percent; Late Wisconsin (Valders) lacustrine plain.

Drainage and permeability: Moderately well drained; surface runoff and internal drainage are slow; permeability is moderately slow.

Parent material: Reddish brown calcareous glaciolacustrine clay; may have a thin silt mantle.

Collected by: R. B. Grossman, William DeYoung, and G. B. Lee, July 18, 1960.

Described by: William DeYoung.

Horizon and

Lincoln

Lab. Number

Aoo	A very thin layer of leaf litter and other organic debris; very little decomposed material.
A1 13552	0 to 3 inches. Very dark gray (10YR 3/1) heavy silt loam; moderate medium granular structure; friable when moist; neutral; abrupt wavy boundary.
A2 13553	3 to 5½ inches. Dark gray (10YR 4/1) to reddish gray (5YR 5/2) silt loam with moderate medium platy structure; firm when moist; slightly acid; abrupt wavy boundary.
B1 13554	5½ to 7½ inches. Dark reddish gray (5YR 4/2) heavy silt loam with strong medium subangular blocky structure; firm when moist; pinkish gray (5YR 6/2) silica coatings; strongly acid; clear boundary.
IIB2 13555	7½ to 14 inches. Reddish brown (2.5YR 4/4) to dark reddish brown (5YR 3/4) silty clay to clay with strong medium angular blocky structure; very firm when moist; slightly acid; clear boundary.
IIB3 13556	14 to 21 inches. Reddish brown (2.5YR 5/4 to 4/4) clay with moderate coarse prismatic structure that breaks to strong medium angular blocky structure; very firm when moist; slight effervescence along old root channels; clear to gradual boundary.
IIC1 13557	21 to 27 inches. Reddish brown (2.5YR 5/4 to 5YR 5/3) clay with moderate coarse prismatic structure that breaks to moderate medium angular blocky structure; strong effervescence with HCl; gradual boundary.
IIC21 13558	27 to 40 inches. Reddish brown (2.5YR 5/4 to 5YR 5/3) clay that appears to be massive in place but breaks to moderate coarse prismatic structure; pinkish gray (5YR 7/2) soft segregated lime along cleavage faces; violent effervescence with HCl.
IIC22 13559	40 to 50 inches. Reddish brown (2.5YR 5/4 to 5YR 5/3) silty clay to clay that appears to be massive in place but breaks to moderate coarse prismatic structure; pinkish gray (5YR 7/2) soft segregated lime along cleavage faces; violent effervescence with HCl.
IIC23 13560	50 to 60 inches. This layer similar to above horizon, but sampled separately.

Remarks: All colors are for moist soil conditions. Reaction determined by Hellige-Truog pH kit. B (5½ to 21 inches) and C (27 to 60 inches) horizons sampled for Bureau of Public Roads. Roots plentiful to 6 inches. Surface stone absent in general area. A hand-picked sample of the A2 horizon (Lab. No. 13561), free of macroscopic inclusions of A1 material, was taken from the pit perimeter where the A2 expression is strongest.

Micromorphology (Method 4E1): The IIB2 horizon shows a lattice-work of elongated zones of preferred clay orientation on a scale of 0.5 to 2.0 mm. Portions of these zones abruptly bound macro-planar structural surfaces and may be considered clay films. Definite clay film coatings are less common than in the argillic horizon of Kewaunee (Podzolized) S60Wis-36-1, although they are present. An occasional body of strongly oriented clay occurs away from the macro voids and may be a clay film incorporated within the ped. A subordinate portion of the matrix away from the macro voids shows weak clay orientation. These parts may show strong orientation in another plane. The matrix of the C horizon appears extremely uniform. Fine-grain carbonate is abundant and may mask the pattern of oriented silicate clay. Coarse clay and fine silt particles of iron oxide(?) are common.

SOIL Otterholt silt loam SOIL Nos. 47Wis-3-16 LOCATION Barron County, Wisconsin
SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 471434-471439

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1												3B2 Cm	Coarse fragments 3B1		
		Total			Sand					Silt					2A2 ≥ 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	
0-3	A1	7.4	78.4	14.2	0.1	0.6	1.1	1.7	3.9	38.5	39.9	43.4	3.5	0			
3-11	A2	8.3	82.0	9.7	0.1	0.6	1.2	1.4	5.0	44.8	37.2	50.4	3.3	0			
11-14	A2&B1	7.2	80.7	12.1	-	0.4	0.8	1.1	4.9	45.2	35.5	50.6	2.3	0			
14-26	B2t	11.3	67.9	20.8	-	0.7	1.6	1.8	7.2	41.6	26.3	49.6	4.1	0			
26-42	C1	16.0	67.9	16.1	0.1	2.3	4.3	3.7	5.6	45.8	22.1	52.8	10.4	0			
42+	IIC2	72.2	17.6	10.2	2.8	16.2	22.1	24.5	6.6	9.8	7.8	27.6	65.6	14			

Depth (in.)	5A1a Organic carbon	Nitrogen	C/N	Carbonate as CaCO ₃	Ext iron as Fe	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH			
						4A1e 1/2 bar	4A1h Oven dry	g/cc		4B1c 1/2 bar	4B2 15 bar	Pct.		Pct.	Pct.	8C1c (1 l) KCl	8C1a (1 l) H ₂ O
						Pct	Pct	Pct		Pct	Pct	Pct		Pct	Pct	Pct	Pct
0-3	7.09														5.6		
3-11	0.94														4.9		
11-14	0.31														4.9		
14-26	0.23														4.7		
26-42	0.19														4.8		
42+	0.06														5.2		

Depth (in.)	Extractable bases 5B1a					6H2a Ext acidity	CEC		6G1d Ext. Al	Ratios to clay			8D3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	Ext. Al		CEC Sum	Ext. iron	15 bar water		5C3 Sum cations Pct	5C1 NH ₄ OAc Pct.
	meq/100 g														
0-3	19.2	4.2	0.3	0.8		9.0		33.5					73		
3-11	0.2	0.6	-	0.1		8.6		9.5					9		
11-14	1.7	0.7	tr.	0.2		7.1		9.7					27		
14-26	0.6	0.4	tr.	tr.		10.7		11.7					9		
26-42	4.0	1.7	0.1	0.1		8.6		14.5					41		
42+	2.5	1.1	0.1	tr.		3.4		7.1					52		

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt	Chi	Vm	Mi	Int	Qtz	Kf	Gibbsite
	7A2 X ray				7A3			

Mt. = Montmorillonite, Chi = 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 type: Otterholt silt loam

Soil No.: 47Wis-3-16

Location: Barron County, Wisconsin. East side NE 1/4 of NE 1/4 section 4, township 33N., range 12W

Horizon and
Beltsville,
Lab. Nos.

A1 471434	0 to 3 inches. Very dark brown granular silt loam.
A2 471435	3 to 11 inches. Grayish brown platy silt loam.
A2 & B1 471436	11 to 14 inches. Brown platy to blocky silt loam.
B2t 471437	14 to 26 inches. Yellowish brown blocky silty clay loam.
C1 471438	26 to 42 inches. Yellowish brown massive silt loam.
IIC2 471439	42+ inches. Reddish brown massive sandy clay loam glacial till.

SOIL Otterholt silt loam SOIL Nos. S60W1a-47-1 LOCATION Pierce County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 13625-13631 May 1965

Depth (in.)	Horizon	1B1a Size class and particle diameter (mm) 3A1											2A2 coarse fragments					
		Total				Sand				Silt			> 2	2 - 19	3B2 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)	Int III (0.05-0.02)	Int II (0.02-0.002)	(2-0.1)						
Pct. of < 2 mm												Pct.	Pct. of < 76 mm					
0-6	Ap1	8.3	79.2	12.5	0.1a	0.3a	0.4a	0.9	6.6	43.8	35.4	58.8	1.7			Tr.	Tr.	-
6-9	Ap2	7.3	79.1	13.6	-	0.2a	0.2a	0.5a	6.4	44.8	34.3	51.5	0.9			Tr.	Tr.	-
9-13	Ap	6.6	77.4	16.0	-	0.1a	0.2a	0.4a	5.9	41.4	36.0	47.5	0.7			Tr.	Tr.	-
13-19	B1	7.8	68.8	23.4	-	-	0.2a	0.4a	7.2	41.7	27.1	49.1	0.6			Tr.	Tr.	-
19-27	B2	9.0	68.5	22.5	-	0.1a	0.2a	0.5a	8.2	45.2	23.3	53.7	0.8			Tr.	Tr.	-
27-36	B3	11.0	68.4	20.6	0.2	0.6	0.7	1.2	8.3	46.8	21.6	55.7	2.7			Tr.	Tr.	-
36-48	IIC	62.9	22.7	14.4	2.6	10.2	14.2	25.5	10.4	11.7	11.0	32.9	52.5			7	7	-

Depth (in.)	6A1a Organic carbon		6B1a Nitrogen		C/N	6B1c Carbonate as CaCO ₃	6C1a Bulk density			4M COLE	4M Water Content				pH	8C1a (1:1)
	Pct.	Pct.	Pct.	Pct.			4A1a Field-State	4A1c 30-Cm.	4A1h Oven-Dry		4B4 Field-State	4B3 30-Cm.	4B1b 1/3-Bar	4B2 15-Bar		
0-6	2.14	0.204	10			Tr.	0.8	1.0	1.0							6.3
6-9	1.59	0.155	10			-	1.0	1.0	1.0	0.007	14.7	23.6	20.0	6.6	0.20	6.1
9-13	0.32	0.044	7				1.51	1.49	1.52	0.007	14.7	23.6	20.0	6.6	0.20	5.3
13-19	0.22	0.030					1.4	1.53	1.49	0.016	11.2	23.2	20.6	9.7	0.16	4.7
19-27	0.21	0.027					1.5	1.57	1.50	0.014	8.8	23.6	22.4	9.8	0.19	4.8
27-36	0.17						1.6	1.52	1.48	0.017	14.5	23.9		9.5		4.8
36-48	0.05						1.5	1.98	1.93	0.016	5.0	10.4		5.0		4.7

Depth (in.)	Extractable bases				5B1a Sum	6B1a Rct. Acidity	6C1a Cat. Mech. Cap.		6C1a Rct. Al	4B3 Ca/Mg	Base saturation			
	6B2b Ca	6B2c Mg	6B2a Na	6C2a K			5A3a Sum	5A1a Sum			5C3 Pct.	5C1 Pct.		
0-6	10.7	3.3	0.1	0.2	14.3	5.4	19.7	13.8	-			3.2	72	104
6-9	9.0	2.3	0.1	0.2	11.6	6.9	18.5	12.4	Tr.			3.9	63	94
9-13	4.9	1.2	0.1	0.1	6.3	7.5	13.8	9.4	1.2			4.1	46	67
13-19	5.9	2.2	0.1	0.2	8.4	11.2	19.6	13.9	4.1			2.7	43	60
19-27	5.9	2.5	0.1	0.2	8.7	11.9	20.6	14.3	4.5			2.4	42	61
27-36	5.1	2.2	0.1	0.2	7.6	11.4	19.0	13.9	4.5			2.3	40	55
36-48	3.7	1.7	0.1	0.1	5.6	4.7	10.3	7.7	1.5			2.2	54	73

Depth (in.)	Ratios to Clay 5B1			a.	b.
	ME OAc CEC	Rct. Iron	15-Bar Water		
0-6	1.10	0.06	0.65		
6-9	0.91	0.07	0.53		
9-13	0.59	0.06	0.41		
13-19	0.59	0.06	0.41		
19-27	0.64	0.07	0.44		
27-36	0.67	0.08	0.46		
36-48	0.53	0.10	0.35		

a. > 50% Fe-Mn nodules.
b. Coefficient of Linear Extensibility.
Note: See descriptions for mineralogy.

Soil type: Otterholt silt loam

Soil Nos.: S60Wis-47-1

Location: Pierce County, Wisconsin; southeast quarter, northwest quarter, Section 10, T27N, R15W, Spring Lake Twp.

Position and relief: Gently rolling ground moraine; 3 to 5 percent convex slope; aspect south.

Drainage and permeability: Well drained; moderately permeable; ground water beyond depth of observed profile.

Parent material: Loess over loam to sandy clay loam glacial till.

Vegetation: Elm trees; corn and clover.

Erosion: Slight.

Stoniness: None.

Root distribution: Many fibrous roots to 10 inches; fewer below.

Sampled by: Paul H. Carroll, William DeYoung, Robert Grossman and Jerry Post, July 26, 1960.

Described by: Paul H. Carroll.

Horizon and

Lincoln

Lab. Number

Ap1 13625	0 to 6 inches. Very dark grayish brown (10YR 3/2) silt loam with weak fine subangular blocky structure; friable; many fine fibrous roots; neutral reaction; abrupt smooth boundary.
Ap2 13626	6 to 9 inches. Very dark grayish brown (10YR 3/2) silt loam with weak fine subangular blocky structure showing weak evidence of thin platiness; friable; vesicular; many fine fibrous roots; neutral reaction; abrupt smooth boundary.
A2 13627	9 to 13 inches. Dark grayish brown (10YR 4/2) silt loam with weak thin platy structure; thin continuous pale brown (10YR 6/3) bleached silt coats on surfaces of individual plates and along weak vertical cleavage planes; friable; vesicular; fine fibrous roots common; medium acid; clear smooth boundary.
B1 13628	13 to 19 inches. Dark brown (10YR 4/3) silt loam with a weak medium platy structure that breaks, under disturbance, to weak fine subangular blocks; thin continuous bleached silt coats on ped faces and few very thin (1- to 2-mm.) pale brown (10YR 6/3) tongues or veins of bleached silt along vertical cleavage planes; friable; vesicular; few fibrous and some coarse roots; strongly acid; clear smooth boundary.
B2 13629	19 to 27 inches. Dark brown (10YR 4/3) heavy silt loam with moderate medium subangular blocky structure; few thin (1-mm.) veins of bleached silt along major vertical cleavage planes; thin patchy low-contrast clay films on ped faces apart from the elutriated surfaces of the primary vertical cleavages; firm; few coarse roots; very strongly acid; clear smooth boundary.
B3 13630	27 to 36 inches. Dark brown (10YR 4/3) silt loam with weak coarse to medium subangular blocky structure; few thin patchy clay films (less than in the horizon above) along vertical cleavage planes; friable; few coarse roots; strongly acid; abrupt smooth boundary.
IIC 13631	36 to 48 inches. Dark brown (7.5YR 4/4) loam to sandy clay loam glacial till of Cary age and Patrician source; weak coarse platy structure; friable to firm; strongly acid. (This material extends from few to many feet deep.)

Remarks: Unless otherwise indicated, all colors shown in the soil profile description are moist colors.

MINERALOGY: Very fine sand similar in mineralogy to that of Otterholt, profile S60Wis-55-1.

SOIL Otterholt silt loam SOIL Nos. S60W1a-47-2 LOCATION Pierce County, Wisconsin
SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 13639-13648 May 1965

Depth (in.)	Horizon	1B1a Size class and particle diameter (mm)											2A1		2A2 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				
0-3	A1	9.7	75.9	14.4	0.2a	1.0b	0.8b	2.1b	5.6	38.9	37.0	45.5	4.1	Tr.	Tr.	-			
3-7	A21	7.0	82.2	10.8	0.1a	0.2b	0.3b	0.7b	5.7	44.0	38.2	50.0	1.3	Tr.	Tr.	-			
7-10	A22	8.0	82.9	9.1	0.1c	0.4c	0.5c	0.9c	6.1	47.1	35.8	53.6	1.9	Tr.	Tr.	-			
10-15	A3	8.1	78.6	13.3	-	0.2c	0.3c	0.7c	6.9	47.1	31.5	54.3	1.2	Tr.	Tr.	-			
15-23	B1	8.6	73.5	17.9	-	0.1d	0.2d	0.5d	7.8	49.4	24.1	57.5	0.8	Tr.	Tr.	-			
23-33	B2	7.0	73.4	19.6	-	-	0.1d	0.4d	6.5	48.9	24.5	55.6	0.5	Tr.	Tr.	-			
33-43	B3	10.2	69.0	20.8	0.4	0.8	0.7	1.4	6.9	44.8	24.2	52.3	3.3	Tr.	Tr.	-			
43-53	IIc1	38.6	41.4	20.0	3.1	7.1	7.1	13.4	7.9	22.6	18.8	36.1	30.7	6	6	-			
53-55	IIc2	24.6	45.8	29.6	1.2	3.2	4.3	9.3	6.6	19.6	26.2	30.9	18.0	Tr.	Tr.	-			
55-67	IIc3	53.0	28.0	19.0	3.2	8.7	10.2	19.4	11.5	13.7	14.3	34.6	41.5	6	6	-			

Depth (in.)	6A1a			6B1c	6C1a			4D1			Water Content					pH	8C1a
	Organic carbon	Nitrogen	C/N		Ext. Iron as Fe ₂ O ₃	4A1a Field State	4A1c 30-Ca.	4A1h Oven-Dry	COLE	4B4 Field State	4B3 30-Ca. 1/3-Bar	4B1b 15-Bar	4B2 15-Bar	4C1 1/3 to 15-Bar in. per in.			
0-3	9.77	0.610	16	Tr.	0.9								18.3			6.3	
3-7	1.22	0.125	10	-	0.9								6.4			6.0	
7-10	0.42	0.054	8	-	0.9								4.4			5.7	
10-15	0.24	0.039			0.8	1.52	1.50	1.54	0.010	12.6	22.3	20.4	5.3	0.23		5.1	
15-23	0.17	0.025			1.4	1.56	1.52	1.58	0.014	11.0	23.1	20.7	7.7	0.20		4.7	
23-33	0.16	0.022			1.6	1.62	1.55	1.61	0.014	12.8	23.5	22.4	9.2	0.20		4.7	
33-43	0.12				1.6	1.50	1.46	1.56	0.022	24.5	26.6	25.4	9.8	0.23		4.6	
43-53	0.05				1.5	1.84	1.76	1.84	0.014	9.6	17.1	17.5	7.6	0.17		4.6	
53-55	0.05				0.7								11.9			4.7	
55-67	0.03				2.0								7.6			4.7	

Depth (in.)	Extractable bases 5B1a					6B1a Ext. Activity	Cat. Resh. Cap.		6C2a Ext. Al	8B3 Ca/Mg	Base saturation	
	6A2b Ca	6A2c Mg	6A2d Na	6A2e K	Sum		5A3a Sum	5A1a CaCO ₃ OAc			5C3 Sum	5C1
0-3	31.4	4.0	Tr.	0.1	35.5	11.1	46.6	38.7		7.8	Pct. 76	Pct. 100
3-7	7.9	1.3	Tr.	0.2	9.4	6.8	16.2	11.4		6.1	58	82
7-10	4.0	0.9	Tr.	0.2	5.1	5.4	10.5	6.7			48	76
10-15	4.0	1.2	Tr.	0.1	5.3	7.1	12.4	8.5			43	62
15-23	4.7	1.6	0.1	0.2	6.6	9.7	16.3	12.0			40	55
23-33	5.9	1.9	0.1	0.2	8.1	10.9	19.0	13.9	4.0		43	58
33-43	6.3	2.2	0.2	0.2	8.9	10.7	19.6	14.7			45	60
43-53	6.7	2.3	0.2	0.2	9.4	6.9	16.3	13.1			58	72
53-55	12.6	4.4	0.3	0.2	17.5	7.9	25.4	20.8			69	84
55-67	6.5	2.3	0.2	0.1	9.1	4.2	13.3	10.6			68	85

Depth (in.)	Ratios to Clay 8D1			a.	b.	c.	d.	e.
	NR OAc	Ext. Iron	15-Bar Water					
0-3	2.27	0.06	1.27	25-50% organic matter.	5-25% organic matter.	5-25% Fe-Mn nodules.	> 50% Fe-Mn nodules.	5-25% Fe-Mn nodules.
3-7	1.06	0.08	0.59	Coefficient of Linear Extensibility.	Note: See descriptions for mineralogy.			
7-10	0.74	0.10	0.48					
10-15	0.64	0.06	0.40					
15-23	0.67	0.08	0.43					
23-33	0.71	0.08	0.47					
33-43	0.71	0.08	0.47					
43-53	0.66	0.08	0.38					
53-55	0.70	0.02	0.40					
55-67	0.56	0.10	0.40					

Soil type: Otterholt silt loam

Soil Nos.: S60Wis-47-2

Location: Pierce County, Wisconsin; northeast quarter, northwest quarter, Section 7, T25N, R15W, Union Township.

Position and relief: Undulating to gently rolling uplands, 3 to 5 percent convex slope; west aspect.

Drainage and permeability: Well drained; moderately permeable; no ground water within observed depth.

Parent material: Deep loess over clay loam glacial till.

Vegetation: Recently cut woodland of basswood, elm, and oak trees.

Erosion: None to slight.

Stoniness: None.

Root distribution: Many fibrous roots in the A1 horizon; fewer below.

Sampled by: Paul H. Carroll, William DeYoung, Robert Grossman and Jerry Post, July 28, 1960.

Described by: Paul H. Carroll.

Horizon and

Lincoln Lab. No.

- Ao 2 to 0 inch. Very dark brown (10YR 2/2) and very dark grayish brown (10YR 3/2) organic debris, partially decomposed and unrecognizable as to vegetative origin and firmly matted by entwining roots. Parts of plants and remains of insects may be identified under magnification; slightly acid.
- A1 0 to 3 inches. Very dark brown (10YR 2/2) and very dark grayish brown (10YR 3/2) silt loam with weak very fine granular structure; very friable; slightly acid; clear smooth boundary.
13639
- A21 3 to 7 inches. Dark grayish brown (10YR 4/2) silt loam with weak thin platy structure; very friable; few organic discolorations of very dark grayish brown (10YR 3/2) are carried into this horizon from the A1 above by worms and burrowing animals and insects; very fine roots numerous; slightly acid; clear smooth boundary.
13640
- A22 7 to 10 inches. Dark grayish brown (10YR 4/2) and grayish brown (10YR 5/2) silt loam with weak thin platy structure; friable; few very fine fibrous roots; strongly acid; gradual smooth boundary.
13641
- A3 10 to 15 inches. Grayish brown (10YR 5/2) and light brownish gray (10YR 6/2) silt loam with weak coarse prismatic and weak medium platy structure that breaks on disturbance to weak fine subangular and somewhat flaky blocks; includes small patches of dark brown (10YR 4/3) B horizon remnants in a lighter-colored zone of apparent degradation; friable; few very fine fibrous roots; strongly acid; gradual smooth boundary.
13642
- B1 15 to 23 inches. Dark brown (10YR 4/3 to 3/3) silt loam with weak coarse prismatic and weak medium to thick platy structure that breaks under disturbance to moderate medium subangular blocks; most blocky peds have dark surfaces, 10YR 3/3 to 3/4, and lighter-colored interiors, 10YR 4/3; friable; vesicular; few coarse roots; some ped faces contain patchy to continuous bleached silt coats of light brownish gray (10YR 6/2) and pale brown (10YR 6/3), being thickest and most continuous along the vertical cleavage planes; few thin clay films on some blocky ped faces; very strongly acid; clear smooth boundary.
13643
- B2 23 to 33 inches. Dark brown (10YR 4/3) heavy silt loam with weak medium prismatic and weak medium to thick platy structure that breaks readily to moderate medium subangular blocks; firm; vesicular; few coarse roots; contains thin bleached silt coats on plate faces, less numerous than the horizon above; clay films occur as thin patchy discolorations on the faces of blocky peds within the body of the prisms, becoming thicker and somewhat more continuous on blocky and prismatic ped faces toward the lower horizon boundary; strongly acid; clear smooth boundary.
13644
- B3 33 to 43 inches. Dark brown (10YR 4/3) silt loam with weak coarse prismatic and weak medium platy structure that breaks under disturbance to weak medium subangular blocks; friable; few coarse roots; peds in upper part of the horizon have thin bleached silt coatings; few thin patchy clay films are observed along the primary vertical cleavage planes and in continuous soil pores; strongly acid; diffuse smooth boundary.
13645
- IIC1 43 to 53 inches. Dark brown (10YR 4/3) clay loam, consisting of loess-influenced glacial till; generally structureless but with some widely spaced and strongly developed vertical cleavage planes along which are found thin patchy clay films; plastic wet, hard dry; strongly acid; clear smooth boundary.
13646
- IIC2 53 to 55 inches. Grayish brown (2.5Y 5/2) clay loam to clay glacial till; generally structureless but with few widely spaced vertical cleavage planes along which are found thick continuous clay films; plastic when wet, very hard when dry; very strongly acid; abrupt smooth boundary.
13647
- IIC3 55 to 67 inches. Grayish brown (10YR 5/2) and yellowish brown (10YR 5/8) clay loam glacial till; generally structureless but having few widely spaced and weakly developed vertical cleavage planes along which are found few thin clay films; plastic wet, very hard dry; strongly acid.
13648

Remarks: Unless otherwise indicated, all colors shown in the soil profile description are moist colors.

MINERALOGY: The following mineralogical observations are for very fine sands; percentages are only rough approximations: 50 percent quartz, 40 percent feldspar, 10 percent altered feldspar aggregates. Opaques, hornblende, epidote, mica-like grains, zircon, tourmaline are the observed accessories in order of abundance. Loess and till are very similar; perhaps a few less altered feldspar aggregates and a few more ferro-magnesian mineral grains in the loess.

SOIL Ottarholt silt loam SOIL Nos. 8601a-47-3 LOCATION Pierce County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 13649-13658 May 1965

Depth (In.)	Horizon	1B1a Size class and particle diameter (mm) 3A1													2A2 Coarse fragments			
		Total											Sand	Silt	Clay	> 2	2-19	3B2
		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)						
Pct. of < 2 mm																		
0-2	A1	12.8	75.4	11.8	0.2a	1.3a	0.9a	2.7	7.7	44.2	31.2	53.4	5.1	Tr.	Tr.	-		
2-5	A21	7.5	82.5	10.0	0.1b	0.3b	0.3b	0.8c	6.0	49.2	33.3	55.6	1.5	Tr.	Tr.	-		
5-9	A22	7.5	81.7	10.8	-	0.2b	0.2b	0.5c	6.6	49.8	31.9	56.7	0.9	Tr.	Tr.	-		
9-14	A3	7.0	75.5	17.5	0.1b	0.1b	0.1b	0.4c	6.3	47.6	27.9	54.1	0.7	Tr.	Tr.	-		
14-22	B1	7.1	71.1	21.8	0.1c	0.1c	0.1c	0.5c	6.3	46.2	24.9	52.8	0.8	Tr.	Tr.	-		
22-32	B2	7.9	68.3	23.8	0.1c	0.2c	0.1c	0.4c	7.1	47.9	20.4	55.2	0.8	Tr.	Tr.	-		
32-41	B31	8.4	70.5	21.1	0.1c	0.3c	0.3c	0.6c	7.1	48.9	21.6	56.3	1.3	Tr.	Tr.	-		
41-48	B32	19.1	65.1	15.8	2.4	2.9	2.6	4.7	6.5	40.7	24.4	49.1	12.6	5	5	-		
48-59	IIc1	55.7	29.5	14.8	4.4	9.9	9.9	19.0	12.5	15.7	13.8	37.1	43.2	5	5	-		
59-72	IIc2	54.8	25.8	19.4	5.5	10.1	9.9	19.0	10.3	12.3	13.5	30.9	44.5	5	5	-		

Depth (In.)	6A1a		6B1a		C/N	6K1c		Bulk density			Water Content					pH
	Organic carbon	Nitrogen	Carbonate as CaCO ₃	6C1a Rct. Fe ₂ O ₃ Pot.		4A1a Field State	4A1c 30-Cm. g/cc	4A1b Oven-Dry g/cc	4D1 COLE d	Water Content					8C1a (1:1)	
										4B4 Field State	4B3 30-Cm.	4B1b 1/3-Bar	4B2 15-Bar	4C1 15-Bar in. per in.		
0-2	5.98	0.434	14	-	1.0	1.50	1.50	1.54	0.010	18.1	26.0	24.0	11.7	4.9	0.29	5.6
2-5	0.79	0.085	9	0.9	1.0	1.44	1.45	1.48	0.007	8.1	23.2	22.5	4.7	0.26		5.0
5-9	0.43	0.049	7	1.0	1.0	1.44	1.45	1.48	0.007	8.1	23.2	22.5	4.7	0.26		4.8
9-14	0.27	0.038	9	1.3	1.51	1.49	1.53	1.53	0.010	12.5	22.8	22.9	7.6	0.23		4.8
14-22	0.26	0.034	8	1.3	1.48	1.48	1.51	1.51	0.010	16.6	24.6	25.6	9.5	0.24		4.7
22-32	0.21	0.028		1.6	1.52	1.48	1.54	1.54	0.011	17.6	25.7	25.5	11.0	0.21		4.6
32-41	0.17			1.6	1.48	1.42	1.51	1.51	0.020	24.1	27.0	23.0	9.5	0.19		4.6
41-48	0.09			1.5									7.6			4.5
48-59	0.03			3.7									6.5			4.6
59-72	0.03			6.0	1.86	1.80	1.86	1.86	0.010	11.3	15.8	17.4	8.4	0.16		4.9

Depth (In.)	Extractable bases 5K1a					6K1a Rct. Acidity	Cat. Exch. Cap.		6G2a KCl-Al	8D3 Ca/Mg	Base saturation		
	6M2b Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum	5A1a NH ₄ OAc			Sum	5C3	5C1
0-2	14.2	3.4	0.1	0.4	18.1	12.2	30.3	20.8	-	4.2	60	87	
2-5	2.8	0.6	0.1	0.2	3.7	9.6	13.3	8.2	1.4		28	45	
5-9	1.9	0.5	0.1	0.2	2.7	8.2	10.9	7.5	2.4		25	36	
9-14	3.3	1.2	0.1	0.4	5.0	10.4	15.4	11.0	3.6		32	45	
14-22	5.1	2.0	0.1	0.4	7.6	11.9	19.5	14.3	4.3		39	53	
22-32	6.2	2.0	0.1	0.2	8.5	13.0	21.5	16.1	5.0		40	53	
32-41	5.8	1.8	0.1	0.2	7.9	11.2	19.1	15.2	4.5		41	52	
41-48	5.3	1.8	0.1	0.2	7.4	8.3	15.7	12.8	3.4		47	58	
48-59	4.5	1.6	0.1	0.2	6.4	5.6	12.0	9.4	1.7		53	68	
59-72	5.4	1.8	0.1	0.2	7.5	6.1	13.6	9.8	0.6		55	76	

Depth (In.)	Ratios to Clay 8D1		
	NH ₄ OAc CEC	Rct. Iron	15-Bar Water
0-2	1.76	0.08	0.99
2-5	0.82	0.09	0.49
5-9	0.69	0.09	0.44
9-14	0.63	0.07	0.43
14-22	0.66	0.06	0.44
22-32	0.68	0.07	0.46
32-41	0.72	0.08	0.45
41-48	0.81	0.09	0.48
48-59	0.64	0.25	0.44
59-72	0.50	0.31	0.43

a. > 50% organic matter.
b. > 50% Fe-Mn nodules.
c. 5-25% Fe-Mn nodules.
d. Coefficient of Linear Extensibility.
Note: See descriptions for mineralogy.

Soil type: Otterholt silt loam

Soil Nos.: S60Wis-47-3

Location: Pierce County, Wisconsin; northeast quarter, southeast quarter, Section 35, T26N, R15W, Rock Elm Township.

Position and relief: Undulating to gently rolling uplands; approximately 3 percent convex slope; north aspect.

Drainage and permeability: Well drained; moderately permeable; no ground water within observed depth.

Parent material: Deep loess over clay loam glacial till.

Vegetation: Scattered maple and elm trees.

Erosion: None to very slight.

Stoniness: None.

Root distribution: Many fibrous roots to 5 inches; fewer below.

Sampled by: Paul H. Carroll, William DeYoung, Robert Grossman and Jerry Post, July 28, 1960.

Described by: Paul H. Carroll.

Horizon and

Lincoln

Lab. Number

A1 13649	0 to 2 inches. Very dark grayish brown (10YR 3/2) silt loam with weak fine granular structure; friable; slightly acid; abrupt smooth boundary.
A21 13650	2 to 5 inches. Grayish brown (10YR 5/2) silt loam with weak thin platy structure; very friable; vesicular; very fine fibrous roots numerous; strongly acid; abrupt smooth boundary.
A22 13651	5 to 9 inches. Brown (10YR 5/3) and light brownish gray (10YR 6/2 moist) silt loam with weak thin platy structure; very friable; vesicular; fibrous roots common though less numerous than horizon above; strongly acid; abrupt smooth boundary.
A3 13652	9 to 14 inches. Dark brown (10YR 4/3) silt loam with weak coarse prismatic and moderate medium to fine platy structure that breaks under disturbance to weak fine subangular blocks; moderately thick bleached silt coats of light brownish gray (10YR 6/2) and pale brown (10YR 6/3) colors are found on plate surfaces and along primary vertical cleavage planes; friable; vesicular; very few fine fibrous roots; strongly acid; clear smooth boundary.
B1 13653	14 to 22 inches. Dark brown (10YR 4/3) silt loam with weak coarse prismatic and weak medium platy structure that breaks under disturbance to weak medium subangular blocks; occasional thin bleached silt coats observed on ped faces; structural peds in general display dark yellowish brown (10YR 3/4) surface color and dark brown (10YR 4/3) interiors; friable; vesicular; few coarse roots; very strongly acid; clear smooth boundary.
B2 13654	22 to 32 inches. Dark brown (10YR 4/3) heavy silt loam with weak coarse prismatic and weak coarse platy structure that breaks readily to moderate medium subangular blocks; some peds have dark yellowish brown (10YR 3/4) surface color and dark brown (10YR 4/3) interiors; very few patchy clay films along vertical cleavage planes of the prismatic structural forms and on some included subangular blocky ped faces; friable; few coarse roots; very strongly acid; clear smooth boundary.
B31 13655	32 to 41 inches. Dark brown (10YR 4/3) silt loam with weak coarse prismatic and weak coarse to medium subangular blocky structure that displays a generally weak coarse platiness throughout; few peds have a dark yellowish brown (10YR 3/4) surface color; friable; few patchy low-contrast clay films along major vertical cleavage planes and in continuous soil pores; few coarse roots; very strongly acid; clear smooth boundary.
B32 13656	41 to 48 inches. Dark brown (10YR 4/3) gritty silt loam, slightly influenced by underlying glacial till toward the lower horizon boundary; weak coarse subangular blocky structure with occasional thin clay films on ped faces; few coarse roots; friable; strongly acid; gradual smooth boundary.
IIC1 13657	48 to 59 inches. Dark yellowish brown (10YR 4/4) clay loam glacial till; generally structureless but with widely spaced vertical cleavage planes along which are found a few thin clay films; clay film coatings are found along worm holes and root cavities; plastic when wet, very hard when dry; strongly acid; diffuse smooth boundary.
IIC2 13658	59 to 72 inches. Dark yellowish brown (10YR 4/4) clay loam glacial till; generally structureless; plastic when wet, very hard when dry; strongly acid.

Remarks: Unless otherwise indicated, all colors shown in the soil profile description are moist colors.

MINERALOGY: Very fine sand similar in mineralogy to Otterholt, profile S60Wis-47 2. Lab. No. 13658 high in opaques which under reflected light appear to be iron oxides other than magnetite.

SOIL Otterholt silt loam SOIL Nos. S60W1a-55-1 LOCATION St. Croix County, Wisconsin
SOIL SURVEY LABORATORY Lincoln, Nebraska LAB Nos. 13632-13638 May 1965

Depth (in.)	Horizon	Size class and particle diameter (mm)											2A2 Coarse fragments			
		1B1a			3A1							> 2 Pct.	2 - 19 Pct.	3B2 19-76 Pct.		
		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)
0-8	Ap	10.4	79.2	10.4	0.1a	0.3a	0.3a	1.0	8.7	46.9	32.3	56.1	1.7	Tr.	Tr.	-
8-11	A2	8.4	77.7	13.9	0.1b	0.3b	0.3b	0.6b	7.1	44.1	33.6	51.5	1.3	Tr.	Tr.	-
11-17	B1	8.1	75.4	16.5	0.1b	0.3b	0.3b	0.6b	6.8	41.6	33.8	48.7	1.3	Tr.	Tr.	-
17-25	B2	8.4	73.5	18.1	-	0.2b	0.2b	0.6b	7.4	43.3	30.2	51.0	1.0	Tr.	Tr.	-
25-36	B3	11.2	70.5	18.3	0.2c	0.2c	0.2c	0.7c	9.9	50.0	20.5	60.3	1.3	Tr.	Tr.	-
36-48	1C1	61.4	23.0	15.6	3.7	11.2	14.3	22.7	9.5	11.6	11.4	30.9	51.9	5	5	-
48-60	1C2	65.5	20.0	14.5	3.3	12.1	16.0	24.5	9.6	10.3	9.7	30.3	55.9	7	7	-

Depth (in.)	6A1a Organic carbon d Pct	6B1a Nitrogen Pct	C/N	6E1c Carbonate as CaCO ₃ Pct.	6C1a Ext. Iron as Fe ₂ O ₃ Pct.	Bulk density			4D1 COLE e	Water Content					pH	8C1a (1.1)
						4A1a Field- State 30-Cm. g/cc	4A1c 30-Cm. g/cc	4A1h Oven- Dry g/cc		4B4 Field- State 30-Cm. Pct.	4B3 30-Cm. 1/3-Bar Pct.	4B1b 15-Bar Pct.	4B2 15-Bar Pct.	4C1 1/3- to in. per in. Pct.		
0-8	1.27	0.127	10	Tr.	1.0	1.40	1.38	1.42	0.010	4.4	28.1	20.7	6.0	0.20		6.6
8-11	0.48	0.064	8	-	1.1	1.51	1.48	1.52	0.010	8.3	23.3	22.7	5.9			6.0
11-17	0.27	0.044	6		1.2	1.55	1.52	1.56	0.010	12.2	24.4	21.6	7.0	0.23		4.9
17-25	0.18	0.034			1.3	1.52	1.48	1.54	0.014	15.4	24.9	17.7	7.1	0.22		4.9
25-36	0.12				1.4	1.90	1.85	1.91	0.010	5.0	11.8	10.1	8.0	0.14		4.8
36-48	0.05				1.6								5.2	0.09		4.8
48-60	0.03				1.6								5.2			4.8

Depth (in.)	Extractable bases 5B1a				6H1a Ext. Acidity	Cat. 5A3a Sum	Exch. 5A1a Sum	6D2a Ext. Al	8D3 Ca/Mg	Base saturation		
	6M2b Ca	6O2b Mg	6P2a Na	6Q2a K						Sum	5C3 Sum	5C1 Cationic NH ₄ OAc
0-8	7.8	2.2	0.1	0.2	10.3	4.2	14.5	10.2		3.5	71	101
8-11	5.7	1.6	0.1	0.1	7.5	5.2	12.7	9.0		3.6	59	83
11-17	4.4	1.2	0.1	0.1	5.8	9.7	15.5	10.3		3.7	37	56
17-25	4.2	1.4	0.1	0.2	5.9	9.9	15.8	10.8	2.8	3.0	37	55
25-36	5.4	1.9	0.1	0.2	7.6	9.7	17.3	12.2		2.8	44	62
36-48	4.3	1.4	0.1	0.1	5.9	4.9	10.8	8.3		3.1	55	71
48-60	4.1	1.6	0.1	0.1	5.9	3.8	9.7	7.4		2.6	61	80

Depth (in.)	Ratios to Clay 8D1		
	NH ₄ OAc CEC	Ext. Iron	15-Bar Water
0-8	0.98	0.10	0.58
8-11	0.65	0.08	0.42
11-17	0.62	0.07	0.42
17-25	0.60	0.07	0.39
25-36	0.67	0.08	0.44
36-48	0.53	0.10	0.33
48-60	0.51	0.11	0.36

a. 5-25% Fe-Mn nodules. 5-25% organic matter.
b. > 50% Fe-Mn nodules.
c. 25-50% Fe-Mn nodules.
d. 6.2 Mg/M² to 60 inches.
e. Coefficient of Linear Extensibility.
Note: See descriptions for mineralogy.

Soil type: Otterholt silt loam

Soil Nos.: S60Ws-55-1

Location: St. Croix County, Wisconsin; southeast quarter, southwest quarter, Section 36, T28N, R15W, Cady Township.

Position and relief: Undulating to rolling ground moraine; approximately 2 percent convex slope; aspect east.

Drainage and permeability: Well drained; moderately permeable; ground water table beyond depth of observed profile.

Parent material: loess over loam to sandy clay loam glacial till.

Vegetation: Corn, clover, and small grains.

Erosion: None to very slight.

Stoniness: None.

Root distribution: Abundant fibrous roots in the Ap; fewer below.

Sampled by: Paul H. Carroll, William DeYoung, Robert Grossman and Jerry Post, July 27, 1960.

Described by: Paul H. Carroll.

Horizon and

Lincoln

Lab. Number

Ap 13632	0 to 8 inches. Dark brown (10YR 3/3) silt loam with weak fine subangular blocky structure; friable; many fibrous roots; slightly acid; clear smooth boundary.
A2 13633	8 to 11 inches. Brown (10YR 5/3) silt loam having weak very thin platy structure with occasional weak vertical cleavage planes; very friable; vesicular; many fibrous roots; slightly to medium acid; abrupt smooth boundary.
B1 13634	11 to 17 inches. Dark brown (10YR 4/3) silt loam with weak thin platy and weak fine subangular blocky structure; dark brown (10YR 4/3) ped interiors and slightly darker brown (10YR 3/3) ped surfaces; occasional thin bleached silt coat on ped faces; friable; fine fibrous roots common; very strongly acid; clear smooth boundary.
B2 13635	17 to 25 inches. Dark brown (10YR 4/3) heavy silt loam with weak medium platy structure that breaks on disturbance to weak fine subangular blocks; thin patchy dark brown (10YR 3/3) clay films on faces of structural peds; major vertical cleavage planes show thin pale brown (10YR 6/3) bleached silt coatings; friable; few fine and few coarse roots; very strongly acid; clear smooth boundary.
B3 13636	25 to 36 inches. Dark brown (10YR 4/3) silt loam with weak medium subangular blocky structure having weak medium platiness throughout; few thin patchy clay films on structural ped faces (less in number or extent than the horizon above); continuous though thin bleached silt coats along some major vertical cleavage planes give way to thin continuous clay films toward the lower horizon boundary; friable; few coarse roots; strongly acid; abrupt smooth boundary.
IIC1 13637	36 to 48 inches. Dark brown (7.5YR 4/4) loam to sandy clay loam glacial till of Cary age and Patrician source; weak coarse platy structure with weak coarse prisms toward the upper horizon boundary; friable; strongly acid; diffuse smooth boundary.
IIC2 13638	48 to 60 inches. Dark brown (7.5YR 4/4) sandy clay loam glacial till with weak coarse platy structure; firm; slightly acid.

Remarks: Unless otherwise indicated, all colors shown in the soil profile description are moist colors.

MINERALOGY:

The mineral count for lab. No. 13635 is rather representative for both Otterholt profiles S60Ws-47-1 and -55-1. About 10 percent altered feldspar aggregates. Opaques, garnet, epidote, zircon, muscovite, biotite(?), chlorite, and one grain of apatite are the accessories listed roughly in order of abundance. Opaques common in loess and in the till. No magnetite or pyrite observed in the opaques. A count of 300 grains was made on lab. No. 13635: 39 percent quartz and 61 percent non-quartz, the latter including 17 percent intermediate calcium plagioclase.

SOIL TYPE *Ozaukee LOCATION Ozaukee County, Wisconsin
silt loam

SOIL NOS. S58Ws-45-1 LAB. NOS. 9360-9366

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS		
		1B1a					3A1						2A2	
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY					> 2	
2-1	1-0.5	0.5-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.07	0.02-0.002	($< 19\mu$)					
0-3	Ap	0.8a	1.3a	2.8a	8.4a	6.0a	59.9	20.8	34.9	35.9	Tr.	sil		
3-10	B1	0.2a	0.7a	1.4a	5.8a	4.2a	45.2	42.5	22.3	30.5	Tr.	sic		
10-16	I-IIB2	0.4a	0.8a	1.5a	5.0a	4.0a	32.9	55.4	15.6	24.3	Tr.	c		
16-23	IIB3	1.7b	1.3b	1.8b	7.0b	8.3b	43.0	36.9	28.4	27.5	5.7	sicl		
23-34	IIC1	2.2b	1.7b	2.0b	7.0b	8.4b	50.4	28.3	30.6	33.0	8.4	cl/sicl		
34-45	IIC2	2.3b	2.1b	2.1b	6.6b	8.2b	51.2	27.5	30.2	33.6	11.6	cl/sicl		
45-55+	IIC3	2.0b	1.9b	2.2b	7.1b	8.4b	51.3	27.1	31.2	33.3	5.0	cl/sicl		
8C1a		pH		ORGANIC MATTER			6C1a	ELECTRICAL CONDUCTIVITY EC-10 ³ MILLIMHOS PER CM @ 25°C.	6E1a		MOISTURE TENSIONS			
1:1		1:10		ORGANIC CARBON %	NITROGEN %	C/N	Free Iron Fe ₂ O ₃ %	CoCO ₃ equiv. %	GYP SUM me./100g. SOIL	1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %		
7.4				1.52	0.125	12	1.3	<				7.8		
6.5				0.57	0.050	11	2.2	<				14.2		
7.3				0.58	0.049	12	2.4	<				17.8		
7.7				0.50	0.048	10	1.4	22				12.8		
8.0				0.24	0.023		0.9	38				10.4		
8.1				0.19			0.8	44				9.9		
8.0				0.11			0.8	45				9.8		
5A1a		EXTRACTABLE CATIONS					5B1a	BASE SAT. %	5C3	5B1a	5A3a	8D3	4B4	4A1a
CATION EXCHANGE CAPACITY NH ₄ Ac		6N2b	6O2b	6H1a	6P2a	6Q2a	NH ₄ Ac EXCH.	Base Sat. % on Sum Cations	Sum Bases	Sum Cations	Ca/Mg	Field State Water %	Vol. Wt. g/cc	
		Ca	Mg	H	Na	K			me/100g					
		milliequivalents per 100g. soil												
14.4		11.4	3.7	3.2	0.1	0.4	108	83	15.6	18.8	3.1			
22.0		13.6	7.2	6.8	0.1	0.3	96	76	21.2	28.0	1.9			
27.3		18.5	10.2	4.0	0.1	0.5	107	88	29.3	33.3	1.8	21.2	1.55	
16.8					0.1	0.3								
10.4					0.1	0.2						10.1	1.97	
8.4					0.1	0.2								
7.9					0.1	0.2								
a. Few smooth		light brown	to black coner.	(Fe-Mn?)										
b. Few smooth		light brown	to black coner.	(Fe-Mn?); few CaCO ₃ coner.										

Soil type: *Ozaukee silt loam
 Soil Nos.: S8WAs-45-1
 Location: SW of SE, Section 16, T9N, R21E, Ozaukee County, Wisconsin.
 Vegetation: Mixed oak, hickory, and maple forest.
 Parent material: Thin loess over moderately calcareous silty clay loam till.
 Physiographic position: Glacial till plain.
 Topography: Sloping.
 Slope: 3 percent convex.
 Salt or alkali: None.
 Drainage: Moderately well.
 Described by: A. J. Klingelhoets, October 9, 1958.

Horizon and
 Lincoln
 Lab. Number

- Ap
 9360 0 to 8 inches. Dark grayish brown (10YR 4/2) silt loam with moderate medium subangular blocky structure which breaks readily into moderate medium granules; friable when moist; plant roots plentiful and many earthworm holes and casts; developed in loess; mildly alkaline; abrupt smooth boundary, 7 to 9 inches thick.
- E1
 9361 8 to 10 inches. Dark brown (7.5YR 4/2 to 4/4) light silty clay loam with moderate medium subangular blocky structure; firm when moist; developed in loess; plant roots plentiful and few earthworm holes and casts; grayish brown (10YR 5/2) silica coatings on peds; mildly alkaline; clear wavy boundary, 2 to 4 inches thick.
- I and IIB2
 9362 10 to 16 inches. Dark brown (7.5YR 3/2) heavy silty clay loam with moderate fine angular blocky structure; hard when dry, slightly plastic when wet; clay skins on peds; roots plentiful; few earthworm holes; developed in loess; moderately alkaline; clear wavy boundary, 5 to 8 inches thick.
- IIB3
 9363 16 to 23 inches. Dark brown (7.5YR 4/4) to brown (7.5YR 5/4) silty clay loam with moderate medium prismatic structure which breaks down into moderate medium angular blocks; hard when dry, slightly plastic when wet; clay skins and very dark brown (7.5YR 2/2) organic stains on the peds; many glacial pebbles and cobbles (principally dolomitic) from here on down in the profile; developed in till; few fine distinct 7.5YR 5/6 mottles; plant roots plentiful; slight effervescence; gradual irregular boundary, 5 to 9 inches thick.
- IIC1
 9364 23 to 34 inches. Brown (7.5YR 5/4) silty clay loam till with weak coarse platy structure which breaks down into moderate medium angular blocks; slightly hard when dry and plastic when wet; few plant roots; clay skins and very dark brown (7.5YR 2/2) organic stains on vertical faces of peds; few medium distinct 7.5YR 5/6 mottles; grayish brown (10YR 5/2) lime coatings on horizontal faces of peds; strong effervescence; gradual irregular boundary, 8 to 15 inches thick.
- IIC2
 9365 34 to 45 inches. Brown (7.5YR 5/4) light silty clay loam till with moderate coarse platy structure; slightly hard when dry and plastic when wet; few plant roots in upper part; grayish brown (10YR 5/2) lime coatings on horizontal faces of plates; many medium distinct 7.5YR 5/6 and 5/2 mottles; strong effervescence; diffuse irregular boundary.
- IIC3
 9366 45 to 55 inches plus. Does not differ from horizon above in observable features; separation was made principally for purpose of sampling.

Remarks: Profile extremely dry when sampled.

SOIL TYPE *Ozaukee silt loam LOCATION Washington County, Wisconsin

SOIL NOS. S58W18-66-1 LAB. NOS. 9353-9359

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS	
		1B1a											2A2
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY	3A1				> 2
	2.0	1.0-0.5	0.5-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.02	0.02-0.002	($< 19\mu$)			
0-7	Ap	0.3a	0.6a	1.1a	3.4a	3.5a	70.8	20.3	33.3	43.0	Tr.	sil	
7-10	B1	0.2a	0.5a	0.9a	2.8a	3.2a	53.6	38.8	24.0	34.4	Tr.	sic1	
10-15	I-1IB2	0.5a	0.7a	1.3a	3.4a	3.3a	37.8	53.0	15.4	27.7	3.6	c	
15-23	1IB3	1.0b	1.4b	1.7b	5.6b	6.6b	46.8	36.9	24.3	32.6	3.6	sic1	
23-33	1IC1	1.0b	1.3b	1.2b	3.8b	5.1b	53.6	34.0	21.9	39.1	5.4	sic1	
33-45	1IC2	1.6b	1.5b	1.2b	4.2b	5.7b	54.2	31.6	23.9	38.6	5.4	sic1	
45-58+	1IC3	1.5b	1.7b	1.6b	4.2b	6.0b	53.6	31.4	25.7	36.6	4.4	sic1	
pH		ORGANIC MATTER				6C1a	ELECTRICAL CONDUCTIVITY EC-103 MILLIMHOS PER CM @ 25 C.	6E1a		MOISTURE TENSIONS			
8C1a		6A1a	6B1a		Free Iron Fe ₂ O ₃ %			CaCO ₃ equiv. atom %	GYPSUM me./100g. SOIL	1/10 ATMOS.	1/3 ATMOS.	4B2 15 ATMOS. %	
	1:5	1:10	%	%	C/N								
	1:1												
7.4		1.70	0.132	13	1.2			Δ				8.1	
7.2		0.87	0.076	11	2.0			Δ				13.7	
7.3		0.56	0.052	11	2.2			Δ				18.5	
7.7		0.40	0.036	11	1.4			19				14.2	
7.9		0.27	0.022	12	0.9			38				13.1	
8.0		0.26			0.8			43				11.3	
8.0		0.20			0.8			48				11.5	
5A1a	EXTRACTABLE CATIONS					5B1a	BASE SAT. % NH ₄ Ac EXCH.	5C3	5B1a	5A3a	8D3	4B4	4A1a
CATION EXCHANGE CAPACITY NH ₄ Ac	6N2b	6O2b	6H1a	6P2a	6Q2a			Base Sat. % on Sum Cations	Sum Bases	Sum Cations	Ca/Mg	Field State Water %	Vol. Wt. g/cc
	Ca	Mg	H	Na	K				me/100g				
	milliequivalents per 100g. soil					5C1							
14.0	11.4	4.1	3.2	0.1	0.3	114	83	15.9	19.1	2.8			
21.3	15.1	8.0	4.0	0.2	0.3	111	86	23.6	27.6	1.9			
27.7	19.0	11.4	4.0	0.2	0.5	112	89	31.1	35.1	1.7	26.1	1.44	
16.1				0.1	0.3								
10.6				0.1	0.2						15.3	1.82	
9.2				0.1	0.2								
8.7				0.1	0.2								
a. Few smooth light brown to black concr. (Fe-Mn?)													
b. Few smooth light brown to black concr. (Fe-Mn?); few CaCO ₃ concr.													

Soil type: *Ozaukee silt loam
 Soil Nos.: S58WLS-66-1
 Location: SW of SE, Section 11, T9N, R20E, Washington County, Wisconsin.
 Vegetation: Mixed oak, hickory, and maple forest.
 Parent material: Thin loess over moderately calcareous silty clay loam till.
 Physiographic position: Glacial till plain.
 Topography: Sloping.
 Slope: 3 percent convex.
 Salt or alkali: None.
 Drainage: Moderately well to well.
 Described by: A. J. Klingelhoets, October 9, 1958.

Horizon and
 Lincoln
 Lab. Number

Ap
 9353 0 to 7 inches. Dark grayish brown (10YR 4/2) silt loam with moderate medium subangular structure which breaks down into moderate medium granules; friable when moist; roots plentiful; few earthworm holes and worm casts; developed in loess; mildly alkaline; abrupt smooth boundary, 6 to 8 inches thick.

Bl
 9354 7 to 10 inches. Dark brown (7.5YR 4/2 to 4/4) light silty clay loam with moderate medium subangular blocks which break down to moderate fine angular blocks; slightly hard when dry, firm when moist; plant roots plentiful; few earthworm holes and casts; brown (7.5YR 5/2) silica coatings on peds; developed in loess; mildly alkaline; clear wavy boundary, 2 to 5 inches thick.

I and IIB2
 9355 10 to 15 inches. Dark grayish brown (10YR 3/2 and 4/2) heavy silty clay loam with moderate to strong fine angular blocky structure; hard when dry; plastic when wet; developed in loess; clay skins on peds; few earthworm holes; plant roots plentiful; few glacial stones and pebbles mostly dolomitic; mildly alkaline; gradual irregular boundary, 4 to 7 inches thick.

IIB3
 9356 15 to 23 inches. Dark brown (7.5YR 4/4) to brown (7.5YR 5/4) silty clay loam with moderate medium angular blocky structure; hard when dry, slightly plastic when wet; clay skins on peds; few distinct medium mottles 7.5YR 5/6; very dark brown (7.5YR 2/2) organic stains on peds; many dolomitic and granitic stones and pebbles from this horizon down through profile; plant roots plentiful; slight effervescence; gradual irregular boundary, 5 to 9 inches thick.

IIC1
 9357 23 to 33 inches. Brown (7.5YR 5/4) silty clay loam till with moderate medium angular blocky structure; slightly hard when dry and plastic when wet; grayish brown (10YR 5/2) lime coatings on horizontal faces of peds; few plant roots and soft lime concretions; few shale chips; clay skins and some organic stains on vertical faces of peds; few medium distinct 7.5YR 5/6 and 5/2 mottles; strong effervescence; gradual irregular boundary, 8 to 12 inches thick.

IIC2
 9358 33 to 45 inches. Brown (7.5YR 5/4) light silty clay loam till with moderate coarse platy structure; slightly hard when dry and plastic when wet; grayish brown (10YR 5/2) lime coatings on horizontal faces of plates; few plant roots; few medium distinct 7.5YR 5/6 and 5/2 mottles; strong effervescence; gradual irregular boundary, 10 to 15 inches thick.

IIC3
 9359 45 to 58 inches plus. Does not differ appreciably from horizon above--separated only for the purpose of sampling.

Remarks: Profile extremely dry when sampled.

SOIL Palgrave silt loam SOIL Nos. 48Wis-52-21 LOCATION Richland County, Wisconsin
SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 5315-5320

Depth (in.)	Horizon	Size class and particle diameter (mm) SA1											3B2 Cm	3B1 Coarse fragments		
		Total			Sand				Silt					2A2 > 2 Pct.	2-19 Pct.	19-76 Pct. of < 76mm
		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)				
0-3	A1	79.6	13.1	0.4	0.5	0.3	2.3	3.5		35.0			0			
3-7	A2	82.1	12.5	0.1	0.2	0.2	1.6	3.3		38.3			0			
7-14	B1	78.2	16.2	-	0.1	0.2	1.3	4.0		35.5			0			
14-28	B21	70.4	25.3	-	0.1	0.2	0.7	3.3		28.3			0			
28-32	B22	61.3	25.6	1.5	2.3	2.7	3.4	3.2		33.0			9			
32+	B23	27.8	48.6	3.5	4.6	5.0	7.1	3.6		18.7			16			

Depth (in.)	6A1a Organic carbon Pct.	Nitrogen Pct.	C/N	Carbonate as CaCO ₃ Pct.	Ext. iron as Fe Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD In/in	pH	
						4A1e 1/2 bar g/cc	4A1h Oven dry g/cc	4A1i g/cc		4B1c 1/2 bar Pct.	4B2 15 bar Pct.	8C1c (1:1) KCl		8C1a (1:1) H ₂ O	
0-3	3.40														5.8
3-7	0.71														5.6
7-14	0.29														5.6
14-28	0.18														5.2
28-32	0.08														5.2
32+	0.07														5.1

Depth (in.)	Extractable bases 5B1a					6H2a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay			8D3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	Ext. Al		CEC Sum	Ext. iron	15-bar water		5C3 Sum cations Pct.	5C1 NH ₄ OAc Pct.
0-3	12.7	2.8	0.5	0.2		11.2	27.4						59		
3-7	3.6	1.2	0.1	0.1		5.1	10.1						50		
7-14	4.0	1.8	0.1	0.1		4.3	10.3						58		
14-28	6.4	4.2	0.2	0.2		6.6	17.6						62		
28-32	5.7	4.2	0.2	0.1		8.6	18.8						54		
32+	9.2	7.3	0.4	0.2		15.6	33.3						53		

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt.	Chl.	Vm.	Mi.	Int.	Qtz.	Kl.	Gibbsite
	7A2 X-ray				7A3			

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 type: Palsgrove silt loam
Soil Nos.: 48Wis-52-21
Location: Richland County, Wisconsin. NW 1/4 sec. 34, T. 10W., R. 2E.
Slope: 9 percent
Collected by: Glenn H. Robinson

Horizon and
Beltsville
Lab. Nos.

A1 5315	0 to 3 inches. Dark gray (10YR 4/1) silt loam.
A2 5316	3 to 7 inches. Light yellowish brown (10YR 6/4) silt loam.
B1 5317	7 to 14 inches. Yellowish brown (10YR 5/4) silt loam.
B21 5318	14 to 28 inches. Brown (7.5YR 4/4) silty clay loam.
B22 5319	28 to 32 inches. Reddish brown with some dark reddish brown (5YR 4/4, 3/2) silty clay.
B23 5320	32+ inches. Dark reddish brown (5YR 3/4 & 3/2) clay.

Soil Type: *Pardeeville loam
 Soil Nos.: 852Wis-11-4
 Location: SW 1/4 SW 1/4, Sec. 5, T11N, R9E, Columbia County, Wisconsin.
 Position and Relief: Rolling ground moraine; 2 to 3 percent convex slope.
 Drainage and Permeability: Well drained; moderately permeable; no ground water within 6 feet of the surface.
 Parent Material: Calcareous sandy loam till.
 Vegetation: Hay; sumac, elm, oak (Conservation Reserve land).
 Erosion: Moderate.
 Stoniness: Many cobbles and stones at depths below 30 inches.
 Root Distribution: Abundant fibrous roots to 8 inches; fewer below.
 Sampled by: P. Carroll, G. Lee, B. Watson, R. Grossman and D. McMurtry.
 Described by: P. H. Carroll and G. Lee.

Horizon and
 Lincoln
 Lab. No.

A_p 0 to 6 inches. Dark brown (7.5YR 3/2) loam with weak very fine subangular blocky structure; friable; neutral; clear smooth boundary.
 17822
 B₂₁ 6 to 11 inches. Dark brown (7.5YR 3/4) loam to sandy clay loam; displays slightly higher value (7.5YR 4/4) when rubbed; weak medium prismatic structure that divides under slight pressure to weak medium subangular blocks; firm; few tongues of organic discoloration extend into this horizon along root channels and animal burrows; neutral; clear wavy boundary.
 17823
 B₂₂ 11 to 20 inches. Dark brown (7.5YR 3/4) loam; displays slightly higher value (7.5YR 4/4) when rubbed; weak medium prismatic structure that divides under slight pressure to weak medium subangular blocks; firm; many small patchy discolorations of dark brown (7.5YR 3/2) are in the ped fabric; medium acid; clear wavy boundary.
 17824
 B₃₁ 20 to 26 inches. Dark brown (7.5YR 4/4) loam with weak medium subangular blocky structure; friable; many small patchy discolorations of dark brown (7.5YR 3/2) are in the ped fabric; medium acid; clear wavy boundary.
 17825
 IB₃₂ 26 to 32 inches. Dark brown (7.5YR 4/4) fine sandy loam with approximately 10 percent by volume of stones, rock fragments and pebbles whose diameters exceed 3/4 inch; weak medium subangular blocky structure; friable; neutral; clear wavy boundary.
 IIB₃₂
 17826
 IIC₁ 32 to 41 inches. Yellowish brown (10YR 5/4) sandy loam with approximately 5 percent by volume of rock fragments, stones and pebbles whose diameters exceed 3/4 inch; very weak thin platy structure to nearly massive; friable; weak effervescence with HCl; gradual smooth boundary.
 17827
 IIC₂ 41 to 52 inches. Yellowish brown (10YR 5/4) sandy loam with approximately 5 percent by volume of rock fragments, stones and pebbles whose diameter is greater than 3/4 inch; very weak thin platy structure to nearly massive; friable; strong effervescence with HCl; gradual smooth boundary.
 17828
 IIC₃ 52 to 64 inches. Brown (10YR 5/3) sandy loam with approximately 5 percent by volume of rock fragments, stones and pebbles whose diameters exceed 3/4 inch; weak thin platy structure; friable; strong effervescence with HCl; diffuse smooth boundary.
 17829
 IIC₄ 64 to 76 inches. Brown (10YR 5/3) sandy loam with approximately 5 percent by volume of rock fragments, stones and pebbles whose diameters exceed 3/4 inch; weak thin platy structure; friable; few carbonate nodules in soil matrix; strong effervescence with HCl.
 17830

Remarks: Intermittent, thin layers of loam B₁ horizon overlie the B₂₁.

SOIL *Pardeeville loam SOIL Nos. 56248-11-5 LOCATION Columbia County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 17831-17839 May 1966
General Methods: 1A, 1B1b, 2A1, 2B

Depth (in)	Horizon	Size class and particle diameter (mm)											Clay					Coarse fragments
		3A1											2A2					
		Total		Sand					Silt				Clay		Coarse fragments			
		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 (0.02-0.002)	Int. III (0.02-0.002)	Int. II (0.2-0.02)	(2-0.1)	3A1a Carbonate	Non-Carbonate	3B2 > 2	3B1 > 2	2-19 Pct. of < 19 μ
0-7	Ap	66.2	22.3	11.5	0.3	5.1	18.2	34.1	8.5	11.4	10.9	35.2	57.7					
7-11	B1	61.9	23.9	14.2	0.2	4.5	16.4	31.6	9.2	11.6	12.3	35.4	52.7					3
11-18	B2	65.4	19.9	14.7	0.7	5.0	17.7	32.4	9.6	10.2	9.7	34.8	55.8					2
18-24	B22	68.6	18.6	12.8	1.2	3.9	16.0	35.1	12.4	9.5	9.1	39.8	56.2					3
24-32	I&IIB3	79.7	13.4	6.9	1.9	8.2	20.8	38.8	10.0	7.3	6.1	35.5	69.7	-	7	8	12	5
32-38	IIC1	77.6	16.7	5.7	2.6a	7.4b	17.6c	36.8c	13.2c	10.1	6.6	41.2	64.4	-	6	6	9	2
38-46	IIC2	77.9	16.9	5.2	3.7d	7.7b	17.9c	36.5c	12.1c	9.8	7.1	39.5	65.8	tr	5	12	18	12
46-60	IIC3	75.9	17.9	6.2	2.2d	7.7b	18.0c	35.7c	12.3c	10.1	7.8	39.4	63.6	tr	6	11	15	9
60-76	IIC4	76.1	16.8	7.1	2.7d	8.0b	18.1c	35.6c	11.7c	9.8	7.0	38.3	64.4	2	5	12	17	11

Depth (in)	6A1a Organic carbon Pct	6B1a Nitrogen Pct	C/N	6C2a Ext. Iron as Fe Pct	6E1b 6E2a Carbonate as CaCO3 Pct	Bulk density				4D1 COLE	Water content				pH	8C1a (1)
						4A1a Field-Bar g/cc	4A1d 1/3-Bar g/cc	4A1d 1/3-Bar g/cc	4A1b Air-Dry g/cc		4B4 Field-State Pct	4B1c 1/3-Bar Pct	4B2 15-Bar Pct	4C1 1/3-to 15-Bar in/in.		
0-7	0.89	0.091	10	0.7	(s)	1.74		1.71	1.75	0.007	5.5	12.0	5.0	0.12		6.4
7-11	0.36	0.045	8	0.9		1.69		1.61	1.68	0.014	6.2	15.3	5.5	0.16		6.4
11-18	0.25	0.025	10	0.9		1.61		1.56	1.59	0.007	6.0	16.5	5.5	0.17		6.4
18-24	0.16	0.016		0.9		1.64		1.60h	1.64	0.007	4.6	12.2k	4.5	0.12m		5.4
24-32	0.09	0.010		0.5	4	1.67f	1.51	1.64i	1.66f	0.003			2.8			7.1
32-38	0.08			0.4	15	1.70	1.57	1.67h	1.68	0.003	3.6	8.9k	2.3	0.10m		7.8
38-46	0.04			0.3	19	1.75	1.51	1.73n	1.74	0.003	3.8	7.9k	2.3	0.09m		8.0
46-60	0.02			0.2	20	1.78r	1.58	1.77i	1.77f				2.4			8.2
60-76	0.01			0.2	22	1.81	1.58	1.80h	1.80		4.7	8.1k	2.1	0.10m		8.2

Depth (in)	Extractable bases				5B1a Sum	6B1a Ext. Acidity	Cat. Sum Cations	Ext. Cap. 5A3a NH4OAc	5A1a	KCl-Ext. Al	8D3 Ca/Mg	Base saturation	
	6N2a Ca	6O2a Mg	6P2a Na	6Q2a K								5C3 Sum Cations	5C1 NH4OAc
0-7	5.2	2.6	tr	0.2	8.0	3.7	11.7	8.4			2.0	68	95
7-11	4.2	2.7	tr	0.2	7.1	3.8	10.9	7.6			1.6	65	93
11-18	3.6	2.4	tr	0.2	6.2	4.0	10.2	7.2			1.5	61	86
18-24	2.8	2.1	tr	0.2	5.1	3.9	9.0	6.2			1.3	57	82
24-32	2.4n	2.0p	tr	0.1	4.5			3.6			1.2		125
32-38	2.3n	1.8p	tr	0.1	4.2			2.6			1.3		162
38-46	2.0n	1.5p	tr	0.1	3.6			2.4			1.3		150
46-60	2.3n	1.5p	tr	0.1	3.9			1.8			1.5		217
60-76	2.3n	1.3p	0.1	0.1	3.8			2.0			1.8		190

Depth (in)	Ratios to Clay 8D1		
	NH4OAc CEC	Ext. Iron	15-Bar Water
0-7	0.73	0.06	0.43
7-11	0.54	0.06	0.39
11-18	0.49	0.06	0.37
18-24	0.48	0.07	0.35
24-32	0.52	0.07	0.40
32-38	0.46	0.07	0.40
38-46	0.46	0.06	0.44
46-60	0.29	0.03	0.39
60-76	0.28	0.03	0.30

a. 25-50% carbonate.
b. 5-25% carbonate.
c. 0-5% carbonate.
d. > 50-100% carbonate.
e. 5.1 kg/m² to 60 inches (Method 6A).
f. Estimated.
g. Calculated to include volume but not weight of > 2-mm. material. (Method 3B2)
h. 1/10-Bar (Method 4A1g).

i. 1/10-Bar, estimated.
j. Coefficient of Linear Extensibility.
k. 1/10-Bar.
l. 1/10-Bar (Method 4C2).
m. NH4Cl-EtOH extraction (Method 6N3a).
n. NH4Cl-EtOH extraction (Method 6O3a).
p. NH4Cl-EtOH extraction (Method 6Q3a).

q. One or more horizons has relatively low cation exchange capacity. As cation exchange capacity decreases, the relative error of base saturation increases. Trace quantities are omitted from the sum of bases. For very low CEC values, this omission contributes significantly to the relative error of base saturation.

Soil Type: *Pardeeville loam
 Soil Nos.: S52Wis-11-5
 Location: NW 1/4 NW 1/4, Sec. 15, T11N, R9E, Columbia County, Wisconsin.
 Position and Relief: Rolling ground moraine or low drumlin; 3 to 5 percent convex slope.
 Drainage and Permeability: Well drained, moderately permeable; no ground water within 6 feet of the surface.
 Parent Material: Calcareous, brown sandy loam glacial till.
 Vegetation: Corn, small grains, hay.
 Erosion: Moderate.
 Stoniness: Many cobbles and stones at depths greater than 30 inches.
 Root Distribution: Abundant fibrous roots to 11 inches; fewer below.
 Sampled by: P. Carroll, G. Lee, B. Watson, R. Grossman and D. McMurtry.
 Described by: P. H. Carroll and G. Lee.

Horizon and
 Lincoln
 Lab. No.

Ap 0 to 7 inches. Dark brown (7.5YR 3/2) loam with weak very fine subangular blocky structure; friable; neutral; abrupt smooth boundary.
 17831

B1 7 to 11 inches. Dark brown (7.5YR 4/3) loam with moderate medium platy structure that separates under disturbance to weak very fine subangular blocks; contains few dark-colored organic tongues that follow animal burrows or root channels; friable; neutral; clear wavy boundary.
 17832

B21 11 to 18 inches. Dark brown (7.5YR 3/4) loam to heavy loam that displays slightly higher value (7.5YR 4/4) when rubbed; weak medium prismatic structure divides under slight pressure to weak fine and medium subangular blocks; firm; neutral; clear wavy boundary.
 17833

B22 18 to 24 inches. Dark brown (7.5YR 3/4) loam that displays slightly higher value (7.5YR 4/4) when rubbed; weak medium prismatic structure that separates under pressure to weak fine and medium subangular blocks; firm; common small patchy fabric discolorations of 7.5YR 3/2 in peds; strongly acid; gradual smooth boundary.
 17834

IB3 * 24 to 32 inches. Dark brown (7.5YR 3/4) light loam that displays slightly higher value (7.5YR 4/4) when rubbed; contains 5 percent by volume of stones, cobbles, rock fragments and pebbles whose diameters exceed 3/4 inch; weak medium subangular blocky structure; friable; medium acid; clear wavy boundary.
 IIB3
 17835

IIC1 32 to 38 inches. Dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) sandy loam with 5 percent by volume of stones, cobbles and pebbles whose diameter exceeds 3/4 inch; weak thin platy structure to nearly massive; friable; weak effervescence with HCl; gradual wavy boundary.
 17836

IIC2 38 to 46 inches. Yellowish brown (10YR 5/4) sandy loam with 5 percent by volume of stone fragments whose diameters exceed 3/4 inch; weak thin platy structure; friable; strong effervescence with HCl; diffuse smooth boundary.
 17837

IIC3 46 to 60 inches. Brown (10YR 5/3) and yellowish brown (10YR 5/4) sandy loam with 5 percent by volume of rock fragments whose diameters exceed 3/4 inch; weak thin platy structure; friable; small (2 inch) areas of lime segregation; strong effervescence with HCl; diffuse smooth boundary.
 17838

IIC4 60 to 76 inches. Brown (10YR 5/3) sandy loam with approximately 5 percent by volume of rock fragments whose diameters exceed 3/4 inch; weak thin platy structure; friable; strong effervescence with HCl.
 17839

SOIL *Pebbles silty clay loam SOIL Nos 959Wls-20-1 LOCATION Fond du Lac County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 11776-11783 April 1966

General Methods: 1A, 1E1a, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm)													Clay		Coarse fragments 2A2		
		Total			Sand					Silt					Carbonate	Non-Carbonate	> 2 (<19) Pct	2-19 (<76) Pct	19-76 (<76) Pct
		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. of < 2 mm																			
0-5	Ap1	22.2	43.6	34.2	0.2a	1.1a	1.9b	5.4b	13.6	14.7	28.9	31.3	8.6						
5-9	Ap2	22.1	43.9	34.0	0.6a	1.4a	1.9b	5.2b	13.0	14.8	29.1	30.8	9.1						
9-15	T1P21	7.4	31.1	61.5	0.1b	0.4b	0.7b	2.4b	3.8	6.9	24.2	12.1	3.6						
15-19	T1B22	11.0	35.5	53.5	1.5c	1.1c	1.0d	3.0d	4.4d	8.9	26.6	15.0	6.6					Tr.	
19-24	T1B3	11.8	41.1	47.1	1.4c	1.4c	1.3d	3.7d	4.0d	11.2	29.9	17.4	7.8					9	
24-34	T1C1	8.9	42.4	48.7	0.9c	1.0c	0.9d	2.9d	3.2d	10.3	32.1	15.2	5.7					Tr.	
34-43	T1C2	12.6	38.7	48.7	2.5c	1.6c	1.2d	3.5d	3.8d	10.0	28.7	15.8	8.8					-	
43-62	T1C3	8.1	41.5	50.4	0.9c	0.9c	0.8d	2.6d	2.9d	10.9	30.6	15.3	5.2					Tr.	

Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N	6E1a 6E2a Carbonate as CaCO ₃	6C1a Ext. Iron as Fe ₂ O ₃	Bulk density			Water content			pH		
						4A1a Field-State	4A1b Oven-Dry	4A1h Dry	4B4 Field-State	4B2 15-Bar	8C1a (11)			
0-5	3.61	0.267	14	Tr(s)	1.9									7.0
5-9	3.14	0.236	13	Tr(s)	2.0									7.1
9-15	0.80	0.074	11	Tr(s)	2.4	1.62		1.72		15.5				7.3
15-19	0.49	0.042	12		11	1.8								7.8
19-24	0.39	0.029	13		20	1.6								8.0
24-34	0.27				32	1.4	1.85	1.83		11.7				8.1
34-43	0.23				30	1.3								8.2
43-62	0.20				29	1.4	1.85	1.85		13.7				8.2

Depth (in.)	Extractable bases				5B1a Sum	6H1a Ext. Acidity	Cat. Exch. Cap.	5A3a Sum	5A1a NH ₄ OAc	8D3 Ca/Mg	Base saturation	
	6N2b Ca	6O2b Mg	6P2a Na	6Q2a K							5C3 Sum Cations	5O1 NH ₄ OAc
0-5	19.3	9.6	0.4	0.5	29.8	4.9	34.7	25.8		2.0	86	116
5-9	18.1	9.8	0.2	0.3	28.4	4.4	32.8	25.4		1.8	86	112
9-15	17.0	14.6	0.2	0.6	32.4	3.4	35.8	29.9		1.2	90	108
15-19			0.2	0.4				22.7				
19-24			0.2	0.4				18.4				
24-34			0.2	0.4				15.5				
34-43			0.3	0.3				15.4				
43-62			0.3	0.4				14.3				

Depth (in.)	Ratios to Clay 8H1		
	NH ₄ OAc CEC	Ext. Iron	15-Bar Water
0-5	0.75	0.06	0.43
5-9	0.75	0.06	0.40
9-15	0.49	0.04	0.32
15-19	0.42	0.03	0.31
19-24	0.39	0.03	0.32
24-34	0.32	0.03	0.34
34-43	0.32	0.03	0.35
43-62	0.28	0.03	0.33

a. 25-50% Fe-Mn.
b. 5-25% Fe-Mn.
c. > 50% carbonate.
d. 5-25% carbonate.

Soil type: *Pebbles silt loam

Soil Nos.: S59Wis-20-1

Location: Fond du Lac County, Wisconsin; southwest quarter of southeast quarter of Section 26, T17N, R18E, about one-half mile southeast of the village of Pipe; 300 feet west of county highway W along field boundary. Photo XF-1F-102 (1941).

Vegetation and use: Cropland, planted to corn in 1959.

Slope and land form: Nearly level to gently sloping, 2 percent; Late Wisconsin (Valders) ground moraine.

Drainage and permeability: Well drained; surface runoff and internal drainage are medium; permeability is moderately slow.

Parent material: Reddish brown calcareous clay till with a thin silt mantle.

Collected by: J. S. Allen, William DeYoung, and G. B. Lee, August 31, 1959.

Described by: E. G. Link.

Horizon and
Lincoln
Lab. Number

Ap1 11776	0 to 5 inches. Black (10YR 2/1, 10YR 3/2 crushed) silty clay loam that appears massive in place but breaks to weak medium granular structure; firm when moist; mildly alkaline.
Ap2 11777	5 to 9 inches. Black (10YR 2/1, 10YR 3/2 crushed) silty clay loam with moderate medium granular structure; firm when moist; mildly alkaline.
IIB21 11778	9 to 15 inches. Dark reddish brown (5YR 3/3, 5YR 4/2 crushed) clay with moderate coarse prismatic structure breaking to strong fine angular blocky structure; very firm when moist; some slightly darker, 5YR 3/2, organic stains; mildly alkaline.
IIB22 11779	15 to 19 inches. Dark reddish brown (5YR 3/3) to reddish brown (5YR 4/3, 5YR 5/3 crushed) clay with weak medium prismatic structure that breaks to moderate to strong medium angular blocky structure; very firm when moist; moderately alkaline.
IIB3 11780	19 to 24 inches. Reddish brown (5YR 4/3, 5YR 5/3 crushed) clay with weak medium prismatic structure that breaks to weak medium subangular blocky structure; very firm when moist; strong effervescence with HCl.
IIC1 11781	24 to 34 inches. Reddish brown (5YR 4/3, 5YR 4/3 crushed) silty clay with weak medium prismatic structure that breaks to weak medium subangular blocky structure; firm when moist; light gray (2.5Y 7/2) to light brownish gray (2.5Y 6/2) coatings along vertical fissures, and light brown (7.5YR 6/4) soft segregated lime; violent effervescence with HCl.
IIC2 11782	34 to 43 inches. Reddish brown (5YR 4/3) silty clay with weak medium prismatic structure that breaks to weak medium subangular blocky structure; firm when moist; light gray (2.5Y 7/2) to light brownish gray (2.5Y 6/2) coatings along vertical fissures, and light brown (7.5YR 6/4) soft segregated lime; violent effervescence with HCl.
IIC3 11783	43 to 62 inches. Reddish brown (5YR 4/3 to 2.5YR 4/4) silty clay with weak medium prismatic structure that breaks to weak medium subangular blocky structure; firm when moist; light gray (2.5Y 7/2) to light brownish gray (2.5Y 6/2) coatings along vertical fissures and light brown (7.5YR 6/4) soft segregated lime; weathered dolomitic pebbles along with a few granitic fragments; violent effervescence with HCl.

Remarks: Colors given are for moist soil. Reaction determined by Hellige-Truog pH kit. Upper 9 inches may be formed in local eolian sediments.

SOIL *Pebbles silty clay loam SOIL Nos. S59Hls-20-3 LOCATION Road du Lac County, Wisconsin
 SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 11794-11802 April 1966
 General Methods: 1A, 1B1a, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm)											Clay					
		Total		Sand					Silt				Coarse fragments					
		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)	Vary fine (0.1-0.05)	0.05-0.02	Int. III (0.02-0.002)	Int. II (0.2-0.02)	(2-0.1)	Carbonate	Non-carbonate	> 2 (0.2-0.075)	2-19 (0.075-0.0075)	19-76 (0.0075-0.00075)
0-8	Ap	8.0	46.0	46.0	0.1a	0.5a	1.1b	3.4c	2.9c	12.3	33.7	17.0	5.1					
8-11	A1	7.7	42.3	50.0	0.1a	0.6b	1.2b	3.2c	2.6c	10.9	31.4	15.2	5.1					
11-16	IIB21	4.6	25.6	69.8	0.2a	0.3a	0.6b	2.0c	1.5c	5.6	20.0	8.2	3.1					
16-20	IIB22	5.2	35.4	59.4	0.5d	0.4d	0.5e	1.8e	2.0e	8.4	27.0	11.4	3.2					
20-25	IIB3	5.9	36.3	57.8	0.7d	0.6d	0.6e	1.9e	2.1e	8.7	27.6	11.9	3.8					
25-31	IIC1	6.1	35.2	58.7	1.0d	0.8d	0.7e	1.8e	1.8e	8.3	26.9	11.1	4.3					
31-39	IIC2	5.9	35.1	59.0	0.8d	0.8d	0.6e	1.7e	2.0e	6.4	28.7	9.4	3.9					
39-48	IIC3	5.7	34.5	59.8	0.9d	0.7d	0.6e	1.7e	1.8e	7.3	27.2	10.1	3.9					
48-60	IIC4	4.8	35.0	60.2	0.4d	0.6d	0.5e	1.6e	1.7e	7.8	27.2	10.4	3.1					

Depth (in.)	6A1a Organic carbon Pct	6B1a Nitrogen Pct	C/N	6E1a Carbonate as CaCO ₃ Pct	6C1a Bulk density			Water content			pH	
					Ext. Iron State Fe ₂ O ₃ Pct	4A1a Field as g/cc	4A1h Oven-Dry g/cc	4B4 Field State Pct	4B2 15-Bar Pct	3C1a (1:1)		
0-8	3.97	0.282	14		2.4					18.0		6.0
8-11	3.42	0.250	14		2.4					18.7		6.0
11-16	1.14	0.091	12		2.6	1.56	1.71		19.6	23.3		6.4
16-20	0.52	0.045	12	9	2.0	1.69	1.71		14.0	21.2		7.8
20-25	0.36	0.027	13	24	1.6					17.2		8.0
25-31	0.28			26	1.6					18.2		8.1
31-39	0.24			28	1.5	1.82	1.80		12.8	18.4		8.1
39-48	0.22			29	1.4					18.2		8.2
48-60	0.23			26	1.6					18.6		8.2

Depth (in.)	Extractable bases				5B1a Sum	6H1a Ext. Acidity	Cat. 5A3a Sum Cations	Exch. Cap. 5A1a NH ₄ OAc	Cat. Exch. Cap. 5A5 Not Heated	Exch. Cap. TEA 5A5 Heated 240°C	8D3 Ca/Mg	Base saturation	
	6N2b Ca	6O2b Mg	6P2a Na	6Q2a K								5C3 Sum Cations	5C1 NH ₄ OAc
	Pct.		Pct.									Pct.	Pct.
0-8	16.3	10.1	0.1	0.4	26.9	13.5	40.4	30.4			1.6	66	88
8-11	15.7	10.6	0.1	0.4	26.8	13.0	39.8	29.8	39.2	31.8	1.5	67	90
11-16	18.6	16.1	0.1	0.6	35.4	8.0	43.4	34.4			1.2	82	103
16-20			0.1	0.6				26.6					
20-25			0.1	0.4				21.2					
25-31			0.1	0.4				19.4					
31-39			0.2	0.4				18.5					
39-48			0.2	0.4				16.6					
48-60			0.2	0.5				16.2					

Depth (in.)	Ratios to Clay 8M		
	NH ₄ OAc CEC	Ext. Iron	15-Bar Water
0-8	0.66	0.05	0.39
8-11	0.60	0.05	0.37
11-16	0.49	0.04	0.33
16-20	0.45	0.03	0.30
20-25	0.37	0.03	0.30
25-31	0.33	0.03	0.31
31-39	0.31	0.02	0.31
39-48	0.28	0.02	0.30
48-60	0.27	0.03	0.31

a. > 50% Fe-Mn.
 b. 25-50% Fe-Mn.
 c. 5-25% Fe-Mn.
 d. > 50% carbonate.
 e. 5-25% carbonate.
 f. Air-Dry.
 Note: See descriptions for mineralogy.

Soil type: *Feebles silt loam

Soil Nos.: S59Wis-20-3

Location: Fond du Lac County, Wisconsin; southeast quarter of southwest quarter of Section 29, T15N, R17E; about two miles southwest of the city of Fond du Lac; 375 feet west of town highway at field entrance; photo XF-2B-74 (1941).

Vegetation and use: Cropland, planted to oats in 1959.

Slope and land form: Nearly level to gently sloping, 1 to 2 percent; Late Wisconsin (Valders) terminal moraine.

Drainage and permeability: Well drained; surface runoff and internal drainage are medium; permeability is moderately slow.

Parent material: Reddish brown calcareous clay till with a thin silt mantle.

Collected by: J. S. Allen, William DeYoung, and G. E. Lee, September 1, 1959.

Described by: E. G. Link.

Horizon and

Lincoln

Lab. Number

Ap 11794	0 to 8 inches. Very dark gray (10YR 3/1) silty clay loam with weak to moderate medium granular structure; friable when moist; medium acid.
A1 11795	8 to 11 inches. Very dark gray (10YR 3/1) silty clay loam with moderate very fine subangular blocky structure; firm when moist; slightly acid.
IIB21 11796	11 to 16 inches. Dark reddish gray (5YR 4/2) to reddish brown (5YR 5/3, 5YR 4/2 crushed) clay with moderate to strong fine subangular blocky structure; very firm when moist; peds have dark reddish brown (5YR 3/2) organic coatings; moderately alkaline.
IIB22 11797	16 to 20 inches. Reddish brown (5YR 4/3 to 2.5YR 4/3, 5YR 5/3 crushed) clay with weak medium prismatic structure that breaks to moderate to strong medium angular blocky structure; very firm when moist; structural units have dark reddish brown (5YR 3/2) organic coatings and some clay skins; moderately alkaline.
IIB3 11798	20 to 25 inches. Reddish brown (5YR 4/3, 5YR 5/3 crushed) clay with weak medium prismatic structure that breaks to weak medium to fine angular blocky structure; very firm when moist; some segregated free lime and a few organic coatings; effervescence with HCl.
IIC1 11799	25 to 31 inches. Reddish brown (5YR 5/3) silty clay to clay with weak medium prismatic structure that breaks to weak medium angular blocky structure; very firm when moist; zone of maximum pinkish gray (5YR 7/2) soft lime segregation; violent effervescence with HCl.
IIC2 11800	31 to 39 inches. Reddish brown (5YR 5/3 to 4/3) silty clay with moderate medium prismatic structure that breaks to weak medium angular blocky structure; very firm when moist; light brownish gray (2.5Y 6/2) coatings along horizontal and vertical cleavage faces; violent effervescence with HCl.
IIC3 11801	39 to 48 inches. Reddish brown (5YR 4/3) silty clay with moderate medium prismatic structure that breaks to weak medium angular blocky structure; very firm when moist; light brownish gray (2.5Y 6/2) coatings along horizontal and vertical cleavage faces; violent effervescence with HCl.
IIC4 11802	48 to 60 inches. Reddish brown (5YR 4/3 to 5/3) silty clay with weak coarse prismatic structure that breaks to a massive condition; very firm when moist; numerous pebbles mostly less than 10-mm. in size; violent effervescence with HCl.

Remarks: Colors given are for moist soil. Reaction determined by Hellige-Truog pH kit. B and C horizons sampled for Bureau of Public Roads. A1 horizon somewhat heavier texture than Ap horizon. Stones and gravel present are largely dolomitic. Upper 11 inches may largely be loess material.

Mineralogy (Method 7A): The dolomite-to-calcite ratio, determined by X-ray diffraction, is about 2:1 in the IIC4 horizon, but only dolomite persists in the carbonate fringe, IIB22 horizon.

SOIL TYPE Plainfield LOCATION Adams County, Wisconsin
loamy fine sand

SOIL NOS. S57Wis-1-1 LAB. NOS. 6966-6971

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)									2A2 > 2	TEXTURAL CLASS
		1B1a		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		
0-3	A1	1.1	18.2	42.2	26.5	2.2	5.7	4.1	11.6	3.6	-	S
3-8	A3	0.4	15.6	41.8	31.6	2.6	4.2	3.8	13.3	2.8	-	S
8-21	C1	0.4	16.9	44.0	28.9	2.1	4.3	3.4	12.8	1.9	-	S
21-31	C2	0.5	13.4	44.6	35.5	3.3	1.1	1.6	15.6	0.5	-	S
31-44	C3	0.1	10.4	42.4	40.2	5.8	0.4	0.7	19.5	0.1	-	S
44-55+	C4	0.2	7.8	20.6	54.5	12.4	3.4	1.1	42.8	0.3	Tr.	fb
pH		ORGANIC MATTER				6C1a	4A3a					
8C1a		6A1a	6B1a		Free Iron							
	1:5	1:10	ORGANIC CARBON %	NITRO-GEN %	C/N	Fe ₂ O ₃ %	Vol. Wt. g/cc					
5.2			2.06	0.120	17	0.5						
5.5			0.62	0.034	18	0.6						
5.6			0.32	0.027	12	0.6	1.50					
5.7			0.13	0.020		0.4						
5.9			0.05			0.3	1.57					
5.9			0.05			0.4						
5A1a		EXTRACTABLE CATIONS				5B1a	5C3	5B1a	5A3a			
CATION EXCHANGE CAPACITY NH ₄ Ac	6N2b	6O2b	6H1a	6P2a	6Q2a	BASE SAT. % NH ₄ Ac EXCH.	Base Sat. % on Sum	Sum Ext. Bases	Sum Ext. Cations	MOISTURE AT SATURATION %		
	Ca	Mg	H	Na	K		5C1a	me/100g.				
	← milliequivalents per 100g. soil →											
6.5	2.3	0.5	11.2	<0.1	0.1	45	20	2.9	14.1			
2.8	0.6	0.3	4.3	<0.1	<0.1	32	17	0.9	5.2			
2.2	0.1	0.3	3.9	<0.1	<0.1	18	9	0.4	4.3			
1.0	0.1	0.1	2.0	<0.1	<0.1	20	9	0.2	2.2			
0.5	<0.1	0.1	1.2	<0.1	<0.1	20	8	0.1	1.3			
0.9	0.1	0.1	1.6	<0.1	<0.1	22	11	0.2	1.8			

Soil type: Plainfield loamy fine sand

Soil Nos.: S57Wis-1-1

Location: Adams County, Wisconsin; 0.1 mile south of northwest corner Section 21, T19N, R6E.

This profile was sampled in a virgin area except for burning, within the so-called glacial Lake Wisconsin basin. Parent materials consisted primarily of quartz sands with an estimated 5 percent of other minerals of sand-grain size such as jasper, feldspar, hornblende, etc. Native vegetation consists of a thirty-year-old stand of mixed jack pine and black oak, with an understory of blueberry and some bunch grasses. Relief is very gently undulating with 1- and 2-percent slopes predominating. Overall drainage is excessive, ground water is deep, and permeability is rapid. The profile was moist at time of sampling. This profile has the characteristics of a Regosol intergrading to a Brown Podzolic. Has been included with the Plainfield series in the past but is thought to have some of Omega series characteristics also.

Sampled by: A. J. Klingelhoets, G. E. Lee, William DeYoung, and R. H. Jordan, October 28, 1957.

Described by: A. J. Klingelhoets.

Horizon and

Lincoln

Lab. Number

Aoo and Ao	1/4 to 0 inch. Very thin layer of partly decomposed and fresh pine needles, oak leaves and grasses; temperature 7 degrees C.; pH 4.2.
A1 6966	0 to 3 inches. Black (10YR 2/1) to very dark grayish brown (10YR 3/2) loamy fine sand having weak medium granular structure; very friable; some bleached quartz grains; high organic matter content and plant roots plentiful; pH 5.3; temperature 7.7 degrees C. at 1 1/2 inches; abrupt irregular boundary; 2 to 6 inches thick.
A3 6967	3 to 8 inches. Dark brown (10YR 3/3 to 4/3) loamy fine sand with weak medium granular structure; very friable; tree roots plentiful; pH 5.0; clear irregular boundary; 4 to 8 inches thick.
C1 6968	8 to 21 inches. Dark brown (7.5YR 4/4) loamy fine sand having weak coarse subangular blocky structure which is very friable when moist; tree roots plentiful; temperature 7.8 degrees C. at 14 inches; pH 5.5; gradual wavy boundary; 8 to 15 inches thick. (Two cores taken at 11 to 14 inches.)
C2 6969	21 to 31 inches. Dark yellowish brown (10YR 4/4) fine sand with very weak coarse subangular blocky structure breaking down into single grains; loose; temperature 7.8 degrees C. at 25 inches; pH 5.5; gradual wavy boundary; 8 to 12 inches thick.
C3 6970	31 to 44 inches. Light yellowish brown (10YR 6/4) fine sand single grained; loose with few fine distinct mottles of 10YR 5/6 in lower part; temperature 9.1 degrees C. at 34 inches; pH 5.8; clear wavy boundary; 10 to 18 inches thick. (Two cores taken at 35 to 38 inches.)
C4 6971	44 to 55 inches plus. Light yellowish brown (10YR 6/4) fine sand having a very weak coarse platy structure breaking down readily into single grain; loose; slightly brittle in place; many medium distinct mottles 10YR 5/6; temperature 9.3 degrees C. at 46 inches; pH 5.8.

Remarks: All pH readings by use of Hellige-Truog kit. All colors were taken under moist field conditions.

Soil type: Plainfield loamy fine sand

Soil Nos.: S57Wla-1-2

Location: Adams County, Wisconsin; 0.2 mile east of northwest corner Section 22, T19N, R6E.

This profile occurs in old glacial Lake Wisconsin and is in a virgin area except for burns which occurred several times in the past century. Parent material consists of sandy glacial outwash with approximately 5 percent of microscopic mineral grains other than quartz. Ground cover consists of black oak and jack pine with an understory of bunch grasses. Relief is very gently undulating with 1 to 2 percent slopes predominating. Drainage is excessive, ground water occurs at about 9 feet, and permeability is rapid. The profile was moist at time of sampling. This profile has the characteristics of a Regosol intergrading to a Brown Podzolic. Has been included with the Plainfield series in the past but is thought to have some of Omega series characteristics also.

Sampled by: A. J. Klingelhoets, G. B. Lee, William DeYoung, and R. H. Jordan, October 28, 1957.

Described by: A. J. Klingelhoets.

Horizon and
Lincoln
Lab. Number

Aoo and Ao	1/4 to 0 inch. Organic mat, partly decomposed oak leaves and grasses; pH 4.6.
A1 6972	0 to 3 inches. Very dark brown (10YR 2/2) loamy fine sand with weak medium granular structure; very friable; high in organic content and some bleached quartz grains; plant roots plentiful; temperature 10.8 degrees C.; pH 5.6; clear wavy boundary; 2 to 4 inches thick.
A3 6973	3 to 7 inches. Dark brown (10YR 3/3) loamy fine sand having weak medium subangular blocky breaking down to weak fine granular structure; very friable; many bleached quartz grains; tree roots plentiful; temperature 9.3 degrees C. at 5 inches; pH 5.7; clear wavy boundary; 3 to 6 inches thick.
C1 6974	7 to 14 inches. Dark yellowish brown (10YR 3/4) to dark brown (7.5YR 3/4) loamy fine sand with weak medium subangular blocky structure; very friable; tree roots plentiful; temperature 8.4 degrees C. at 12 inches; pH 5.8; gradual wavy boundary; 5 to 10 inches thick. (Two cores taken at 8 to 11 inches.)
C2 6975	14 to 21 inches. Dark brown (7.5YR 4/4) loamy fine sand to fine sand having a weak medium subangular blocky structure; friable when moist; tree roots plentiful; temperature 8.6 degrees C. at 17 inches; pH 5.8; gradual wavy boundary; 6 to 10 inches thick.
C3 6976	21 to 30 inches. Dark brown (7.5YR 4/4) to dark yellowish brown (10YR 4/4) fine sand having a very weak medium subangular blocky structure; slightly coherent to loose; temperature 9.6 degrees C. at 25 inches; pH 5.8; gradual wavy boundary; 8 to 12 inches thick.
C4 6977	30 to 42 inches. Yellowish brown (10YR 5/4) fine sand having a few fine distinct rusty mottles; single grained; loose; temperature 10.2 degrees C. at 35 inches; pH 5.8; clear wavy boundary; 8 to 15 inches thick. (Two cores taken at 34 to 37 inches.)
C5 6978	42 to 56 inches. Light yellowish brown (10YR 6/4) fine to medium sand; single grained; loose; many distinct fine mottles 7.5YR 5/6 and 8/2; temperature 11.1 degrees C. at 49 inches; pH 5.8.

Remarks: All pH readings by use of Hellige-Truog kit. All colors were taken under moist field conditions. Air temperature was 14.5 degrees C.

SOIL TYPE Plainfield LOCATION Waushara County, Wisconsin
loamy sand

SOIL NOS. S57Wis-69-1 LAB. NOS. 6979-6984

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)									TEXTURAL CLASS	
		1B1a		3A1					2A2			
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY	> 2			
	2-1	1-0.5	0.5-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.02	0.02-0.002	($< 19\mu$)		
0-4	A1	1.3	27.1	33.0	26.8	1.5	6.4	3.9	10.7	4.5	Tr.	cos
4-13	C1	1.4	25.4	33.3	28.7	1.4	5.8	4.0	10.7	4.1	Tr.	cos
13-22	C2	2.8	31.6	31.3	24.0	1.4	5.1	3.8	10.1	3.0	2	cos
22-32	C3	2.3	22.4	37.1	32.4	0.7	1.9	3.2	8.1	1.2	4	cos
32-49	C4	1.6	32.7	35.5	28.2	0.4	<0.1	1.6	6.5	0.2	2	cos
49-60+	C5	0.1	10.6	36.1	51.4	0.8	<0.1	1.0	13.5	<0.1	Tr.	fs
pH		ORGANIC MATTER				6C1a	4A3a					
8C1a	1:5	1:10	6A1a	6B1a		Free Iron	Vol.					
			ORGANIC CARBON %	NITROGEN %	C/N	Fe ₂ O ₃ %	Wt. g/cc					
4.9			0.89	0.056	16	0.6						
5.3			0.22	0.022		0.5	1.52					
5.6			0.14	0.014		0.5						
5.5			0.06	0.009		0.5						
5.9			0.01			0.2	1.59					
6.1			<0.01			0.2						
5A1a	EXTRACTABLE CATIONS					5B1a	BASE SAT. %	5C3	5B1a	5A3a		
CATION EXCHANGE CAPACITY NH ₄ Ac	6N2b	6O2b	6H1a	6P2a	6Q2a		NH ₄ Ac EXCH.	Base Sat. % on Sum Cations	Sum Ext. Bases	Sum Ext. Cations	MOISTURE AT SATURATION %	
	Ca	Mg	H	No	K							
	← milliequivalents per 100g. soil →						5C1		me/100g.			
4.0	0.5	0.2	5.1	<0.1	0.1	20	14	0.8	5.9			
2.1	0.2	0.1	2.4	<0.1	<0.1	10	8	0.2	2.6			
1.9	0.3	0.1	2.4	<0.1	<0.1	21	14	0.4	2.8			
1.5	0.3	0.1	1.6	<0.1	<0.1	20	16	0.3	1.9			
0.7	0.1	0.1	0.8	<0.1	<0.1	<1	<1	<0.1	0.8			
0.4	0.2	0.1	0.4	<0.1	<0.1	50	33	0.2	0.6			

Soil type: Plainfield loamy sand

Soil Nos.: S57WAs-69-1

Location: Waushara County, Wisconsin; northwest quarter of southwest quarter of southwest quarter, Section 10, T19N, R8E.

While this profile was sampled in a virgin area, some evidence of burning in the past 30 years was seen. The parent material is sandy glacial outwash of old Lake Wisconsin basin. Parent materials consisted principally of quartz sands with some glacial pebbles and a few cobbles; sand over 90 percent quartz. Black oak and jack pine constituted the upperstory cover while hazel brush, wild roses and bunch grasses formed the ground cover. The soil occurs principally on nearly level relief with 1 percent slopes predominating. Drainage is excessive, ground water is deep, and permeability is rapid. This profile is representative of extensive areas mapped as Plainfield in central Wisconsin; it differs from the official description of Plainfield in having developed in sandy glacial outwash containing a higher percent of dark-colored minerals. In this particular case approximately 10 percent of other than quartz minerals were noted. Similar profiles examined in the past have contained up to an estimated 25 percent of weatherable minerals other than quartz in the substratum. It differs from the official Plainfield also in having more of the Podzol characteristics. Plainfield is described as being a Gray Brown Podzolic or Regosol soil. This particular profile has been considered as a Regosol intergrading to weak Podzol.

Sampled by: A. J. Klingelhoets, G. B. Lee, William DeYoung, and R. H. Jordan, October 29, 1957.

Described by: A. J. Klingelhoets.

Horizon and

Lincoln

Lab. Number

- Aoo and Ao 1 to 0 inch. Mat of undecomposed oak leaves and grasses over a thin layer of very dark brown (10YR 2/2) well decomposed organic matter; pH 5.1.
- A1 0 to 4 inches. Very dark grayish brown (10YR 3/2) loamy sand having weak medium granular structure; very friable when moist; plant roots plentiful; approximately 1 inch of lighter-colored sand overburden in places; many bleached quartz grains; pH 5.0; clear wavy boundary; 2 to 5 inches thick.
- 6979
- C1 4 to 13 inches. Dark brown (7.5YR 4/4) loamy sand with weak medium subangular blocky structure; very friable when moist; tree roots plentiful; pH 5.2; gradual wavy boundary; 7 to 11 inches thick. (Two cores taken at 5 to 8 inches.)
- 6980
- C2 13 to 22 inches. Strong brown (7.5YR 4/6) loamy sand with weak medium to coarse subangular blocky structure; very friable when moist; tree roots plentiful; pH 5.2; gradual wavy boundary; 7 to 12 inches thick.
- 6981
- C3 22 to 32 inches. Strong brown (7.5YR 5/6) medium sand having very weak coarse platy structure which breaks down into single grains readily; loose consistency; few scattered gravels and cobbles; pH 5.0; clear wavy boundary; 8 to 12 inches thick.
- 6982
- C4 32 to 49 inches. Yellowish brown (10YR 5/8) medium sand which is single grained and loose; few scattered gravel; pH 5.3; abrupt smooth boundary; 10 to 18 inches thick. (Two cores taken at 32 to 35 inches.)
- 6983
- C5 49 to 60 inches plus. Light yellowish brown (10YR 6/4) fine and medium sands single grained; loose; stratified; pH 5.3.
- 6984

Remarks: All pH readings by use of Hellige-Truog kit. All colors were taken under moist field conditions. No temperature readings were taken.

SOIL TYPE Plainfield LOCATION Waushara County, Wisconsin
loamy sand

SOIL NOS. S57W18-69-2 LAB. NOS. 6985-6991

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS
		1B1a					3A1					
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY	0.2-0.02	0.02-0.002	> 2	
		2.1	1.0-5	0.5-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.02	0.02-0.002	< 9mm	
0-4	A1	1.4	37.2	33.2	16.2	1.3	6.8	3.9	7.8	4.5	-	cos
4-12	C1	1.8	36.3	36.1	16.2	0.8	4.8	4.0	6.1	3.2	Tr.	cos
12-21	C2	1.5	34.3	37.2	18.2	0.9	4.4	3.5	6.3	3.1	Tr.	cos
21-28	C3	2.3	41.7	36.5	14.0	0.6	2.0	2.9	4.2	1.4	2	cos
28-39	C4	1.8	42.0	38.2	13.9	0.3	0.6	3.2	2.9	0.3	7	cos
39-48	C5	2.7	43.8	40.9	10.0	0.2	<0.1	2.4	1.7	<0.1	2	cos
48-60+	C6	3.7	48.1	36.3	9.9	0.2	<0.1	1.8	1.8	<0.1	2	cos
pH		ORGANIC MATTER				6C1a	4A3a					
8C1a		6A1d 6B1a		6C1a		Free Iron	Vol.					
	1:5	1:10	ORGANIC CARBON %	NITROGEN %	C/N	Fe2O3 %	Wt. g/cc					
5.7			1.25	0.083	15	0.5						
5.8			0.26	0.022	12	0.5	1.57					
5.8			0.15	0.015		0.4						
5.7			0.06	0.010		0.4						
5.8			0.04			0.4	1.63					
5.9			0.04			0.3						
6.1			0.01			0.3						
5A1a		EXTRACTABLE CATIONS				5B1a	BASE SAT. %	5C3	5B1a	5A3a		
CATION EXCHANGE CAPACITY NH4 Ac		6N2b	6O2b	6H1a	6P2a	6Q2a	NH4 Ac EXCH.	Base Sat. %	Sum Ext.	Sum Ext.	MOISTURE AT SATURATION %	
		milliequivalents per 100g. soil					5C1	on Sum Cations	me	100g.		
5.5	2.4	0.3	4.4	<0.1	0.1	51	39	2.8	7.2			
2.3	0.9	0.1	2.4	<0.1	<0.1	43	29	1.0	3.4			
1.8	0.6	0.1	1.6	<0.1	<0.1	39	30	0.7	2.3			
1.5	0.5	<0.1	2.0	<0.1	<0.1	33	20	0.5	2.5			
1.5	0.4	0.2	1.2	<0.1	<0.1	40	33	0.6	1.8			
1.1	0.3	0.1	0.8	<0.1	<0.1	36	33	0.4	1.2			
0.8	0.1	0.1	0.4	<0.1	<0.1	25	33	0.2	0.6			

Soil type: Plainfield loamy sand

Soil Nos.: S57Wis-69-2

Location: Waushara County, Wisconsin; northwest quarter of southwest quarter of Section 3, T19N, R8E.

The area where this soil was sampled had been burned and pastured, but not within the last few years. Parent material consisted of sandy glacial outwash of old Lake Wisconsin. Approximately 12 percent of the substratum by volume was composed of minerals other than quartz. Some cobbles and gravels present in the profile. Black oak with an understory of hazelnut and bunch grasses made up the ground cover. Relief was nearly level and profile was sampled on a 1 percent plain slope. Drainage was excessive, ground water deep, and permeability rapid. This profile is representative of extensive areas mapped as Plainfield in central Wisconsin; it differs from the official description of Plainfield in having developed in sandy glacial outwash containing a higher percent of dark-colored minerals. In this particular case approximately 10 percent of other than quartz minerals were noted. Similar profiles examined in the past have contained up to an estimated 25 percent of weatherable minerals other than quartz in the substratum. It differs from the official Plainfield also in having more of the Podzol characteristics. Plainfield is described as being a Gray-Brown Podzolic or Regosol soil. This particular profile has been considered as a Regosol intergrading to weak Podzol.

Sampled by: A. J. Klingelhoets, G. B. Lee, William DeYoung, and R. H. Jordan, October 29, 1957.

Described by: A. J. Klingelhoets.

Horizon and

Lincoln

Lab. Number

Aoo and Ao	1/2 to 0 inch. Thin layer of oak, hazelnut and grass leaves over black (10YR 2/1) well decomposed mat of humus; pH 6.0.
A1 6985	0 to 4 inches. Very dark grayish brown (10YR 3/2) loamy sand with very weak medium granular structure; very friable when moist; plant roots plentiful; high content of organic matter and abundance of bleached quartz grains; temperature 4.2 degrees C.; pH 5.8; clear wavy boundary; 3 to 5 inches thick.
C1 6986	4 to 12 inches. Dark brown (7.5YR 3/4) loamy sand having weak medium subangular blocky structure; very friable when moist; tree roots plentiful; temperature 5.0 degrees C.; pH 5.6; gradual irregular boundary; 6 to 10 inches thick. (Two cores taken at 6 to 9 inches.)
C2 6987	12 to 21 inches. Dark brown (7.5YR 4/4) loamy sand to medium sand with a weak medium subangular blocky structure; very friable; thin band of cobbles 1- to 2-inch diameter at top of horizon; tree roots plentiful; temperature 6.3 degrees C.; pH 5.7; clear wavy boundary; 8 to 12 inches thick.
C3 6988	21 to 28 inches. Dark brown (7.5YR 4/4) to strong brown (7.5YR 4/6) medium sand with very weak coarse subangular blocky structure; loose; temperature 7.4 degrees C.; pH 5.7; clear wavy boundary; 7 to 10 inches thick.
C4 6989	28 to 39 inches. Strong brown (7.5YR 4/6) medium sand with some fine gravels; very weak coarse platy structure to single grained; loose; temperature 8.3 degrees C.; pH 5.5; clear wavy boundary; 8 to 14 inches thick.
C5 6990	39 to 48 inches. Yellowish brown (10YR 5/6) medium sand, single grained, few spots and streaks of dark brown (7.5YR 4/4); loose; pH 5.7; temperature 8.6 degrees C.; clear wavy boundary; 8 to 11 inches thick.
C6 6991	48 to 60 inches plus. Light yellowish brown (10YR 6/4) medium sand with few fine gravel; single grained; loose; temperature 9.5 degrees C.; pH 5.7.

Remarks: All pH readings by use of Hellige-Truog kit. All colors were taken under moist field conditions.

SOIL TYPE Plainfield LOCATION Waushara County, Wisconsin
loamy sand

SOIL NOS. S57Wis-69-4 LAB. NOS. 6998-7003

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS
		1B1a 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		2A2 > 2 ($\leq 19\mu m$)	
0-8	Ap	1.2	21.9	30.4	31.6	4.0	7.0	3.9	17.7	3.8	Tr.	s
8-16	C1	1.9	19.7	32.9	33.1	2.2	6.7	3.5	13.9	3.8	3	s
16-26	C2	0.9	11.1	28.0	50.7	1.9	3.7	3.7	18.7	1.3	3	fs
26-36	C3	2.8	10.9	24.6	55.5	1.9	2.0	2.3	20.3	1.1	5	fs
36-48	C4	1.3	8.0	20.4	58.0	2.9	6.0	3.4	22.9	2.1	4	fs
48-60+	C5	1.0	18.7	31.6	39.5	2.8	3.8	2.6	17.4	1.5	2	s
8C1a		pH		ORGANIC MATTER			6C1a	4A3a				
1:1		1:10	ORGANIC CARBON %	NITRO-GEN %	C/N	Free Iron Fe ₂ O ₃ %	Vol. Wt. g/cc					
6.7			0.45	0.044	10	0.5						
6.5			0.13	0.014		0.5	1.61					
6.3			0.07	0.009		0.4						
6.0			0.04			0.4						
5.9			0.04			0.5	1.58					
6.1			0.01			0.4						
5A1a		EXTRACTABLE CATIONS					5B1a	5C3	5B1a	5A3a		
CATION EXCHANGE CAPACITY NH ₄ Ac		6N2b	6O2b	6H1a	6P2a	6Q2a	BASE SAT. % NH ₄ Ac EXCH.	Base Sat. % on Sum Cations	Sum Ext. Bases me/100g.	Sum Ext. Cations me/100g.	MOISTURE AT SATURATION %	
←		milliequivalents per 100g. soil					5C1					
3.2	2.0	0.8	2.0	<0.1	<0.1	88	58	2.8	4.8			
2.2	1.1	0.9	1.2	<0.1	<0.1	91	62	2.0	3.2			
1.7	0.8	0.6	1.2	<0.1	<0.1	82	54	1.4	2.6			
1.3	0.5	0.6	0.8	<0.1	<0.1	85	58	1.1	1.9			
1.8	1.2	0.8	0.8	<0.1	<0.1	111	71	2.0	2.8			
1.5	1.0	0.2	0.4	<0.1	<0.1	80	75	1.2	1.6			

Soil type: Plainfield loamy sand

Soil Nos.: S57Wis-69-4

Location: Waushara County, Wisconsin; 3 miles west of northeast corner of Section 10, T19N, R8E.

This profile was sampled in an alfalfa-bromegrass field. It has developed from the same parent material and occurs on identical relief as Richford, profile S57Wis-69-3.

Sampled by: A. J. Klingelhoets, G. B. Lee, William DeYoung, and R. H. Jordan, October 29, 1957.

Described by: A. J. Klingelhoets.

Horizon and

Lincoln

Lab. Number

- Ap
6998 0 to 8 inches. Very dark grayish brown (10YR 3/2) to dark brown (10YR 3/3) loamy sand which is cloddy but breaks down into weak medium granules; very friable when moist; plant roots plentiful; temperature 5.2 degrees C.; pH 6.3 (may have been lined); abrupt smooth boundary; 7 to 9 inches thick.
- C1
6999 8 to 16 inches. Dark brown (7.5YR 3/4 to 4/4) loamy sand having weak medium subangular blocky structure; very friable when moist; temperature 5.4 degrees C.; pH 6.2; clear wavy boundary; 6 to 10 inches thick. (Two cores taken at 8 to 11 inches.)
- C2
7000 16 to 26 inches. Dark brown (7.5YR 4/4) to strong brown (7.5YR 4/6) medium sand with very weak medium subangular blocky structure; very friable when moist; temperature 6.8 degrees C.; pH 6.2; clear wavy boundary; 8 to 12 inches thick.
- C3
7001 26 to 36 inches. Strong brown (7.5YR 4/6) fine sand which is single grained; loose; few pebbles and pea gravel scattered throughout; temperature 8.5 degrees C.; pH 6.0; abrupt wavy boundary; 7 to 12 inches thick.
- C4
7002 36 to 48 inches. Brown (7.5YR 5/4) to yellowish brown (10YR 5/4) loamy fine sand which is massive in place and very friable when moist; temperature 10.0 degrees C.; pH 5.5; clear wavy boundary; 8 to 14 inches thick.
- C5
7003 48 to 60 inches plus. Dark brown (10YR 4/3) loamy fine sand with strata of light yellowish brown (10YR 6/4) fine sand; massive to single grained; very friable to loose; temperature 10.5 degrees C.; thin finer-textured bands also occur below 60 inches; pH 5.5.

Remarks: All pH readings by use of Hellige-Truog kit. All colors were taken under moist field conditions.

SOIL Flano silt loam SOIL Nos. S62W1s-11-2 LOCATION Columbia County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 17879-17890 May 1966
General Methods: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm)											3A1		Clay		Coarse fragments				
		Total			Sand				Silt				Int. III (0.02-0.002)	Int. II (0.2-0.02)	3A1a Carbonate	Non-Carbonate	3B2 > 2 Vol. Pct.	3B1 > 2 Pct. of	2-19 Pct. < 19 tr		
		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											
		Pct of < 2 mm																			
0-3	Ap	3.9	71.7	24.4	-	0.3a	0.3b	0.6c	2.7	30.4	41.3	33.5	1.2								
8-15	A12	3.4	73.6	23.0	-	0.2a	0.2a	0.4c	2.6	31.9	41.7	34.7	0.8								
15-20	A3	3.8	77.0	19.2	tr a	0.2a	0.1a	0.3b	3.2	35.5	41.5	38.9	0.6								
20-26	B1	3.6	70.6	25.8	-	0.1a	0.1a	0.3b	3.1	35.1	35.5	38.4	0.5								
26-37	B21	3.2	65.9	30.9	-	0.1a	0.1a	0.3b	2.7	34.7	31.2	37.6	0.5								
37-44	B22	3.5	68.4	28.1	-	0.1a	0.2a	0.4b	2.8	37.0	31.4	40.0	0.7								
44-59	B31	12.6	64.6	22.8	0.1	1.0	3.1	4.6	3.8	35.0	29.6	40.8	8.8						tr		
59-64	T&IIB32	50.4	35.1	14.5	1.0	5.4	15.0	22.4	6.6	19.5	15.6	35.4	43.8						tr		
64-70	IIB33/B	62.4	24.6	13.0	2.8	7.7	16.4	26.7	8.8	12.4	12.2	33.1	53.6	-	13				5		
70-75	IIC1	72.4	20.7	6.9	2.5d	6.3d	16.0d	32.9d	14.7d	12.3	8.4	43.1	57.7	-	7	15	21	8			
75-87	IIC2	72.9	22.2	4.9	1.4d	6.0d	16.9d	34.8d	13.8d	14.3	7.9	44.4	59.1	tr	5	15	21	15			
87-99	ITC3	72.4	23.1	4.5	1.3d	7.2d	18.3d	33.3d	12.3d	13.0	10.1	40.9	60.1	tr	4	15	20	14			
Depth (in.)	Organic carbon	Nitrogen	C/N	6C2a Ext. Iron as Fe Pct.	6E1b 6E2a Carbonate as CaCO3 Pct.	Bulk density				4D1 COLE	Water content				pH						
						4A1a Field State	4A1d 1/3-Bar	4A1d 1/3-Bar	4A1b Air-Dry		4B4 Field State	4B1c 1/3-Bar	4B2 15-Bar	4C1 1/3-to 15-Bar		8C1a (1:1)					
0-3	3.36	0.271	12	0.8	tr(s)	1.28		1.24	1.31	0.017	14.5	27.5	11.9	0.19				6.1			
8-15	2.04	0.167	12	0.8		1.32		1.26	1.32	0.017	13.1	26.9	10.0	0.21				5.3			
15-20	0.80	0.080	10	0.8		1.44		1.40	1.44	0.010	9.2	21.6	7.8	0.19				5.2			
20-26	0.48	0.053	9	1.0		1.44		1.40	1.46	0.014	10.6	21.4	10.2	0.16				5.3			
26-37	0.32	0.037	9	1.1		1.45		1.40	1.51	0.024	16.5	24.5	12.8	0.16				5.2			
37-44	0.20	0.027		1.1		1.52f		1.48f	1.57f				12.4					5.3			
44-59	0.13	0.017		1.1	-(s)	1.61		1.56	1.64	0.017	14.9	21.8	9.8	0.19				5.8			
59-64	0.11	0.016		1.1	-(s)	1.60f		1.54f	1.62f				6.2					6.0			
64-70	0.08	0.016		0.9	2	1.58		1.52	1.58	0.014	9.6	14.9	6.3	0.13				7.0			
70-75	0.06			0.5	22	1.80f	1.51	1.78h	1.78f				3.2					7.7			
75-87	0.04			0.3	20	1.80	1.51	1.78i	1.78		3.2	10.4k	2.2	0.13m				7.9			
87-99	0.02			0.3	22	1.86	1.57	1.84i	1.84		4.6	10.9k	2.3	0.14m				8.0			
Depth (in.)	Extractable bases				5E1a Sum	6H1a Ext. Acidity	Oct. Sum	Ext. Cap. NH4, OAc	6G1b KCl-Ext. Al	8D3 Ca/Mg	Base saturation										
	6N2a Ca	6O2a Mg	6P2a Na	6Q2a K							5C3 Sum	5C1 NH4, OAc									
0-3	12.8	6.4	0.1	0.4	19.7	9.8	29.5	22.2		2.0	67	89									
8-15	6.8	2.9	0.1	0.2	10.0	13.6	23.6	16.6	0.1	2.3	42	60									
15-20	5.2	2.0	0.1	0.2	7.5	8.2	15.7	11.9	0.5	2.6	48	63									
20-26	8.1	3.5	0.1	0.3	12.0	7.0	19.0	15.1	0.5	2.3	63	79									
26-37	10.5	5.2	0.1	0.5	16.3	7.4	23.7	19.1	0.5	2.0	69	85									
37-44	10.7	5.6	0.1	0.4	16.8	6.6	23.4	18.8	0.4	1.9	72	89									
44-59	9.0	5.0	0.1	0.4	14.5	3.8	18.3	15.0		1.8	79	97									
59-64	5.8	3.4	0.1	0.2	9.5	2.0	11.5	9.2		1.7	83	103									
64-70	5.4n	3.4p	tr	0.2	9.0	0.6		8.5		1.6		106									
70-75	3.0n	1.9p	tr	0.1	5.0	-		3.9		1.6		128									
75-87	2.0n	1.5p	tr	0.1	3.6	-		2.4		1.3		150									
87-99	2.0n	1.3p	tr	0.1	3.4	-		2.2		1.5		154									
Depth (in.)	Ratios to Clay 8M				NH4, OAc CEC	Ext. Iron	15-Bar Water	a. > 50% Fe-Mn.	b. 25-50% Fe-Mn.	c. 5-25% Fe-Mn.	d. 5-25% carbonate.	e. 18 kg/m ² to 60 inches (Method 6A).	f. Estimated.	g. Calculated to include volume but not weight of > 2-mm. material. (Method 3B2)	h. 1/10-Bar, estimated.	i. 1/10-Bar (Method 4Alg).	j. Coefficient of Linear Extensibility.	k. 1/10-Bar.	m. 1/10-Bar (Method 4C2).	n. NH4Cl-EtOH extraction (Method 6N3a).	p. NH4Cl-EtOH extraction (Method 6O3a).
	0-3	0.91	0.03	0.49																	
8-15	0.72	0.03	0.43																		
15-20	0.62	0.04	0.41																		
20-26	0.58	0.04	0.40																		
26-37	0.62	0.04	0.41																		
37-44	0.67	0.04	0.44																		
44-59	0.66	0.05	0.43																		
59-64	0.63	0.08	0.43																		
64-70	0.65	0.07	0.48																		
70-75	0.56	0.07	0.46																		
75-87	0.49	0.06	0.45																		
87-99	0.49	0.07	0.51																		

Soil Type: Plano silt loam

Soil Nos.: 862Wis-11-2

Location: SW 1/4 NE 1/4, Sec. 29, T10N, R10E, Columbia County, Wisconsin; 50 feet west and 250 feet north of field gate.

Position and Relief: Gently undulating ground moraine; 1 to 2 percent convex slope.

Drainage and Permeability: Well to moderately well drained; moderately permeable; no ground water within the 8-foot observed depth.

Parent Material: Thick loess over brown calcareous sandy loam glacial till.

Vegetation: Corn, hay and small grains.

Erosion: Slight.

Stoniness: Few large stones in the till.

Root Distribution: Many fibrous roots to 15 inches; common to 37 inches; few below 37 inches.

Sampled by: P. Carroll, G. Lee, R. Grossman, B. Watson, and D. McMurtry.

Described by: P. H. Carroll and G. Lee.

Horizon and

Lincoln

Lab. No.

Ap 17879	0 to 8 inches. Black (10YR 2/1) and very dark brown (10YR 2/2) silt loam with weak fine crumb structure; very friable; neutral; abrupt smooth boundary.
A12 17880	8 to 15 inches. Very dark brown (10YR 2/2) silt loam with weak thick platy structure that breaks on disturbance to weak fine subangular blocks; friable; medium acid; clear smooth boundary.
A3 17881	15 to 20 inches. Very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2) silt loam with weak medium platy structure that breaks on disturbance to weak very fine subangular blocks; friable; thin patchy bleached silt coats on ped faces; medium acid; clear wavy boundary.
B1 17882	20 to 26 inches. Dark brown (10YR 4/3) silt loam that is dark yellowish brown (10YR 4/4) when rubbed; weak and moderate fine subangular blocky structure; friable; thin patchy bleached silt coats on ped faces; medium acid; clear smooth boundary.
B21 17883	26 to 37 inches. Dark brown (10YR 4/3) heavy silt loam that is dark yellowish brown (10YR 4/4) when rubbed; moderate fine angular and subangular blocky structure; firm; thin bleached silt coats on some ped faces; medium acid; gradual smooth boundary.
B22 17884	37 to 44 inches. Dark yellowish brown (10YR 4/4) heavy silt loam with weak medium and coarse prismatic structure that breaks on disturbance to moderate medium angular blocks; firm; patchy bleached silt coats on ped faces in the upper part of the horizon; thin patchy dark brown (10YR 3/3) clay films on ped faces in the lower part; medium acid; clear wavy boundary.
B31 17885	44 to 59 inches. Dark yellowish brown (10YR 4/4) silt loam with weak coarse prismatic structure breaking on disturbance to weak and moderate coarse angular blocks; firm; nearly continuous thin dark brown (10YR 3/3) clay films on prism faces; medium acid; clear wavy boundary.
IB32 & IIB32 17886	59 to 64 inches. Dark yellowish brown (10YR 4/4) loam; common large prominent strong brown (7.5YR 5/6 to 5/8) and yellowish red (5YR 5/6 to 5/8) mottles; weak coarse prismatic structure that breaks under slight pressure to weak coarse subangular blocks; friable; medium acid; clear wavy boundary.
IIB33 or Beta 17887	64 to 70 inches. Reddish brown (5YR 4/4) and dark reddish brown (5YR 3/2) loam to clay loam; nearly massive; firm; neutral; clear wavy boundary.
IIC1 17888	70 to 75 inches. Yellowish brown (10YR 5/4) sandy loam with approximately 10 percent rock fragments and pebbles larger than 3/4-inch diameter; weak thin platy structure that is nearly massive in places; friable; weak effervescence with HCl; gradual wavy boundary.
IIC2 17889	75 to 87 inches. Brown (10YR 5/3) sandy loam with approximately 5 percent rock fragments and pebbles larger than 3/4-inch diameter; weak very thin platy structure; friable; strong effervescence with HCl; gradual wavy boundary.
IIC3 17890	87 to 99 inches. Brown (10YR 5/3) sandy loam with approximately 5 percent stones, rock fragments and pebbles larger than 3/4-inch diameter; weak very thin platy structure; friable; strong effervescence with HCl.

Remarks: This pedon was sampled as representative of the Maupun series and was later correlated Catlin.

SOIL Plano silt loam SOIL Nos. 962W1s-13-2 LOCATION Dane County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 17891-17902 May 1966
General Methods: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm)													3A1				
		Total				Sand					Silt				Clay				2A2 Coarse fragments
		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)	3A1a Carbonate	Non-Carbonate	3B2 > 2 Vol. Pct.	3B1 > 2 Pct.	2-19 of < 19	
Pct. of < 2 mm																			
0-8	Ap	10.0	68.0	22.0	0.1	1.0	2.2	3.5	3.2	33.6	34.4	35.5	6.8					tr	
8-11	A3	3.7	71.9	24.4	tr	0.2a	0.4a	0.8	2.3	31.9	40.0	34.6	1.4					tr	
11-18	B1	3.0	69.8	27.2	-	0.1b	0.2a	0.4	2.3	32.3	37.5	34.8	0.7					-	
18-25	B21	2.8	65.7	31.5	-	tr b	0.1a	0.3	2.4	32.7	33.0	35.3	0.4					-	
25-33	B22	3.0	67.7	29.3	-	tr b	0.1a	0.3a	2.6	33.5	34.2	36.3	0.4					tr	
33-45	B23	5.2	67.6	27.2	tr	0.4	1.1	1.6	2.1	33.7	33.9	36.5	3.1					tr	
45-57	B31	18.6	61.4	20.0	0.2	1.3	4.8	8.3	4.0	36.1	25.3	43.6	14.6					tr	
57-61	IIIC2/3	68.0	22.4	9.6	1.4	5.1	14.4c	33.5c	13.6c	12.6	9.8	42.6	54.4	-	10	20	29	5	
61-68	IIIC1	72.2	23.0	4.8	3.5c	8.3c	14.2c	30.3c	15.9c	13.7	9.3	45.4	56.3	-	5	14	19	13	
68-79	IIIC2	71.2	23.2	5.6	2.4c	7.1c	14.7c	30.5c	16.5c	12.8	10.4	45.2	54.7	-	6	23	30	25	
79-91	IIIC3	71.4	22.6	6.0	2.4c	7.8c	14.9c	29.5c	16.8c	12.6	10.0	45.2	54.6	-	6	22	29	24	
91-103	IIIC4	71.8	22.4	5.8	2.3c	6.3c	14.1c	31.6c	17.3c	13.1	9.3	47.5	54.5	-	5	23	30	25	
Depth (in.)	Organic carbon	6B1a Nitrogen	6B1a C/N	6C2a Ext. Iron as Fe Pot.	6E1b Ext. Carbonate as CaCO3 Pot.	Bulk density				4D1 COLE	Water content				pH				
						4A1a Field State	4A1d 1/3-Bar	4A1d 1/3-Bar	4A1b Air-Dry		4B4 Field State	4B1c 1/3-Bar	4B2 15-Bar	4C1 1/3-to 15-Bar	8C1a (1:1)				
0-8	1.92	0.177	11	1.0	tr (s)	1.42	1.37	1.45	0.020	16.8	22.8	9.6	0.18				6.3		
8-11	1.04	0.104	10	1.0		1.43	1.39	1.47	0.020	17.1	22.7	10.3	0.17				6.2		
11-18	0.75	0.072	10	1.1		1.37	1.32	1.42	0.024	16.0	24.9	10.4	0.19				5.5		
18-25	0.48	0.057	8	1.3		1.40e	1.35e	1.46e				13.2					5.4		
25-33	0.32	0.037	9	1.2		1.42	1.38	1.50	0.028	17.8	24.8	11.7	0.18				5.4		
33-45	0.24	0.029		1.3	(s)	1.43	1.48	1.62	0.032	18.0	23.1	11.8	0.17				5.7		
45-57	0.20	0.021		1.1	(s)	1.54	1.48	1.60	0.028	16.0	21.3	9.1	0.18				6.1		
57-61	0.10	0.010		0.7	12	1.70	1.32	1.66g	0.008	9.2	14.5j	4.1	0.14k				7.6		
61-68	0.08			0.4	23	1.86e	1.58	1.84e				2.5					7.8		
68-79	0.07			0.4	26	1.86	1.42	1.84g		5.1	9.3j	2.3	0.10k				8.0		
79-91	0.04			0.3	27	1.86e	1.43	1.84h				2.0					8.1		
91-103	0.03			0.4	27	1.96	1.42	1.84h		5.2	9.1j	1.7	0.11k				8.2		
Depth (in.)	Extractable bases				5B1a Ext. Sum	6H1a Ext. Acidity	Ox. Sum	Nch. NH4	Cap. OAc	6G1b Ext. Al	8D3 Ca/Mg	Base saturation							
	6N2a Ca	6O2a Mg	6P2a Na	6Q2a K								5C3 Sum	5C1 NH4 OAc						
0-8	10.1	5.1	0.1	0.3	15.6	7.1	22.7	16.1			2.0	69	97						
8-11	8.4	4.6	0.1	0.2	13.3	8.0	21.3	15.1			1.8	62	88						
11-18	8.4	4.7	0.1	0.3	13.5	9.4	22.9	16.4	0.2		1.8	59	82						
18-25	10.9	6.6	0.1	0.5	18.1	9.4	27.5	20.5	0.4		1.6	66	88						
25-33	11.0	6.7	0.1	0.5	18.3	7.9	26.2	19.8	0.3		1.6	70	92						
33-45	10.6	6.5	0.1	0.4	17.6	6.3	23.9	18.7			1.6	74	94						
45-57	8.1	5.1	0.1	0.3	13.6	3.3	16.9	14.0			1.6	80	97						
57-61	4.6m	3.1n	tr	0.2	7.9			6.9			1.5		114						
61-68	2.7m	1.6n	tr	0.1				3.6											
68-79	2.3m	1.8n	tr	0.1				2.5											
79-91	2.0m	1.3n	tr	0.1				2.2											
91-103	2.2m	1.2n	tr	0.1				2.0											
Depth (in.)	Ratio to Clay 8D1			15-Bar Water	a. 25-50% Fe-Mn.	b. > 50% Fe-Mn.	c. 5-25% carbonate.	d. 12 kg/m ² to 60 inches (Method 6A).	e. Estimated.	f. Calculated to include volume but not weight of > 2-mm. material. (Method 3B2)	g. 1/10-Bar (Method 4A1g).	h. 1/10-Bar; estimated.	i. Coefficient of linear Extensibility.	j. 1/10-Bar	k. 1/10-Bar (Method 4C2).	m. NH4Cl-EtOH extraction (Method 6N3a).	n. NH4Cl-EtOH extraction (Method 6O3a).		
	NH4 OAc CBC	Ext. Iron	15-Bar Water																
0-8	0.73	0.05	0.44																
8-11	0.62	0.04	0.42																
11-18	0.60	0.04	0.38																
18-25	0.65	0.04	0.42																
25-33	0.68	0.04	0.40																
33-45	0.69	0.05	0.43																
45-57	0.70	0.06	0.46																
57-61	0.72	0.07	0.43																
61-68	0.75	0.08	0.52																
68-79	0.45	0.07	0.41																
79-91	0.37	0.05	0.33																
91-103	0.34	0.07	0.29																

Soil Type: Flano silt loam
 Soil Nos.: S62Wis-13-2
 Location: NE 1/4 SW 1/4, Sec. 1, T8N, R9E, Dane County, Wisconsin.
 Position and Relief: Undulating ground moraine; 2 to 3 percent convex slope.
 Drainage and Permeability: Well drained; moderately permeable; no ground water within the 9-foot observed depth.
 Parent Material: Thick loess over brown calcareous sandy loam glacial till.
 Vegetation: Corn, small grains and hay.
 Erosion: Slight.
 Stoniness: Few large stones in the till portion of the profile.
 Root Distribution: Many fibrous roots to 24 inches, fewer below.
 Sampled by: P. Carroll, G. Lee, B. Watson, R. Grossman and D. McMurtry.
 Described by: P. H. Carroll and G. Lee.

Horizon and
 Lincoln
 Lab. No.

Ap 0 to 8 inches. Black (10YR 2/1) silt loam with weak fine subangular blocky structure; friable; mildly alkaline; clear smooth boundary.
 17891

A3 8 to 11 inches. Very dark grayish brown (10YR 3/2) silt loam that is dark grayish brown (10YR 4/2) when rubbed; weak fine subangular blocky structure; friable; mildly alkaline; clear smooth boundary.
 17892

B1 11 to 18 inches. Very dark grayish brown (10YR 3/2) and dark brown (10YR 3/3) silt loam that is dark grayish brown (10YR 4/2) when rubbed; weak to moderate fine subangular blocky structure; friable; strongly acid; clear smooth boundary.
 17893

B21 18 to 25 inches. Dark brown (10YR 3/3) heavy silt loam that is dark yellowish brown (10YR 4/4) when rubbed; moderate fine angular and subangular blocky structure; firm; few thin small spots of bleached silt on ped faces; strongly acid; gradual smooth boundary.
 17894

B22 25 to 33 inches. Dark brown (10YR 3/3) silty clay loam that is dark yellowish brown (10YR 4/4) when rubbed; moderate fine angular and subangular blocky structure; firm; many small spots of bleached silt on ped faces; strongly acid; gradual smooth boundary.
 17895

B23 33 to 45 inches. Dark brown (10YR 4/3) silty clay loam that is dark yellowish brown (10YR 4/4) when rubbed; moderate very coarse prismatic structure that breaks under pressure to moderate coarse angular blocks; firm; many fine spots of bleached silt on ped faces in the upper part of the horizon; thin patchy clay films on ped faces in the lower part; medium acid; clear irregular boundary.
 17896

B31 45 to 57 inches. Dark brown (10YR 4/3) silt loam that is dark yellowish brown (10YR 4/4) when rubbed; weak very coarse prismatic structure that breaks under pressure to weak coarse angular blocks; friable; thin patchy clay films on prism faces but less than in horizon above; medium acid; gradual wavy boundary.
 17897

IIB32 or Beta 57 to 61 inches. Dark brown (10YR 3/3) loam that is dark yellowish brown (10YR 4/4) when rubbed; contains 15 to 20 percent rock fragments and pebbles greater than 3/4 inch in diameter; weak thin platy structure that is nearly massive; friable; few patches of organic discoloration on ped faces; slightly acid; clear smooth boundary.
 17898

IIC1 61 to 68 inches. Brown (10YR 5/3) and yellowish brown (10YR 5/4) sandy loam with approximately 5 percent rock fragments and pebbles larger than 3/4-inch diameter; weak thin platy structure; friable; mildly alkaline; clear wavy boundary.
 17899

IIC2 68 to 79 inches. Brown (10YR 5/3) sandy loam with 5 percent rock fragments and pebbles greater than 3/4-inch diameter; weak very thin platy structure; friable; strong effervescence with HCl; diffuse smooth boundary.
 17900

IIC3 79 to 91 inches. Brown (7.5YR 5/4) sandy loam to loamy sand with approximately 5 percent rock fragments and pebbles larger than 3/4-inch diameter; weak very thin platy structure; very friable; strong effervescence with HCl; diffuse smooth boundary.
 17901

IIC4 91 to 103 inches. Brown (7.5YR 5/4) sandy loam with approximately 5 percent rock fragments and pebbles larger than 3/4-inch diameter; weak very thin platy structure; very friable; strong effervescence with HCl.
 17902

Remarks: This pedon was sampled as representative of the Waupun and was later correlated as Catlin.

SOIL SURVEY LABORATORY Lincoln, Nebr. 1/21/58

SOIL TYPE Fort Byron LOCATION La Crosse County, Wisconsin
silt loam

SOIL NOS. S56Wis-32-1 LAB. NOS. 5310-5315

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)								3A1		TEXTURAL CLASS
		1B1a	2A2	3A1	4A2	5A1	6A1a	7A1	8A1	9A1	10A1	
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY	0.2-0.02	0.02-0.002	> 2	
		2.1	1.0-5	0.5-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.02	0.02-0.002		
0-12	A1	0.1	0.3	0.5	0.9	2.1	78.2	17.9	54.0	26.7	-	sil
12-18	A3	0.1	0.1	0.4	1.2	4.9	75.3	18.0	54.1	26.9	-	sil
18-27	B1	-	0.1	0.3	0.9	5.0	74.6	19.1	52.7	27.5	-	sil
27-36	B2	-	0.2	0.4	0.9	4.0	73.2	21.3	54.3	23.4	-	sil
36-44	B3	-	0.1	0.3	1.1	1.2	72.9	24.4	53.2	21.6	-	sil
44-60	C1	-	0.7	1.4	5.3	14.0	60.6	18.0	65.6	13.3	-	sil
pH		ORGANIC MATTER				6E1a		MOISTURE TENSIONS				
1:1		6A1a	6B1a	C/N		CoCO ₃ equiv. percent		1/10 ATMOS.		1/3 ATMOS.	15 ATMOS.	4B2
1:5		1:10	ORGANIC CARBON %	NITRO-GEN %	C/N	%		%		%	%	%
6.7	6.8	6.8	3.81	.308	12	-						11.8
7.0	7.0	7.0	1.85	.163	11	-						8.4
5.3	5.3	5.3	0.76	.097	8	-						7.5
4.8	4.8	4.9	0.33			-						8.7
5.0	5.1	5.2	0.30			-						10.0
5.2	5.3	5.5	0.14			-						7.6
5A1a		EXTRACTABLE CATIONS				5B1a	BASE SAT. %	5C3	5B1a	5A3a	8D3	
CATION EXCHANGE CAPACITY		6N2b	6O2b	6H1a	6P2a	6Q2a	NH ₄ Ac Exch.	Base Sat. % on	Sum Bases	Sum Cations	Ca/Mg	
NH ₄ Ac		milliequivalents per 100g. soil				5C1	Cations	< me/100g.				
22.9	18.1	5.1	6.2	-	0.5		79	23.7	29.9	3.5		
17.2	13.7	4.0	4.1	0.1	0.2		81	18.0	22.1	3.4		
12.6	7.0	2.4	8.2	0.1	0.2	77	54	9.7	17.9	2.9		
13.4	7.2	3.2	7.0	0.2	0.3	81	61	10.9	17.9	2.2		
17.2	10.4	3.9	6.2	0.2	0.4	87	71	14.9	21.1	2.7		
13.0	8.4	3.3	3.7	0.2	0.3	94	77	12.2	15.9	2.5		

Soil type: Port Byron silt loam

Soil Nos.: S56Wis-32-1

Location: NE1/4 of NW1/4 of Section 28, T16N, R6W, Ia Crosse County, Wisconsin.

Well drained Brunizem soil developed in deep Peorian loess on rolling foothills between the higher upland Fayette and Dubuque ridges and the lower stream terraces. This profile was collected from a 5 percent south-facing convex slope under bluegrass sod. It was moist at time of sampling and was considered as being modal for the type. Both surface and internal drainage are medium; permeability is moderate. Soil colors are according to Munsell color chart under moist field conditions.

Collected and described by: A. J. Klingelhoets and M. Beatty.

Horizon and

Lincoln

Lab. Number

A1 5310	0 to 12 inches. Very dark brown (10YR 2/2) silt loam having moderate medium granular structure; friable when moist; abundance of grass roots; pH 7.5; gradual smooth boundary.
A3 5311	12 to 18 inches. Very dark grayish brown (10YR 3/2) silt loam with moderate fine granular structure; friable when moist; plant roots plentiful; pH 6.0; clear smooth boundary.
B1 5312	18 to 27 inches. Dark brown (10YR 4/3) silt loam having weak medium subangular blocky structure; friable when moist; slightly vesicular; roots plentiful; pH 5.5; gradual smooth boundary.
B2 5313	27 to 36 inches. Dark yellowish brown (10YR 4/4) heavy silt loam with moderate medium subangular blocky structure; friable when moist; plant roots plentiful; pH 5.5; gradual smooth boundary.
B3 5314	36 to 44 inches. Dark yellowish brown (10YR 4/4) heavy silt loam having a weak coarse subangular blocky structure; friable when moist; few plant roots; pH 5.8; gradual smooth boundary.
C1 5315	44 to 60 inches. Dark yellowish brown to yellowish brown (10YR 4/4 to 5/4) silt loam; massive; friable when moist; pH 5.8.

SOIL SURVEY LABORATORY Lincoln, Nebr. 1/22/58

SOIL TYPE Port Byron . LOCATION La Crosse County, Wisconsin
silt loam

SOIL NOS. S57Wis-32-1 LAB. NOS. 5545-5552

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS
		1B1a		3A1					2A2			
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY	> 2			
2.1	1-0.5	0.5-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.02	0.02-0.002				
0-8	Ap	0.2	0.1	0.1	2.2	9.8	72.7	14.9	58.0	26.3	-	sil
8-16	A1	-	0.1	0.1	1.0	4.0	78.9	15.9	52.5	31.2	-	sil
16-21	A3	-	0.1	-	0.8	5.7	81.0	12.4	55.0	32.3	-	sil
21-26	B1	-	-	0.1	0.6	5.5	83.2	10.6	57.8	31.4	-	si
26-34	B21	-	-	0.1	1.0	7.9	72.0	19.0	58.7	22.0	-	sil
34-42	B22	-	-	0.1	3.7	18.9	56.7	20.6	68.2	10.4	-	sil
42-47	B3	-	0.1	0.9	16.5	29.5	38.0	15.0	73.8	6.3	-	l
47+	C1	-	-	0.4	12.9	41.1	35.1	10.5	81.4	5.3	-	vfsl

pH 8C1a		ORGANIC MATTER			MOISTURE TENSIONS			
1:1		6A1a	6B1a	6E1a		4B2		
1:5	1:10	ORGANIC CARBON	NITROGEN	CaCO ₃ equiv- alent	1/10 ATMOS.	1/3 ATMOS.	15 ATMOS.	
		%	%	%	%	%	%	
6.5	6.6	6.7	2.73	.210	13	-	-	8.9
5.8	5.9	5.9	2.59	.179	14	-	-	9.2
5.3	5.5	5.6	1.07	.078	14	-	-	6.0
5.5	5.7	5.7	0.46	.051	9	-	-	4.8
5.2	5.4	5.5	0.29			-	-	8.1
5.2	5.2	5.3	0.21			-	-	8.8
5.2	5.4	5.4	0.15			-	-	6.2
5.4	5.6	5.6	0.10			-	-	4.6

5A1a	EXTRACTABLE CATIONS					5B1a	BASE SAT. NH ₄ Ac Exch.	5C3	5B1a	5A3a	8D3
CATION EXCHANGE CAPACITY	6N2b	6O2b	6H1a	6P2a	6Q2a		NH ₄ Ac Exch.	Base Sat. % on Cations	Sum Bases	Sum Cations	Ca/Mg
NH ₄ Ac	milliequivalents per 100g. soil								me/100g		
19.8	15.4	4.4	3.7	0.1	0.2			84	20.1	23.8	3.5
21.0	16.4	3.0	7.9	0.1	0.1		93	71	19.6	27.5	5.5
12.7	8.3	1.4	7.4	0.1	0.1		78	57	9.9	17.3	5.9
9.6	6.7	1.0	4.1	0.1	0.1		82	66	7.9	12.0	6.7
13.4	8.8	2.4	5.0	0.1	0.2		86	70	11.5	16.5	3.7
14.4	9.2	2.7	5.4	0.1	0.2		85	69	12.2	17.6	3.4
10.1	6.6	2.1	3.7	0.1	0.2		89	71	9.0	12.7	3.1
7.8	5.1	1.6	2.5	0.1	0.2		90	74	7.0	9.5	3.2

Soil type: Port Byron silt loam
 Soil Nos.: S57Wis-32-1
 Location: SE1/4 of NE1/4, Section 20, T16N, R6W, Ia Crosse County, Wisconsin.

This is a well drained Brunizem soil developed in deep deposits of Peorian loess on the rolling foothills midway in elevation between the stream terraces and the higher lying Fayette and Dubuque upland ridges. Both surface and internal drainage are medium while permeability is moderate. The parent loess contains less fines and more coarse material than the loess-mantled uplands and terraces in the same general area. This profile was sampled on a 5 percent plain slope in a cornfield 300 yards from the nearest road. There was little evidence of any erosion; profile was moist at time of sampling and all of the colors given in the description are for moist colors according to the Munsell color chart.

Collected and described by: A. J. Klingelhoets and M. F. Beatty.

Horizon and
 Lincoln
 Lab. Number

Ap 5545	0 to 8 inches. Black (10YR 2/1) silt loam with very fine moderate subangular blocky structure which is friable when moist; abundance of plant roots; many earthworm casts; pH 7.0 (has been limed); abrupt smooth boundary, 6 to 9 inches thick.
A1 5546	8 to 16 inches. Black to very dark gray (10YR 2/1 to 3/1) silt loam having moderate fine granular structure which is friable when moist; plant roots plentiful; many earthworm holes; pH 6.5; clear wavy boundary, 5 to 8 inches thick.
A3 5547	16 to 21 inches. Very dark gray (10YR 3/1) silt loam with weak coarse platy structure breaking down into weak medium subangular blocks; friable when moist; moderately vesicular; plant roots plentiful; pH 6.2; clear wavy boundary, 3 to 6 inches thick.
B1 5548	21 to 26 inches. Very dark grayish brown to dark grayish brown (10YR 3/2 to 4/2) silt loam with weak medium subangular blocky structure which is friable when moist; moderately vesicular; plant roots plentiful; gray to light brownish gray (10YR 6/1 to 6/2) silica coatings on vertical faces of peds; pH 6.0; clear wavy boundary, 4 to 7 inches thick.
B21 5549	26 to 34 inches. Dark brown (10YR 4/3) heavy silt loam having moderate medium subangular blocky structure which is firm when moist; moderately vesicular; plant roots plentiful; gray to light brownish gray (10YR 6/1 to 6/2) silica coatings and very dark grayish brown (10YR 3/2) organic stains on the surface of the peds; pH 6.0; clear wavy boundary, 5 to 8 inches thick.
B22 5550	34 to 42 inches. Dark yellowish brown (10YR 3/4) heavy silt loam with very dark grayish brown (10YR 3/2) organic stains on surface of moderate medium subangular blocky peds; firm when moist; few distinct fine mottles of strong brown (7.5YR 5/6); plant roots few; pH 6.0; clear wavy boundary, 6 to 10 inches thick.
B3 5551	42 to 47 inches. Dark yellowish brown (10YR 3/4 to 4/4) silt loam with some dark brown (7.5YR 3/2) organic stains on surface of peds; weak coarse subangular blocky structure which is friable when moist; pH 6.0; gradual irregular boundary, 3 to 8 inches thick.
C1 5552	47 inches plus. Dark yellowish brown to yellowish brown (10YR 4/4 to 5/4) coarse silt loam which is massive, friable when moist, and contains layers of very fine sandy loam; pH 6.0.

SOIL SURVEY LABORATORY Lincoln, Nebr. 1/22/58

SOIL TYPE Port Byron silt loam LOCATION La Crosse County, Wisconsin

SOIL NOS. S57Wis-32-2 LAB. NOS. 5553-5559

DEPTH INCHES	HORIZON	1B1a PARTICLE SIZE DISTRIBUTION (in mm.) (per cent) 3A1									2A2 > 2	TEXTURAL CLASS
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY				
		2-1	1-0.5	0.5-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.02	0.02-0.002		
0-9	Ap	0.1	0.1	0.4	0.8	5.6	72.2	20.8	55.2	23.0	-	sil
9-16	A3	-	-	0.1	0.4	4.5	72.8	22.2	51.5	26.0	-	sil
16-23	B1	-	-	-	0.3	2.9	75.1	21.7	48.9	29.3	-	sil
23-29	B21	-	-	-	0.2	4.7	72.6	22.5	50.3	27.2	-	sil
29-37	B22	-	-	-	0.2	7.1	74.5	18.2	60.2	21.6	-	sil
37-44	B3	-	-	-	0.2	8.4	77.0	14.4	64.5	21.1	-	sil
44-60	C1	-	-	-	0.4	8.6	74.7	16.3	61.9	21.7	-	sil

pH 8C1a	ORGANIC MATTER					6E1a CaCO ₃ equiv- alent %	MOISTURE TENSIONS		
	6A1a ORGANIC CARBON		6B1a NITRO-GEN		C/N		1/10 ATMOS.	1/3 ATMOS.	15 ATMOS.
	1:5	1:10	%	%					
6.9	7.0	7.0	2.23	.211	11	-			9.7
6.3	6.4	6.4	1.55	.139	11				9.5
5.4	5.6	5.6	0.77	.075	10				9.0
5.5	5.6	5.7	0.56	.057	10				9.2
5.2	5.4	5.4	0.34						7.8
5.2	5.4	5.4	0.20						6.5
5.3	5.4	5.4	0.10						7.4

5A1a CATION EXCHANGE CAPACITY	EXTRACTABLE CATIONS 5B1a					BASE SAT. % NH ₄ Ac Exch. 5C1	5C3 Base Sat. % on Cations	5B1a Sum Bases < me/100g →	5A3a Sum Cations	8D3 Ca/Mg
	6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K					
	← milliequivalents per 100g. soil →									
18.8	13.5	5.0	4.2	0.1	0.7	82	19.3	23.5	2.7	
18.3	10.3	4.1	6.7	0.2	0.2	81	14.8	21.5	2.5	
15.0	8.6	3.2	7.1	0.1	0.2	81	12.1	19.2	2.7	
15.5	9.8	3.4	4.6	0.1	0.3	88	13.6	18.2	2.9	
13.4	8.5	3.0	4.6	0.1	0.2	88	11.8	16.4	2.8	
11.3	7.3	2.5	4.2	0.1	0.2	89	10.1	14.3	2.9	
13.2	8.7	3.2	3.7	0.2	0.2	93	12.3	16.0	2.7	

Soil type: Fort Byron silt loam
 Soil Nos.: 857Wis-32-2
 Location: SW1/4 of SE1/4, Section 16, T16N, R6W, La Crosse County, Wisconsin.

This soil is a well drained Brunizem developed in deep deposits of Peorian loess on rolling uplands adjacent to large flood plains in the "Driftless Area" of Wisconsin. The parent material consists of the coarser silts deposited near the source. Surface and internal drainage are medium; permeability is moderate. This profile was sampled on a convex 12 percent slope in a corn field approximately 200 yards from the road. Evidence of slight erosion existed. The profile was moist at time of sampling and all colors given are for moist conditions, using the Munsell color chart. This profile is considered modal for the Fort Byron series in Wisconsin.

Collected and described by: A. J. Klingelhoets and M. F. Beatty.

Horizon and
 Lincoln
 Lab. Number

Ap 5553	0 to 9 inches. Very dark brown (10YR 2/2) silt loam having weak fine subangular blocky structure which breaks down into moderate medium granules; friable when moist; plant roots plentiful; pH 7.5 (has been limed); abrupt smooth boundary, 8 to 10 inches thick.
A3 5554	9 to 16 inches. Very dark brown to very dark grayish brown (10YR 2/2 to 3/2) silt loam with moderate medium granular structure which is friable when moist; plant roots plentiful; pH 7.0; clear wavy boundary, 5 to 8 inches thick.
B1 5555	16 to 23 inches. Very dark grayish brown (10YR 3/2) silt loam having weak to moderate fine subangular blocky structure which is friable when moist; slightly vesicular; plant roots plentiful; pH 6.5; clear wavy boundary, 5 to 9 inches thick.
B21 5556	23 to 29 inches. Dark brown (10YR 4/3) heavy silt loam with moderate medium subangular blocks which are firm when moist; slightly vesicular; plant roots plentiful; pH 6.0; clear wavy boundary, 5 to 8 inches thick.
B22 5557	29 to 37 inches. Dark brown (10YR 4/3 to 3/3) heavy silt loam with moderate medium subangular blocky structure which is firm when moist; slightly vesicular; plant roots plentiful; pH 5.8; clear wavy boundary, 6 to 9 inches thick.
B3 5558	37 to 44 inches. Yellowish brown (10YR 5/4) silt loam having weak coarse subangular blocky structure which is friable when moist; slightly vesicular; few plant roots; few faint small dark brown mottles (7.5YR 4/4); pH 5.8; gradual irregular boundary, 5 to 10 inches thick.
C1 5559	44 to 60 inches. Yellowish brown (10YR 5/4) coarse silt which is massive, very friable when moist and slightly vesicular; contains few faint small strong brown and dark brown (7.5YR 5/6 and 4/4) mottles; pH 5.8.

SOIL SURVEY LABORATORY Lincoln, Nebr. 1/22/58

SOIL TYPE Port Byron LOCATION La Crosse County, Wisconsin
silt loam

SOIL NOS. 557Wis-32-3 LAB. NOS. 5560-5567

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS
		1B1a		3A1					2A2		2A2 > 2	
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY	0.2-0.002	0.02-0.002		
0-8	Ap	0.3	0.6	0.8	6.7	10.4	60.9	20.3	54.1	22.7	Tr.	sil
8-12	A1	-	-	-	0.5	3.9	73.4	22.2	48.1	29.6	-	sil
12-15	A3	-	-	-	0.4	3.8	72.5	23.3	48.3	28.3	-	sil
15-21	B1	-	-	-	0.4	3.6	72.6	23.4	49.5	27.0	-	sil
21-26	B21	-	-	-	0.4	3.6	70.6	25.4	47.5	27.0	-	sil
26-39	B22	-	-	-	0.4	4.0	70.8	24.8	49.7	25.4	-	sil
39-46	B3	-	-	-	0.5	4.7	73.3	21.5	52.5	25.9	-	sil
46+	Cl	-	-	-	0.7	5.4	74.7	19.2	55.7	25.0	-	sil

pH	8C1a					6E1a			MOISTURE TENSIONS		
	6A1a		6B1a		C/N	CoCO ₃ equiv- alent	1/10 ATMOS.		1/3 ATMOS.		4B2 15 ATMOS.
	ORGANIC CARBON	NITRO-GEN	%	%			%	%	%		
1:1	1:5	1:10									
6.5	6.5	6.6	1.80	.168	11	-					8.7
6.0	6.0	6.1	1.72	.153	11						10.1
5.6	5.7	5.6	1.36	.121	11						10.0
5.3	5.5	5.6	1.02	.092	11						10.1
5.2	5.3	5.4	0.69	.068	10						11.0
5.3	5.4	5.4	0.45								10.8
5.5	5.5	5.5	0.24								9.5
5.4	5.5	5.5	0.13								8.6

5A1a CATION EXCHANGE CAPACITY NH ₄ Ac	EXTRACTABLE CATIONS 5B1a					BASE SAT. % NH ₄ Ac Exch. 5C1	5C3 Base Sat. % on Cations	5B1a Sum Bases ← me/100g →	5A3a Sum Cat-ions	8D3 Ca/Mg
	6N2b	6O2b	6H1a	6P2a	6Q2a					
	Ca	Mg	H	Na	K					
17.0	12.0	4.2	4.2	0.1	0.3	98	80	16.6	20.8	2.8
17.5	10.6	3.8	7.1	0.1	0.3	84	68	14.8	21.9	2.8
16.9	8.9	3.6	8.4	0.1	0.2	76	60	12.8	21.2	2.5
16.2	8.8	3.6	7.5	0.1	0.2	78	63	12.7	20.2	2.4
17.6	9.7	4.0	7.1	0.1	0.3	80	66	14.1	21.2	2.4
17.8	10.6	4.5	5.9	0.1	0.2	86	72	15.4	21.3	2.4
16.3	10.1	4.0	5.0	0.1	0.2	88	74	14.4	19.4	2.3
15.5	10.0	4.4	3.8	0.2	0.2	95	80	14.8	18.6	2.3

Soil type: Port Byron silt loam
 Soil Nos.: S57Wis-32-3
 Location: SW1/4 of SE1/4, Section 3, T16N, R6W, La Crosse County, Wisconsin.

This soil is a well drained Brunizem developed in deep deposits of Peorian loess on rolling uplands adjacent to large flood plains in the "Driftless Area" of Wisconsin. The parent material consists of the coarser silts deposited near the source. Surface and internal drainage are medium; permeability is moderate. This profile was sampled on a 16 percent slightly concave slope in an alfalfa-quackgrass hayfield 200 feet from a dirt trail. Slight erosion had occurred. The profile was moist at time of sampling and all soil colors given are for moist conditions according to the Munsell color chart. This profile is considered modal for the Port Byron series in Wisconsin.

Collected and described by: A. J. Klingelhoets and M. F. Beatty.

Horizon and
 Lincoln
 Lab. Number

Ap 5560	0 to 8 inches. Black to very dark brown (10YR 2/1 to 2/2) silt loam having moderate fine subangular blocky structure which is friable when moist; plant roots abundant; pH 7.0 (has been limed); abrupt smooth boundary, 7 to 9 inches thick.
A1 5561	8 to 12 inches. Very dark brown (10YR 2/2) silt loam with very fine moderate subangular blocky structure which is friable when moist; plant roots plentiful; pH 6.5; clear wavy boundary, 3 to 6 inches thick.
A3 5562	12 to 15 inches. Very dark brown to very dark grayish brown (10YR 2/2 to 3/2) silt loam having moderate fine subangular blocky structure; friable when moist; roots plentiful; pH 6.3; clear wavy boundary, 3 to 6 inches thick.
B1 5563	15 to 21 inches. Dark brown (10YR 3/3) silt loam with moderate fine subangular blocky structure which is friable when moist; plant roots plentiful; slightly vesicular; pH 6.3; clear irregular boundary, 4 to 7 inches thick.
B21 5564	21 to 26 inches. Dark yellowish brown (10YR 3/4) heavy silt loam having moderate medium subangular blocky structure which is firm when moist; plant roots plentiful; slightly vesicular; few light brownish gray silica coatings on vertical surfaces of peds (10YR 6/2); pH 6.0; clear wavy boundary, 4 to 8 inches thick.
B22 5565	26 to 39 inches. Dark brown (10YR 4/3) heavy silt loam with moderate medium subangular blocky structure which is firm when moist; slightly vesicular; few light brownish gray silica coatings on surface of peds, 10YR 6/2; plant roots plentiful; pH 6.0; clear wavy boundary, 8 to 12 inches thick.
B3 5566	39 to 46 inches. Dark brown (10YR 4/3) silt loam having a weak coarse subangular blocky structure which is friable when moist; few plant roots; slightly vesicular; light brownish gray (10YR 6/2) silica coatings on vertical faces of peds; few faint small dark brown and strong brown (7.5YR 4/4 and 5/6) mottles; pH 6.0; gradual irregular boundary, 6 to 11 inches thick.
C1 5567	46 inches plus. Yellowish brown (10YR 5/4) silt loam which is massive, friable when moist, and slightly vesicular; few faint small dark brown and strong brown (7.5YR 4/4 and 5/6) mottles; pH 5.8.

SOIL SURVEY LABORATORY Lincoln, Nebr. 5/18/58

SOIL TYPE *Poy silty clay loam LOCATION Winnebago County, Wisconsin

SOIL NOS. S57Wis-70-1 LAB. NOS. 6139-6144

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS	
		1B1a					3A1						2A2
		VERY COARSE SAND 2.1	COARSE SAND 1.0-0.5	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	0.2-0.075	0.075-0.002	> 2 (<19mm)		
0-8	A1	0.3a	0.8c	4.0c	13.4c	2.5c	40.1	38.9	24.5	23.7	Tr.	cl	
8-15	A2g	0.1b	1.0c	5.6c	18.1c	3.0c	33.8	38.4	26.8	17.4	Tr.	cl	
15-20	B1g	0.2b	0.8c	4.4c	14.2c	2.8c	37.4	40.2	28.1	18.0	-	c	
20-26	B22	0.2b	0.3c	0.9c	2.5c	2.0c	44.8	49.3	28.1	19.8	-	sic	
26-36	B23	0.3	0.6	3.0	8.2	1.9	37.6	48.4	23.6	19.3	-	c	
36-42+	D1	3.1	4.1	13.2	45.4	13.9	11.3	9.0	45.3	4.2	7.6	lfs	
0-8 d/		0.4	0.5	1.0	2.6	1.5	51.4	42.6	27.7	26.3	Tr.	sic	

pH	ORGANIC MATTER			6E1a CaCO ₃ equiv- alent %	MOISTURE TENSIONS		
	8O1a 1:5	6A1a 1:10	6B1a ORGANIC CARBON % NITRO-GEN % C/N		1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
6.2		10.60	.877				31.9
6.7		0.62	.073				14.3
7.3		0.27	.030				14.0
7.2		0.22	.024				17.8
7.4		0.18	.019				17.4
8.1		0.04	.009		15		3.3
7.0		5.48	.437	12			

5A1a CATION EXCHANGE CAPACITY NH ₄ Ac	EXTRACTABLE CATIONS					5B1a BASE SAT. % NH ₄ Ac Excl.	5C3 Base Sat. % on Sum Cations	5B1a Sum Bases	5A3a Sum Cations	8D3 Ca/Mg
	6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K					
	← milliequivalents per 100g. soil →									
53.5	40.2	15.4	14.4	0.1	0.5		80	56.2	70.6	2.6
28.0	17.4	11.9	2.5	0.1	0.3		92	29.7	32.2	1.5
25.1	15.1	11.4	2.1	0.1	0.3		93	26.9	29.0	1.3
25.3	15.7	11.6	2.1	0.1	0.4		93	27.8	29.9	1.4
26.2	16.3	12.1	2.6	0.1	0.4		92	28.9	31.5	1.3
5.3		3.7	0.8	-	0.1					

a. Some organic matter.
b. Common irregular brown concn. (Mn-Fe?).
c. Few irregular brown concn. (Mn-Fe?).
d. S57Wis-70-2, Lab. No. 6145

Soil type: *Foy silty clay loam

Soil Nos.: S57Wis-70-1

Location: NE1/4 of Section 26, T18N, R15E, Winnebago County, Wisconsin; site is located 150 yards east of the half section line and 360 yards south of the north section line.

Vegetation: Hickory, ash, oak, elm, and sedges.

Parent material: Red lacustrine clays over a thin bed of sandy outwash which in turn lies over red lacustrine clays.

Physiographic position: Lake plain.

Topography: Nearly level; a shallow but broad depression 1 to 3 feet below the general level of the Lake plain.

Slope: 0 to 1 percent.

Drainage: Natural drainage is poor; surface runoff is poor and sometimes ponded.

Permeability: Moderately slow.

Ground water: Deep at time of sampling.

Sampled by: L. T. Alexander, A. H. Paschall, W. DeYoung, and E. Link, August, 1957.

Horizon and

Lincoln

Lab. Number

A1 6139	0 to 8 inches. Black (N 2/0) silty clay loam; weak to moderate medium subangular blocks and moderate fine and medium granules; friable when moist; slightly sticky and plastic when wet; roots plentiful.
A2g 6140	8 to 15 inches. Gray to dark gray (5Y 5/1 to 4/1) silty clay; moderate very fine angular blocks; slightly sticky and sticky when wet; clay skins present; roots plentiful.
B1g 6141	15 to 20 inches. Predominantly olive gray (5Y 5/2) but contains some spots of reddish brown (5YR 4/3) silty clay; moderate fine angular blocks; sticky when wet; clay skins are present and a few pores are visible; roots plentiful.
B22 6142	20 to 26 inches. Reddish brown (5YR 4/3) silty clay; strong fine and medium angular blocks; sticky; clay skins are on all faces; moderate number of fine pores.
B23 6143	26 to 36 inches. Dominant color is olive gray (5Y 5/2) but also shows reddish brown (5YR 4/3) silty clay; strong fine medium angular blocks; sticky; contains a few clay skins on the vertical faces.
M 6144	36 to 42 inches plus. Brown (7.5YR 5/4) layered loamy sand and sandy loam; some is single grained and some is compact glacial sandy loam till; contains a few small pebbles and stones; loose when moist; horizon is irregular in thickness as the lower boundary of the C layer slants across the sample hole.

Special Sample: S57Wis-70-2

Lincoln Lab. Number: 6145

Type: *Foy silty clay loam

Location: NE1/4, Section 26, T18N, R15E, Winnebago County, Wisconsin. Site is 40 yards east of the half section line and 375 yards south of the north section line.

Vegetation: Plowed field.

SOIL SURVEY LABORATORY Lincoln, Nebr. 5/19/58

SOIL TYPE Poygan LOCATION Calumet County, Wisconsin
silty clay loam

SOIL NOS. S57Wis-8-1 LAB. NOS. 6479-6484

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS
		1B1a		COARSE SAND		MEDIUM SAND		FINE SAND		VERY FINE SAND		
		2-1	1-0.5	0.5-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.02	0.02-0.002	2A2 (< 0.075mm)	
0-5	A1	0.1	0.5a	1.0a	2.9a	2.8a	45.1	47.6	13.0	36.6	-	sic
5-9	A2g	0.1	0.4a	1.0a	3.0a	2.9a	41.2	51.4	11.5	34.4	-	sic
9-12	B1g	0.1	0.5a	1.2a	3.5a	3.3a	43.3	48.1	13.5	35.1	-	sic
12-17	B2	0.3	0.6a	1.4a	4.0a	3.6a	41.1	49.0	13.3	33.7	Tr.	sic
17-24	C1	0.3b	0.7b	1.4b	3.8b	3.7b	44.8	45.3	14.6	36.1	Tr.	sic
24-36	C2	0.4b	0.6c	1.2b	3.4b	3.4b	45.4	45.6	14.0	36.8	2.1	sic
0-5c/		0.4	0.5	0.8	2.5	2.4	48.1	45.3	11.5	40.5	Tr.	sic
0-5d/		0.1	0.5	0.8	2.4	2.3	45.2	48.7	10.5	38.4	-	sic
pH		ORGANIC MATTER					6E1a		MOISTURE TENSIONS			
8C1a		6A1a		6B1a				4B2				
1:1	1:5	1:10	ORGANIC CARBON %	NITROGEN %	C:N	CoCO ₃ equiv. alent %		1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %		
6.2			7.28	.617	12					26.9		
6.3			1.32	.147	9					17.7		
6.5			0.78	.092	8					16.8		
7.2			0.37	.035	10					18.2		
7.9			0.30	.024	12		15			16.7		
8.1			0.27	.019	14		23			15.3		
6.5			6.58	.523	13							
6.7			4.03	.349	12							
5A1a	EXTRACTABLE CATIONS					5B1a	5C3	5B1a	5A3a	8D3		
CATION EXCHANGE CAPACITY NH ₄ Ac	6N2b	6O2b	6H1a	6P2a	6Q2a	BASE SAT. % NH ₄ Ac EXCH.	Base Sat. % on Sum Cations	Sum Bases me/100g	Sum Cations	Ca/Mg		
	Ca	Mg	H	Na	K							
	milliequivalents per 100g. soil					5C1						
48.5	34.1	9.7	14.0	-	0.6	92	76	44.4	58.4	3.5		
37.3	25.3	10.3	7.2	0.1	0.3	96	83	36.0	43.2	2.4		
33.4	22.8	9.4	5.6	0.1	0.3	98	85	32.6	38.2	2.4		
29.1	20.6	9.6	3.2	0.1	0.3		90	30.6	33.8	2.1		
21.4		7.5	-	0.1	0.3							
16.2		5.5	-	0.1	0.2							
<p>a. Few irregular black concr. (Mn?)</p> <p>b. Few smooth and irregular brown and black concr. (Fe-Mn?); also few CaCO₃ concr.</p> <p>c. S57Wis-8-1a, Lab. No. 6153.</p> <p>d. S57Wis-8-2, Lab. No. 6154.</p>												

Soil type: Poygan silty clay loam

Soil Nos.: S57Wis-8-1

Location: SE1/4 of SE1/4 of SW1/4, Section 27, T20N, R20E, Calumet County, Wisconsin. Site is located in a woodlot 0.4 mile east of the southwest section corner and 25 yards northeast of a large elm standing in a fence corner.

Vegetation: Oak, aspen, alder, and hickory; little or no ground cover.

Parent material: Red lacustrine clays.

Physiographic position: Lake plain.

Topography: Nearly level, in a slight depression, 1 to 3 feet below the general level of the Lake plain.

Slope: 0 to 1 percent.

Drainage: Natural drainage is poor; surface runoff is slow and is ponded for short periods.

Permeability: Moderately slow.

Ground water: Deep at time of sampling.

Sampled by: A. H. Paschall, August, 1957.

Horizon and

Lincoln

Lab. Number

- A1
6479 0 to 5 inches. Black (N 2/0, 10YR 2/1 moist) silty clay loam; mixture of strong fine subangular blocky and moderate fine granular structure; friable when moist; slightly plastic and slightly sticky when wet; roots plentiful; abrupt smooth boundary.
- A2g
6480 5 to 9 inches. Gray (5Y 5/1) silty clay with a few small faint brown (10YR 5/3) mottles; moderate fine prisms that break to strong fine and medium angular blocks; plastic and sticky when wet; roots plentiful; clear smooth boundary.
- B1g
6481 9 to 12 inches. A transitional layer, color at top mostly dark gray (5Y 4/1), lower part shows thin coatings of dark gray (5Y 4/1) over blocks with reddish brown (5YR 4/3) silty clay; strong medium and coarse angular blocks; plastic and sticky when wet; roots plentiful; gradual smooth boundary.
- B2
6482 12 to 17 inches. Reddish brown (2.5YR 4/4) silty clay; weak fine to medium prisms that break to strong medium and coarse angular blocks; a few blocks have thin coatings of gray (5YR 5/1); old root channels, up to 2 inches in diameter, are filled with dark gray (5Y 4/1) silty clay which has strong fine and medium angular blocky structure; roots few; gradual smooth boundary.
- C1
6483 17 to 24 inches. Reddish brown (2.5YR 4/4) silty clay; weak fine to medium prisms that break to strong medium and coarse angular blocks; calcareous with lime appearing as soft spots or small hard concretions; horizon contains old root channels filled with dark gray to gray (5Y 4/1 to 5/1) silty clay having moderate medium angular blocky structure.
- C2
6484 24 to 36 inches. Reddish brown (2.5YR 4/4) silty clay; strong coarse angular blocks; a few fine pebbles are present; some calcareous concretions; most of the vertical faces and many of the horizontal faces of the peds have a clay-like coating of greenish color (5G 7/1). Material does not appear to be till but more like a lacustrine clay with fine pebbles or gravel about 1/8-inch in size.

Special Sample: S57Wis-8-1a

Lincoln Lab. Number: 6153

Type: Poygan silty clay loam

Location: SW1/4 SE1/4 SW1/4, Section 27, T20N, R20E, Calumet County, Wisconsin. Site is located in a woodlot 0.4 mile east of southwest section corner and 25 yards northeast of a large elm standing in fence corner. This is same site as for S57Wis-8-1, the difference being that this is a composite of 9 borings with a bucket auger, made around the pit from which profile sample was obtained.

Vegetation: Oak, aspen, alder, and hickory; little or no ground cover.

Special Sample: S57Wis-8-2

Lincoln Lab. Number: 6154

Type: Poygan silty clay loam

Location: NE1/4 NE1/4 NW1/4, Section 34, T20N, R20E, Calumet County, Wisconsin. This sample is from field immediately south of woodlot from which S57Wis-8-1a was taken; 0.4 mile east of the northeast section corner and 10 yards west and 50 yards south of elm tree standing in fence corner.

Vegetation: Alfalfa field.

SOIL TYPE Poysan LOCATION Winneshago County, Wisconsin
 silty clay loam

SOIL NOS. S57Wis-70-3 LAB. NOS. 6146-6151

DEPTH INCHES	HORIZON	PARTICLE-SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS	
		1B1a 3A1											
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY	2A2				
		2.0	1.0-0.75	0.75-0.50	0.50-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.20-0.02	0.02-0.002	> 2	(19mm)
0-8	A1	0.4a	0.7a	0.5a	1.0a	1.0a	43.8	52.6	12.3	33.0	-	-	sic
8-13	A2g	0.2a	0.4a	0.3a	0.6a	0.5a	26.2	71.8	6.4	20.6	Tr.	-	c
13-18	B1	0.2a	0.4a	0.2a	0.7a	0.6a	26.5	71.4	5.7	21.8	-	-	c
18-23	B2	0.1a	0.3a	0.3a	1.0a	1.2a	29.9	67.2	8.1	23.6	Tr.	-	c
23-30	C1	0.4a	0.6a	0.5a	0.9a	0.8a	32.5	64.3	6.5	27.3	-	-	c
30-37+	C2	0.6a	0.7a	0.7a	1.2a	0.8a	32.5	63.5	6.3	27.6	1.2	-	c
0-8 ^b		0.2	0.7	1.0	2.0	1.3	38.4	56.4	10.9	29.8	-	-	c

8C1a	pH		ORGANIC MATTER			6E1a	MOISTURE TENSIONS		
	1:5	1:10	6A1a	6B1a	4B2				
			ORGANIC CARBON	NITROGEN			C/N		
%	%	%	%	%					
5.8			5.71	.468	12				27.6
5.8			0.94	.078	12				24.4
6.6			0.48	.038	13				24.2
7.8			0.30	.020	15				23.0
8.0			0.25	.018	14				21.3
8.2			0.22	.014					20.0
6.7			4.61	.389	12				

5A1a	EXTRACTABLE CATIONS					5B1a	BASE SAT. %	5C3	5B1a	5A3a	8D3
	6N2b	6O2b	6H1a	6P2a	6Q2a						
	Ca	Mg	H	Na	K						
	NH ₄ Ac										
	milliequivalents per 100g. soil										
45.2	26.9	14.8	17.3	-	0.7	94	71	42.4	59.7	1.8	
42.5	22.5	19.2	8.8	0.1	0.6	100	83	42.4	51.2	1.2	
41.7	21.6	19.4	6.1	0.1	0.5	100	87	41.6	47.7	1.1	
36.2		19.0	0.9	0.1	0.5						
25.7		13.2	-	0.1	0.4						
22.0		12.4	-	0.1	0.4						

5C1 Cations me/100g

a. Common smooth light brown concr. (Mn-Fe?).
 b. S57Wis-70-4, Lab. No. 6152

Soil type: Poygan silty clay loam
 Soil Nos.: S57Wis-70-3
 Location: Section 6, T17N, R15E, Winnebago County, Wisconsin. Site is in a woodlot 50 feet west of the road at a point 1/2-mile south of the northeast section corner.
 Vegetation: Hardwoods, oak, aspen, alder, and hickory.
 Parent material: Red lacustrine clays.
 Physiographic position: Lake plain.
 Topography: Nearly level.
 Slope: 0 to 1 percent.
 Drainage: Poor.
 Ground water: Deep at time of sampling.
 Permeability: Moderately slow.
 Sampled by: L. T. Alexander, A. H. Paschall, W. DeYoung, and E. Link, August, 1957.

Horizon and
 Lincoln
 Lab. Number

A1 6146	0 to 8 inches. Black (N 3/0 to 2/0) silty clay loam; moderate fine and medium subangular blocks and moderate fine and medium granules; friable to firm when moist; many roots.
A2g 6147	8 to 13 inches. Dark gray (5Y 4/1) silty clay loam; weak to moderate fine angular blocks; firm when moist; plastic and sticky when wet; thin clay skins show on the vertical faces; many roots.
B1 6148	13 to 18 inches. Blocks in the top part of the horizon have coatings of reddish gray (5YR 5/2) with interiors of weak red (2.5YR 4/2) to reddish brown (2.5YR 4/3); interior coloring becomes more dominant with depth; silty clay; medium to strong fine and medium angular blocks; firm when moist, plastic when wet; reddish gray coatings (5YR 5/2) appear on both vertical and horizontal ped faces and gives them a mottled appearance; interior of peds in lower part of horizon are colored reddish brown (2.5YR 4/4); few roots.
B2 6149	18 to 23 inches. Weak red (2.5YR 4/2) to reddish brown (2.5YR 4/4) silty clay; strong coarse angular blocks; firm when moist, plastic when wet; clay skins on both horizontal and vertical faces but thicker on horizontal faces; original breakage is into moderate coarse prisms; some large root channels are present and filled with silty clay of very dark gray (5YR 3/0 to 3/1).
C1 6150	23 to 30 inches. Weak red (2.5YR 4/2) to reddish brown (2.5YR 4/4) silty clay; moderate coarse angular blocks; aggregate faces show streaks and smears of gray (5YR 5/1 to 6/1); plastic when wet; calcareous concretions are present as hard granules and soft smears.
C2 6151	30 to 37 inches+. Weak red (2.5Y 4/2) to reddish brown (2.5YR 4/4) silty clay; weak to moderate coarse angular blocks; faces of blocks do not show clay skins but do have threads of roots lined with light gray (5YR 6/1); plastic when wet; lime segregations are present as concretions and smears.

Special Sample: S57Wis-70-4
 Lincoln Lab. Number: 6152

Type: Poygan silty clay loam

Location: SW1/4 of SW1/4 of NW1/4, Section 5, T17N, R15E, Winnebago County, Wisconsin. Sample site is 20 yards east of road, at point 0.5 mile south of northwest section corner; across road from location of S57Wis-70-3.

Vegetation: Hay meadow.

SOIL TYPE *Richford LOCATION Waushara County, Wisconsin
loamy sand

SOIL NOS. S57Wis-69-3 LAB. NOS. 6992-6997

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS	
		1B1a					3A1						2A2
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY					> 2
	2-1	1-0.5	0.5-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.02	0.02-0.002	< 0.002	(19mm)		
0-7	Ap	1.4	24.7	27.4	28.6	4.7	9.3	3.9	19.9	4.7	Tr.	lcos	
7-18	C1	2.2	23.1	26.6	31.9	5.1	8.2	2.9	20.9	4.1	4	cos	
18-28	C2	4.1	37.2	28.9	21.2	1.7	4.8	2.1	9.7	2.2	12	cos	
28-34	C3	3.8	31.8	22.6	27.1	6.0	6.7	2.0	23.6	2.3	4	cos	
34-41	C4	1.7	11.0	11.3	43.4	14.2	9.9	8.5	48.9	3.1	2	lfs	
41-59+	C5	1.7	11.3	14.7	44.8	14.1	8.4	5.0	45.4	2.3	5	ls/lfs	
pH		ORGANIC MATTER				6C1a	4A3a						
8C1a		6A1a	6B1a			Free Iron							
	1:5	1:10	ORGANIC CARBON	NITRO-GEN	C/N	Fe ₂ O ₃	Vol. Wt.						
	1:1		%	%		%	g/cc						
	7.2		0.46	0.027	17	0.6							
	7.2		0.12	0.007		0.5	1.68						
	7.2		0.09	0.006		0.4							
	7.2		0.08			0.3							
	6.8		0.07			0.8	1.80						
	7.1		0.04			0.6							
5A1a	EXTRACTABLE CATIONS					5B1a	5C3	5B1a	5A3a				
CATION EXCHANGE CAPACITY NH ₄ Ac	6N2b	6O2b	6H1a	6P2a	6Q2a	BASE SAT. % NH ₄ Ac EXCH.	Base Sat. % on Sum Cations	Sum Ext. Bases me/100g.	Sum Ext. Cations me/100g.				
	Ca	Mg	H	Na	K					MOISTURE AT SATURATION %			
	milliequivalents per 100g. soil					5C1							
3.4	2.4	0.6	0.8	<0.1	0.1	91	52	3.1	3.9				
2.1	1.4	0.1	0.4	<0.1	<0.1	71	79	1.5	1.9				
1.5	1.1	0.2	0.4	<0.1	<0.1	87	76	1.3	1.7				
1.5	1.1	<0.1	0.4	<0.1	<0.1	73	73	1.1	1.5				
4.7	3.8	0.6	1.2	<0.1	0.1	96	79	4.5	5.7				
2.8	2.2	0.8	0.8	<0.1	0.1		79	3.1	3.9				

Soil type: *Richford loamy sand

Soil Nos.: S57Ms-69-3

Location: Waushara County, Wisconsin; 0.3 mile east from northwest corner Section 15, T19N, R3E.

Virgin areas of this soil are difficult to locate because of better plant-soil-moisture relationship and subsequent greater use for agriculture. This profile was sampled in a fallow field. Parent material consists of sandy glacial outwash overlying finer-textured deposits at depths ranging from 30 to 60 inches or more. Over 8 percent by volume of dark-colored microscopic mineral grains estimated in parent materials. Pastured areas in vicinity had a forest cover of black oak and jack pine with bunch grass ground cover. Relief is nearly level with 1-percent slopes predominating. This profile is excessive to well drained, ground water is deep, permeability is rapid in the solum and moderate below. The strata of finer-textured materials are believed to be of depositional rather than genetic nature. Evidence of stratification throughout the substratum. Examination of a small virgin area 1,000 feet away indicated the original A1 was 2 to 4 inches in thickness, very dark brown (10YR 2/2), and of loamy sand texture; this layer had an abundance of bleached quartz grains throughout.

Sampled by: A. J. Klingelhoets, G. B. Lee, William DeYoung, and R. H. Jordan, October 29, 1957.

Described by: A. J. Klingelhoets.

Horizon and
Lincoln
Lab. Number

Ap 6992	0 to 7 inches. Very dark grayish brown (10YR 3/2) to dark brown (10YR 3/3) loamy sand which is massive in place and breaks out into weak medium granules when disturbed; very friable when moist; weed roots plentiful; temperature 5.5 degrees C.; pH 7.0 (has been limed); abrupt smooth boundary; 6 to 8 inches thick.
C1 6993	7 to 18 inches. Dark brown (7.5YR 4/4) grading to brown (7.5YR 5/4) in lower part loamy sand with weak medium subangular blocky structure; very friable when moist; few weed roots; temperature 5.8 degrees C.; pH 6.5; clear wavy boundary; 8 to 12 inches thick. (Two cores taken at 8 to 11 inches.)
C2 6994	18 to 28 inches. Dark yellowish brown (10YR 4/4) to yellowish brown (10YR 5/4) medium sand having very weak medium subangular blocks to single grain; loose; temperature 7.9 degrees C.; pH 6.0; clear wavy boundary; 7 to 11 inches thick.
C3 6995	28 to 34 inches. Yellowish brown (10YR 5/4) to light yellowish brown (10YR 6/4) medium sand which is single grained and loose; temperature 8.7 degrees C.; pH 6.0; abrupt wavy boundary; 6 to 9 inches thick.
C4 6996	34 to 41 inches. Dark brown (7.5YR 4/4) loam with layers of yellowish brown (10YR 5/4) loamy fine sand; weak coarse blocky structure; friable to very friable when moist; loamy fine sand occurs as pockets and lenses and becomes more abundant with depth; few distinct fine mottles of 7.5YR 5/6; temperature 9.1 degrees C.; pH 5.8; gradual irregular boundary; 6 to 12 inches thick. (Two cores taken at 34 to 37 inches.)
C5 6997	41 to 59 inches plus. Yellowish brown (10YR 5/4) to brown (7.5YR 5/4) light sandy loam which is massive and very friable when moist; few thin bands or lenses of dark brown (7.5YR 4/4) loam occur in this horizon; pH 5.5.

Remarks: All pH readings by use of Hellige-Truog kit. All colors were taken under moist field conditions.

SOIL SURVEY LABORATORY Lincoln, Nebr 1/21/58

SOIL TYPE Richwood LOCATION La Crosse County, Wisconsin
silt loam

SOIL NOS. S56Wis-32-3 LAB. NOS. 5323-5329

DEPTH INCHES	HORIZON	PARTICLE-SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS	
		1B1a											2A2 > 2
		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				
0-8	Ap	-	0.1	0.2	0.5	3.2	77.1	18.9	47.2	33.4	-	sil	
8-13	A1	-	0.1	0.1	0.5	3.0	75.9	20.4	45.5	33.7	-	sil	
13-20	A3	-	0.1	0.1	0.4	3.1	76.1	20.2	46.3	33.2	-	sil	
20-26	B1	-	0.1	0.1	0.4	3.1	73.7	22.6	47.9	29.2	-	sil	
26-35	B2	-	0.1	0.1	0.4	3.7	70.2	25.5	48.3	25.9	-	sil	
35-42	B3	-	0.3	0.4	0.9	4.2	70.2	24.0	50.8	24.1	-	sil	
42+	C1	-	0.1	0.1	0.5	3.8	72.4	23.1	51.7	24.8	-	sil	

pH	ORGANIC MATTER					6E1a CaCO ₃ equiv- alent %	MOISTURE TENSIONS		
	8C1a		6A1a	6B1a	C/N		1/10 ATMOS. %	1/3 ATMOS. %	4B2 15 ATMOS. %
	1:5	1:10	ORGANIC CARBON %	NITRO- GEN %					
6.2	6.2	6.2	1.95	.173	11	-			9.0
5.2	5.2	5.3	1.78	.162	11				8.6
5.0	5.1	5.2	0.83	.096	9				8.0
5.0	5.1	5.2	0.64	.076	8				8.9
5.0	5.1	5.2	0.43						10.1
5.3	5.4	5.5	0.39						10.0
5.4	5.5	5.6	0.16						10.1

5A1a CATION EXCHANGE CAPACITY NRU, Ac	EXTRACTABLE CATIONS						BASE SAT. % NH ₄ Ac Exch.	5C3 Base Sat. % on Cations	5B1a Sum Bases < me/100g >	5A3a Sum Cat- ions	8D3 Ca/Mg
	6N2b	6O2b	6H1a	6P2a	6Q2a	5C1					
	Ca	Mg	H	Na	K						
17.1	12.7	4.2	6.6	0.1	0.2		72	17.2	23.8	3.0	
16.3	8.5	2.2	10.7	0.1	0.2	67	51	11.0	21.7	3.9	
13.5	7.0	1.8	8.7	0.1	0.2	67	51	9.1	17.8	3.9	
14.6	8.2	2.6	7.8	0.1	0.3	77	59	11.2	19.0	3.2	
16.9	10.2	3.2	7.1	0.1	0.4	82	66	13.9	21.0	3.2	
17.2	11.3	4.0	5.4	0.1	0.4	92	74	15.8	21.2	2.8	
16.7	11.7	4.2	4.6	0.2	0.4	99	78	16.5	21.1	2.8	

Soil type: Richwood silt loam

Soil Nos.: S96Wis-32-3

Location: SW1/4 of SW1/4, Section 30, T17N, R5W, La Crosse County, Wisconsin.

Brunizem soil developed in deep silts of Peorian age on nearly level stream terraces. Sandy outwash occurs below 5 feet in this area where soil was sampled. Soil is well drained, moderately permeable, and was moist when sampled. It occurred on a high stream terrace with 1 percent plain slope and was sampled under a bluegrass sod. Soil name was taken from township in Richland County, Wisconsin. Soil colors are according to Munsell color chart under moist field conditions.

Collected and described by: A. J. Klingelhoets and M. Beatty.

Horizon and
Lincoln

Lab. Number

Ap 5323	0 to 8 inches. Black (10YR 2/1) silt loam with moderate coarse plates breaking down readily into moderate medium granules; friable when moist; abundance of plant roots; pH 8.0 (road dust influence?); abrupt smooth boundary.
A1 5324	8 to 13 inches. Black to very dark brown (10YR 2/1 to 2/2) silt loam having moderate fine to medium plates and medium granules; friable when moist; plant roots plentiful; pH 5.8; clear wavy boundary.
A3 5325	13 to 20 inches. Very dark grayish brown to dark brown (10YR 3/2 to 3/3) silt loam having a weak medium platy structure which breaks down to moderate fine to medium granules; friable when moist; plant roots plentiful; pH 5.5; clear wavy boundary.
B1 5326	20 to 26 inches. Dark brown (10YR 4/3) light silty clay loam with moderate fine to medium subangular blocky structure; firm when moist; roots plentiful; pH 5.2; gradual smooth boundary.
B2 5327	26 to 35 inches. Dark yellowish brown (10YR 3/4) silty clay loam having moderate medium subangular blocky structure; firm when moist; roots plentiful in upper portion with fewer in lower; pH 5.5; clear wavy boundary.
B3 5328	35 to 42 inches. Dark yellowish brown to yellowish brown (10YR 4/4 to 5/4) light silty clay loam with weak medium subangular blocky structure; firm when moist; pH 6.0; clear wavy boundary.
C1 5329	42 inches plus. Brown (10YR 5/3) light silty clay loam; massive; friable when moist; pH 6.5.

SOIL SURVEY LABORATORY Lincoln, Nebr. 1/21/58

SOIL TYPE Richwood LOCATION La Crosse County, Wisconsin
silt loam

SOIL NOS. S56Wis-32-4 LAB. NOS. 5330-5336

DEPTH INCHES	HORIZON	PARTICLE-SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS
		1B1a		3A1					2A2			
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY	> 2	> 2	> 2	
		2-1	1-0.5	0.5-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.02	0.02-0.002		
0-8	Ap	0.2	0.4	0.7	1.5	3.7	77.5	16.0	48.4	33.6	Tr.	sil
8-12	A1	0.2	0.4	0.7	1.4	3.3	78.0	16.0	47.6	34.4	Tr.	sil
12-17	A3	-	0.4	0.6	1.1	3.0	78.8	16.1	47.9	34.5	-	sil
17-23	B1	-	0.2	0.6	0.8	3.3	75.9	19.2	48.7	30.9	-	sil
23-30	B2	-	0.2	0.5	0.8	3.3	70.0	25.2	49.1	24.6	-	sil
30-37	B3	-	0.2	0.4	0.7	4.5	70.3	23.9	52.6	22.6	-	sil
37-60	C1	-	0.4	0.7	1.2	4.7	69.7	23.3	52.2	22.9	-	sil

DEPTH INCHES	HORIZON	ORGANIC MATTER					6E1a	MOISTURE TENSIONS		
		6A1a		6B1a		CaCO ₃ equivalent		4B2		
		ORGANIC CARBON	NITROGEN	C/N	1/10 ATMOS.			1/3 ATMOS.	15 ATMOS.	
		1:5	1:10	%	%	%	%	%	%	
7.2	7.3	7.3	1.97	.171	12	-			8.3	
7.3	7.3	7.3	1.96	.178	11	-			8.3	
7.1	7.2	7.3	0.75	.076	10	-			6.6	
6.9	7.0	7.1	0.43	.057	8	-			8.0	
6.7	6.8	6.8	0.38	.046	8	-			10.9	
5.6	5.8	5.8	0.24						10.4	
5.3	5.4	5.6	0.14						10.2	

DEPTH INCHES	HORIZON	EXTRACTABLE CATIONS					BASE SAT. NH ₄ Ac Exch.	5C3 Base Sat. % on Cations	5B1a Sum Bases	5A3a Sum Cations	8D3 Ca/Mg
		6N2b		6H1a		6P2a					
		Ca	Mg	H	Na	K					
		milliequivalents per 100g. soil					5C1	< me/100g			
16.9	13.9	5.0	2.1	0.1	0.2		90	19.2	21.3	2.8	
17.7	14.7	4.9	2.9	0.1	0.2		87	19.9	22.8	3.0	
12.2	9.6	3.4	2.0	-	0.2		87	13.2	15.2	2.8	
13.0	9.8	3.6	2.9	-	0.2		82	13.6	16.5	2.7	
16.6	12.3	4.2	4.2	0.1	0.3		80	16.9	21.1	2.9	
16.9	11.2	4.0	5.4	0.1	0.4	93	74	15.7	21.1	2.8	
16.5	10.8	3.8	5.0	0.1	0.4	92	75	15.1	20.1	2.8	

Soil type: Richwood silt loam
 Soil Nos.: S56Wa-32-4
 Location: SW1/4 of SW1/4, Section 28, T17N, R5W, La Crosse County, Wisconsin.

Brunizem soil developed in deep silts of Peorian age on a gently sloping, 1 percent, high stream terrace. Although a few mottlings occurred in substratum this profile is well drained and permeability is moderate. Sampling was done in a bluegrass-quackgrass strip bordering an alfalfa field 50 feet from the road. Soil colors are according to Munsell color chart under moist field conditions.

Collected and described by: A. J. Klingelhoets and M. Beatty.

Horizon and
 Lincoln
 Lab. Number

Ap 5330	0 to 8 inches. Black (10YR 2/1) silt loam having moderate fine plates and granules; friable when moist; grass roots abundant; pH 7.5; clear smooth boundary.
A1 5331	8 to 12 inches. Black (10YR 2/1) silt loam with moderate fine plates and medium granular structure; friable when moist; roots plentiful; pH 7.5; gradual wavy boundary.
A3 5332	12 to 17 inches. Very dark grayish brown to dark grayish brown (10YR 3/2 to 4/2) silt loam having moderate medium platy structure; friable when moist; roots plentiful; pH 7.0; gradual wavy boundary.
B1 5333	17 to 23 inches. Dark brown (10YR 4/3) light silty clay loam with moderate fine to medium subangular blocky structure; dark grayish brown (10YR 4/2) coatings on surface of peds; firm when moist; roots plentiful; pH 6.5; clear wavy boundary.
B2 5334	23 to 30 inches. Dark brown (10YR 3/3) silty clay loam with moderate fine subangular to angular blocky structure; firm when moist; few plant roots; pH 6.0; clear wavy boundary.
B3 5335	30 to 37 inches. Dark brown (10YR 4/3) light silty clay loam with moderate medium subangular blocky structure; firm when moist; pH 6.0; gradual wavy boundary.
C1 5336	37 to 60 inches. Dark grayish brown to dark yellowish brown (10YR 4/2 to 4/4) light silty clay loam; massive; friable when moist; few medium distinct mottles of strong brown and brown (7.5YR 5/6 and 5/2); pH 6.0.

SOIL Ringwood silt loam SOIL Nos. 862W1s-11-3 LOCATION Columbia County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 17859-17868 May 1966
General Methods: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm)											3A1		2A2 Coarse fragments				
		Total			Sand					Silt			Clay 3A1a Carbonate	Non-Carbonate	3B2 > 2 Vol.	3B1 > 2 Pct.	2-19 Pct. of		
		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 of < 2 mm																			
0-8	Ap	14.2	63.8	22.0	0.1	1.5	3.8	5.9	3.9	30.8	33.0	37.3	11.3						
8-10	B11	6.8	69.7	23.5	-	0.4	1.1	2.0	3.3	30.4	39.3	34.7	3.5						tr
10-14	B12	6.2	68.3	25.5	-	0.3	0.8	1.6	3.5	30.4	37.9	34.8	2.7						tr
14-19	B21	7.2	62.4	30.4	0.3	0.6	1.0	2.1	3.2	32.0	30.4	36.3	4.0						tr
19-23	B22	13.9	54.1	32.0	0.4	1.2	2.7	5.8	3.8	27.2	26.9	34.0	10.1						tr
23-30	B11B23	53.2	30.4	16.4	3.8	7.1	10.1	21.5	10.7	14.4	16.0	36.1	42.5						tr
30-35	B11B3	65.3	25.7	9.0	2.5	8.7	15.7	28.4	10.0	12.1	13.6	35.7	53.3	-	9	3	6	6	5
35-41	IIC1	71.9	23.3	4.8	2.8a	7.0a	17.6a	32.6a	11.9a	12.6	10.7	38.9	60.0	-	5	21	29	14	14
41-53	IIC2	70.1	25.2	4.7	1.2a	5.4a	16.0a	33.7a	13.8a	14.3	10.9	44.7	56.3	tr	5	14	19	13	13
53-66	IIC3	69.6	26.1	4.3	1.0a	5.5a	15.7a	33.0a	14.4a	14.4	11.7	45.0	55.2	tr	4	13	18	12	12

Depth (in.)	6A1a Organic carbon b PET	6B1a Nitrogen Pct	C/N	6C2a Ext. Iron as Fe Pct.	6E1b 6E2a Carbonate as CaCO3 Pct.	Bulk density				4D1 COLE E	Water content				pH		8C1a (1.1)	
						4A1a Field State g/cc	4A1d 1/3-Bar g/cc	4A1d 1/3-Bar g/cc	4A1b Air-Dry g/cc		4B4 Field State Pct.	4E1c 1/3-Bar Pct	4E2 15-Bar Pct	4C1 1/3-to 15-Bar ln/in.	8D3 Ca/Mg	5C3 Sum Options Pct.		5C1 NH4 OAc m Pct.
0-8	2.39	0.202	12	1.1	tr(s)	1.44		1.36	1.45	0.020	10.3	24.3	10.2	0.19				6.8
8-10	1.23	0.113	11	1.1	-(s)	1.42		1.35	1.42	0.017	9.8	24.7	8.7	0.22				6.5
10-14	0.84	0.078	11	1.2		1.38		1.31	1.38	0.017	10.5	22.3	10.3	0.16				6.3
14-19	0.66	0.062	11	1.3		1.44c		1.34c	1.46c				12.4					6.1
19-23	0.52	0.050	10	1.4	-(s)	1.49		1.37	1.53	0.036	12.8	22.8	13.6	0.13				6.0
23-30	0.33	0.030	11	1.4	-(s)	1.55		1.50	1.56	0.014	7.0	14.8	8.2	0.10				6.2
30-35	0.17	0.017		0.8	2	1.43	1.32	1.36e	1.41	0.014	5.1	13.3h	4.5	0.121				7.1
35-41	0.07			0.3	23	1.77	1.36	1.72e	1.7h	0.002	1.9	9.7h	2.4	0.101				7.9
41-53	0.06			0.3	26	1.86c	1.57	1.82f	1.84c	0.003			2.3					8.0
53-66	0.05			0.2	26	1.86	1.58	1.82e	1.84	0.003	4.6	10.3h	2.1	0.131				8.2

Depth (in.)	Extractable bases				6H1a Ext. Acidity	Ost. Sum	Bch. 5A3a	Cap. 5A1a	KCl-Ext. Al	8D3 Ca/Mg	Base saturation	
	6N2a Ca	6O2a Mg	6P2a Na	6Q2a K							Sum	Options
0-8	12.5	6.4	0.1	0.3	19.3	5.6	24.9	18.9		2.0	78	102
8-10	9.4	5.5	0.1	0.2	15.2	8.0	23.2	16.5		1.7	66	92
10-14	9.5	5.8	0.1	0.3	15.7	7.2	22.9	17.4		1.6	68	90
14-19	11.6	6.9	0.1	0.4	19.0	7.5	26.5	20.1		1.7	72	94
19-23	12.9	7.8	tr	0.4	21.1	8.7	29.8	21.3		1.6	71	99
23-30	8.2	5.0	tr	0.2	13.4	5.5	18.9	14.1		1.6	71	95
30-35	4.7j	2.4k	0.1	0.1	7.3			7.3		2.0		100
35-41	2.4j	1.8k	tr	0.1	4.3			2.7		1.3		159
41-53	2.1j	1.5k	tr	0.1	3.7			2.6		1.4		142
53-66	2.2j	1.8k	tr	0.1	4.1			2.2		1.2		186

Depth (in.)	Ratios to Clay 8D1			a. 5-25% carbonate.	h. 1/10-Bar.
	NH4 OAc CEC	Ext. Iron	15-Bar Water		
0-8	0.86	0.05	0.46		
8-10	0.70	0.05	0.37		
10-14	0.68	0.05	0.40		
14-19	0.66	0.04	0.41		
19-23	0.66	0.04	0.42		
23-30	0.86	0.09	0.50		
30-35	0.81	0.09	0.50		
35-41	0.56	0.06	0.50		
41-53	0.55	0.06	0.49		
53-66	0.51	0.05	0.49		

b. 12 kg/m² to 60 inches (Method 6A).
c. Estimated.
d. Calculated to include volume but not weight of > 2-mm. material. (Method 3B2)
e. 1/10-Bar values (Method 4Alg).
f. 1/10-Bar, estimated.
g. Coefficient of Linear Extensibility.
i. 1/10-Bar (Method 4C2).
j. NH4Cl-ETOH extraction (Method 6N3a).
k. NH4Cl-ETOH extraction (Method 6O3a).
m. One or more horizons has relatively low cation exchange capacity. As cation exchange capacity decreases, the relative error of base saturation increases. Trace quantities are omitted from the sum of bases. For very low CEC values, this omission contributes significantly to the relative error of base saturation.

Soil Type: Ringwood silt loam
 Soil Nos.: S62Hls-11-3
 Location: NW 1/4 SW 1/4, Sec. 30, T10N, R10E, Columbia County, Wisconsin; 250 feet south of farm road.
 Position and Relief: Undulating ground moraine or low drumlin; 3 to 4 percent convex slope.
 Drainage and Permeability: Well drained; moderately permeable; no ground water within 6 feet of the surface.
 Parent Material: Loess over brown calcareous sandy loam glacial till.
 Vegetation: Alfalfa.
 Erosion: Moderate.
 Stoniness: Few large stones in the till portion of the profile.
 Root Distribution: Many fine fibrous roots to 12 inches; common to 30 inches; few below 30 inches.
 Sampled by: P. Carroll, G. Lee, B. Watson, R. Grossman and D. McMurry.
 Described by: P. H. Carroll and G. Lee.

Horizon and

Lincoln
 Lab. No.

Ap 0 to 8 inches. Black (10YR 2/1) and very dark brown (10YR 2/2) silt loam with weak fine subangular blocky structure; friable; neutral; abrupt smooth boundary.
 17859

B11 8 to 10 inches. Very dark grayish-brown (10YR 3/2) silt loam that is dark brown (10YR 4/3) when rubbed; weak fine subangular blocky structure; friable; neutral; abrupt smooth boundary.
 17860

B12 10 to 14 inches. Dark brown (10YR 3/3) silt loam that is dark brown (10YR 4/3) with slightly less chroma when rubbed; weak fine subangular blocky structure; friable; neutral; clear wavy boundary.
 17861

B21 14 to 19 inches. Dark brown (10YR 3/3) light silty clay loam that is dark brown (10YR 4/3) with slightly less chroma when rubbed; weak medium prismatic structure that breaks on disturbance to moderate fine angular and subangular blocks; friable to firm; few thin bleached silt coats on ped faces; slightly acid; clear wavy boundary.
 17862

B22 19 to 23 inches. Dark yellowish brown (10YR 3/4) and dark brown (10YR 3/3) silty clay loam that is dark yellowish brown (10YR 4/4) when rubbed; weak medium prismatic structure that may be divided easily to moderate fine and medium angular and subangular blocks; firm; dark brown (10YR 3/3) clay films are common, thin and patchy on ped faces; slightly acid; clear wavy boundary.
 17863

IB23 & 23 to 30 inches. Dark brown (7.5YR 3/4 to 4/4) heavy loam with moderate medium subangular blocky structure; firm; clay films are common, thin and patchy on ped faces; slightly acid; clear wavy boundary.
 IB23
 17864

IB3 & 30 to 35 inches. Dark brown (7.5YR 3/4) light loam that displays slightly higher value (7.5YR 4/4) when rubbed; very weak thin platy structure to nearly massive; friable; slightly acid; clear wavy boundary.
 IB3
 17865

IC1 35 to 41 inches. Brown (10YR 5/3) and yellowish brown (10YR 5/4) sandy loam with 10 to 15 percent stones, rock fragments and pebbles larger than 3/4-inch diameter; moderate very thin platy structure; friable; weak effervescence with HCl; gradual weak boundary.
 17866

IC2 41 to 53 inches. Brown (10YR 5/3) and yellowish brown (10YR 5/4) sandy loam with approximately 5 percent stones, rock fragments and pebbles larger than 3/4-inch diameter; moderate very thin platy structure; friable; strong effervescence with HCl; gradual smooth boundary.
 17867

IIIC 53 to 66 inches. Brown (10YR 5/3) sandy loam with approximately 5 percent rock fragments, stones and pebbles larger than 3/4-inch diameter; moderate very thin platy structure; friable; strong effervescence with HCl.
 17868

SOIL Ringwood silt loam SOIL Nos. S62W1s-11-6 LOCATION Columbia, County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 17869-17878 May 1966

General Methods: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm)													3A1						
		Total			Sand						Silt				Clay		Coarse fragments				
		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)	3A1a Carbonate	Non-Carbonate	3B2 Vol. Pct.	3B1 > 2 Pct.	2-19 Pct. of			
Pct. of < 2 mm																					
0-7	Ap	13.4	65.3	21.3	tr	1.5	3.2	4.8	3.9	31.5	33.8	37.6	9.5								
7-10	A3	8.5	66.6	24.9	0.2	0.7	1.6	2.4	3.6	32.4	34.2	37.1	4.9					tr			
10-13	B1	7.5	65.2	27.3	0.1	0.5	1.2	2.0	3.7	32.7	32.5	37.3	3.8					tr			
13-18	B21	6.4	62.1	31.5	tr	0.4	1.0	1.7	3.3	32.2	29.9	36.3	3.1					tr			
18-22	B22	9.7	60.0	30.3	0.1	0.7	2.0	3.3	3.6	33.1	26.9	38.2	6.1					tr			
22-26	B23	31.1	45.6	23.3	0.3	3.1	8.5	13.7	5.5	25.2	20.4	36.9	25.6					tr			
26-32	IIIg/IIIb	70.0	18.4	11.6	1.5	7.0	18.6	32.6	10.3	20.1	8.3	35.5	59.7					5			
32-37	IIIc1	75.0	19.4	5.6	2.4a	8.0b	17.6c	32.1c	14.9b	12.5	6.9	42.6	60.1					14			
37-47	IIIc2	71.5	22.9	5.6	3.4a	8.3b	17.3c	29.8c	12.7b	14.1	8.8	41.2	58.8		6	22	29	15			
47-62	IIIc3	73.8	21.3	4.9	3.2a	9.0b	18.5c	30.3c	12.8b	12.6	8.7	39.7	61.0	tr	5	16	21	16			

Depth (in.)	6A1a Organic carbon d Pct	6B1a Nitrogen Pct	C/N	6C2a Exct. Iron as Fe Pct	6E1b 6E2a Carbonate as CaCO3 Pct	Bulk density				4D1 COLE i	Water content				pH	8C1a (1:1)
						4A1a Field-State g/cc	4A1d 1/3-Bar g/cc	4A1d 1/3-Bar g/cc	4A1b Air-Dry g/cc		4B1 Field-State Pct	4B1c 1/3-Bar Pct	4B2 15-Bar Pct	4C1 1/3-to 15-Bar ln./in		
0-7	1.92	0.165	12	0.3	tr(s)	1.54	1.46	1.54	1.54	0.017	8.4	20.9	9.6	0.16		6.6
7-10	1.24	0.109	11	1.1		1.34	1.28	1.35	1.35	0.017	10.3	26.9	10.8	0.21		6.0
10-13	0.87	0.084	10	1.1		1.40e	1.32e	1.43e	1.43e				11.7			5.6
13-18	0.65	0.063	10	1.3		1.46	1.36	1.50	1.50	0.032	12.6	22.6	13.3	0.13		5.6
18-22	0.48	0.048	10	1.4		1.53	1.43	1.56	1.56	0.028	11.0	21.7	13.2	0.12		5.6
22-26	0.36	0.038	9	1.3		1.53e	1.43e	1.56e	1.56e				9.8			5.6
26-32	0.20	0.023		0.8	2	1.52	1.46g	1.49	1.49	0.007	3.9	13.7j	4.7	0.13k		6.8
32-37	0.09			0.3	22	1.84e	1.40	1.79h	1.81e	0.002			2.6			7.8
37-47	0.06			0.4	26	1.84	1.52	1.79z	1.81	0.003	1.6	10.0j	2.2	0.12k		7.9
47-62	0.04			0.3	28	1.93	1.59	1.90g	1.90		1.2	8.0j	2.1	0.09k		8.0

Depth (in.)	Extractable bases				5B1a Sum	6H1a Exct. Acidity	Cationic	5A3a Sum	5A1a NH4 OAc	KCl-Exct. Al	8D3 Ca/Mg	Base saturation	
	6N2a Ca	6O2a Mg	6P2a Na	6Q2a K								5C3 Sum Cations	5C1 NH4 OAc Pct.
0-7	10.8	5.5	tr	0.2	16.5	7.5	24.0	16.9			2.0	69	98
7-10	8.2	4.5	0.1	0.2	13.0	9.1	22.1	16.2			1.8	59	80
10-13	8.5	4.6	0.1	0.3	13.5	9.9	23.4	17.1			1.8	58	79
13-18	10.4	6.4	0.1	0.4	17.3	9.4	26.7	20.2			1.6	65	86
18-22	10.6	6.7	0.1	0.4	17.8	8.3	26.1	20.5			1.6	68	87
22-26	8.0	5.1	0.1	0.3	13.5	6.2	19.7	15.0			1.6	68	90
26-32	3.8m	2.6n	tr	0.2	6.6	3.4	10.0	7.1			1.5	66	93
32-37	2.3m	1.6n	tr	0.1	4.0			2.9			1.4		138
37-47	2.5m	1.9n	tr	0.1	4.5			3.0			1.3		150
47-62	1.9m	1.7n	tr	0.1	3.7			2.4			1.1		154

Depth (in.)	Ratios to Clay 8D1			NH4 OAc CEC	Exct. Iron	15-Bar Water	a. > 50-100% carbonate.	b. 25-50% carbonate.	c. 5-25% carbonate.	d. 10 kg/m ² to 60 inches (Method 6A).	e. Estimated.	f. Calculated to include volume but not weight of > 2-mm. material. (Method 3B2)	g. 1/10-Bar (Method 4A1g).	h. 1/10-Bar, estimated.	i. Coefficient of Linear Extensibility.	j. 1/10-Bar.	k. 1/10-Bar (Method 4C2).	m. NH4Cl-EtOH extraction (Method 6N3a).	n. NH4Cl-EtOH extraction (Method 6O3a).	
0-7	0.79	0.01	0.45																	
7-10	0.65	0.04	0.43																	
10-13	0.63	0.04	0.43																	
13-18	0.64	0.04	0.42																	
18-22	0.68	0.05	0.44																	
22-26	0.64	0.06	0.42																	
26-32	0.61	0.07	0.40																	
32-37	0.52	0.05	0.46																	
37-47	0.54	0.07	0.39																	
47-62	0.49	0.06	0.43																	

Soil Type: Ringwood silt loam
 Soil Nos.: 962Wis-11-6
 Location: NE 1/4, SW 1/4, Sec. 27, T10N, R10E, Columbia County, Wisconsin.
 Position and Relief: Undulating ground moraine; 2 to 3 percent convex slope.
 Drainage and Permeability: Well drained; moderately permeable; no ground water within 6 feet of the surface.
 Parent Material: Loess over brown calcareous sandy loam glacial till.
 Vegetation: Alfalfa.
 Erosion: Moderate.
 Stoniness: Few large stones in till portion of the profile.
 Root Distribution: Many fine fibrous roots to 12 inches; common to 32 inches; few below 37 inches.
 Sampled by: P. Carroll, G. Lee, B. Watson, R. Grossman and D. McMurtry.
 Described by: P. H. Carroll and G. Lee.

Horizon and
 Lincoln
 Lab. No.

Ap 17869	0 to 7 inches. Black (10YR 2/1) silt loam with weak fine subangular blocky structure; friable; neutral; clear smooth boundary.
A3 17870	7 to 10 inches. Very dark brown (10YR 2/2) silt loam with weak to moderate fine subangular blocky structure; friable; slightly acid; gradual smooth boundary.
B1 17871	10 to 13 inches. Dark brown (10YR 3/3) heavy silt loam that is dark yellowish brown (10YR 4/4) when rubbed; weak medium prismatic structure divides when disturbed to moderate fine subangular blocks; firm; medium acid; clear smooth boundary.
B21 17872	13 to 18 inches. Dark brown (10YR 3/3) light silty clay loam that is dark yellowish brown (10YR 4/4) when rubbed; weak medium prismatic structure divides when disturbed to moderate fine angular and subangular blocks; firm; medium acid; clear smooth boundary.
B22 17873	18 to 22 inches. Dark brown (10YR 3/3) light silty clay loam that is dark yellowish brown (10YR 4/4) when rubbed; moderate medium prismatic structure divides when disturbed to moderate fine and medium angular blocks; firm; medium acid; clear smooth boundary.
IB23 & IB23 17874	22 to 26 inches. Dark brown (10YR 3/3 to 4/3) light silty clay loam, with few chert fragments, that is yellowish brown when rubbed; moderate medium prismatic structure that divides when disturbed to moderate fine and medium angular blocks; firm; thin nearly continuous clay films on some ped faces; medium acid; clear wavy boundary.
IIB3 or IIBeta 17875	26 to 32 inches. Dark brown (7.5YR 3/4) light loam that has a slightly higher value (7.5YR 4/4) when rubbed; slightly higher clay content toward lower horizon boundary; weak coarse subangular blocky structure; friable; slightly acid; gradual wavy boundary.
IIC1 17876	32 to 37 inches. Yellowish brown (10YR 5/4) sandy loam with approximately 10 to 15 percent rock fragments, stones and pebbles larger than 3/4-inch diameter; weak thin platy structure; friable; weak effervescence with HCl; diffuse wavy boundary.
IIC2 17877	37 to 47 inches. Light yellowish brown (10YR 6/4) sandy loam with approximately 5 percent rock fragments, stones and pebbles larger than 3/4-inch diameter; weak thin platy structure; friable; strong effervescence with HCl; diffuse smooth boundary.
IIC3 17878	47 to 62 inches. Light yellowish brown (10YR 6/4) sandy loam with approximately 5 percent rock fragments, stones and pebbles larger than 3/4-inch diameter; weak thin platy structure; very friable; strong effervescence with HCl; diffuse smooth boundary.

SOIL Santiago silt loam SOIL Nos. 47145-3-5 LOCATION Barron County, Wisconsin

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 471409-471415

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1				
		1B1b Total				Sand				Silt				2A2 ≥ 2 Pct	2-19 Pct	19-76 Pct of ← 76mm →		
		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)	Int. III (0.05-0.02)	Int. II (0.02-0.002)	(2-0.1)						
Pct of < 2 mm																		
1/4-0	O2																	
0-2	A1																	
2-12	A2	16.4	75.3	8.3	0.4	3.7	4.3	3.6	4.4	41.0	34.3	46.9	12.0					tr.
12-14	A2&B1	13.9	70.1	16.0	0.4	3.0	3.3	2.8	4.4	40.7	29.4	46.5	9.5					tr.
14-18	B2t	22.7	59.4	17.9	1.1	4.9	5.6	5.7	5.4	34.8	24.6	42.7	17.3					4
18-24	T1B2&t	45.0	37.7	17.3	2.7	12.0	13.2	11.2	5.9	22.8	14.9	33.2	39.1					16
24+	T1C1	72.5	17.3	10.2	5.3	17.2	20.0	23.0	7.0	8.8	8.5	26.5	65.5					20
Depth (in.)	6A1a Organic carbon	Nitrogen	C/N	Carbonate as CaCO ₃	Ext. iron as Fe	Bulk density			4D1 COLE	Water content			4C1 WRD m/n	pH				
						4A1e ½ bar	4A1h Oven dry	g/cc		4B1c ½ bar	4B2 15 bar	Pct.		Pct.	Pct.	8C1c (1:1) KCl	8C1a (1:1) H ₂ O	
						Pct.	Pct.	Pct.		Pct.	Pct.	Pct.		Pct.	Pct.			
1/4-0	20.89															5.8		
0-2	8.18															5.4		
2-12	0.69															4.9		
12-14	0.26															5.0		
14-18	0.26															5.0		
18-24	0.15															5.2		
24+	0.13															5.3		
Depth (in.)	Extractable bases 5B1a					6H2a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay			8D3 Ca/Mg	Base saturation				
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	Ext. Al		CEC Sum	Ext. iron	15-bar water		5C3 Sum cations Pct.	5C1 NH ₄ OAc Pct.			
	meq/100 g																	
1/4-0																		
0-2	17.6	3.1	0.2	0.7		18.5	40.1								54			
2-12	0.8	0.3	tr.	0.1		7.8	9.0								13			
12-14	2.9	1.5	tr.	0.1		7.5	12.0								38			
14-18	3.6	1.6	0.3	0.1		8.2	13.8								41			
18-24	4.5	2.3	0.1	0.1		6.1	13.1								53			
24+	2.5	1.2	tr.	tr.		3.6	7.3								51			
Depth (in.)	Clay Fraction Analysis 7A1b-d																	
	Mt.	Chl.	Vm.	Mi.	Int.	Qtz.	Kl.	Gibbsite										
	7A2 X-ray				7A3													

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 type: Santiago silt loam

Soil No.: 47Wis-3-5

Location: Barron County, Wisconsin. NW corner NW 1/4 of NE 1/4 section 18, township 36N., range 11W.

Horizon and

Beltsville

Lab. Nos.

O2 471409	1/4 to 0 inches. Black organic loam.
A1 471410	0 to 2 inches. Black silt loam which has a medium granular structure.
A2 471411	2 to 12 inches. Grayish brown platy silt loam.
A2 & B1 471412	12 to 14 inches. Reddish brown platy to weak blocky silt loam.
B21t 471413	14 to 18 inches. Reddish brown medium blocky silty clay loam.
IIB22t 471414	18 to 24 inches. Dark reddish brown medium blocky and somewhat firm silty clay loam.
IIC1 471415	24+ inches. Dark reddish brown sandy clay loam glacial till.

SOIL Santiago silt loam SOIL Nos. 860W1a-55-2 LOCATION St. Croix County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 13659-13667 May 1965

Depth (in.)	Horizon	1B1a Size class and particle diameter (mm)											3A1		2A2 coarse fragments				
		Total				Sand					Silt		Int III (0.05-0.02)	Int II (0.02-0.002)	(2-0.1)	> 2	2 - 19	3B2 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	0.02-0.002	Pct.							Pct. of < 76mm
0-2	A1	35.0	56.7	8.3	1.6a	8.4	7.9	9.6	7.5	31.5	25.2	42.5	27.5				Tr.	Tr.	-
2-5	A21	34.6	57.1	8.3	1.6	7.1	8.2	10.1	7.6	32.7	24.4	43.8	27.0				Tr.	Tr.	-
5-9	A22	33.9	56.6	9.5	1.3	7.2	7.9	9.9	7.6	32.6	24.0	43.8	26.3				Tr.	Tr.	-
9-15	B1	28.9	56.1	15.0	1.3	5.8	6.4	7.9	7.5	32.7	23.4	43.0	21.4				Tr.	Tr.	-
15-19	B21	33.7	46.8	19.5	1.6	6.8	7.8	9.2	8.3	28.0	18.8	39.8	25.4				Tr.	Tr.	-
19-25	B22	60.3	22.7	17.0	2.8	12.1	14.9	21.1	9.4	13.5	9.2	31.5	50.9				30	10	20
25-36	2C3	68.6	18.5	12.9	2.7	10.5	16.3	28.0	11.1	11.2	7.3	34.5	57.5				15	10	5
36-53	3C1	72.6	17.0	10.4	2.4	9.9	16.5	32.1	11.7	9.6	7.4	34.6	60.9				9	9	-
53-65	3C2	91.2	4.8	4.0	5.5	23.5	33.6	25.8	2.8	1.9	2.9	10.7	88.4				15	15	-

Depth (in.)	6A1a Organic carbon		6B1a Nitrogen		C/N	Carbonate as CaCO ₃	6C1a Bulk density			4M COLE	Water Content					pH	8C1a (1)
	Pct.	Pct.	Pct.	Fe ₂ O ₃ Pct.			4A1a Field-State	4A1c 30-Cm.	4A1d Oven-Dry		4B4 Field-State	4B3 30-Cm.	4B1b 1/3-Bar	4B2 15-Bar	4C1 1/3 to 15-Bar in. per in.		
0-2	3.15	0.182	17				0.9										5.2
2-5	0.94	0.073	13				0.9										4.8
5-9	0.39	0.039	10				0.9	1.57	1.52	1.59	0.014	-	14.6	14.9	3.6	0.17	4.9
9-15	0.30	0.029	10				1.2	1.60	1.50	1.54	0.010	4.9	17.6	15.0	5.4	0.14	4.8
15-19	0.27	0.027	9				1.5	1.63	1.55	1.64	0.020	7.7	18.7	17.5	8.1	0.14	4.9
19-25	0.13	0.017					1.5	1.85	1.78	1.84	0.007	3.6	11.9	12.9	6.1	0.10	4.9
25-36	0.08						1.3	1.92	1.88	1.92	0.007	3.1	8.6	7.8	4.4	0.06	5.0
36-53	0.06						1.2								4.0		5.1
53-65	0.02						1.1								2.1		5.6

Depth (in.)	Extractable bases 5M1a				6M1a Ext. Acidity	Cat. 5A3a Sum	Mech. 5A1a Sum	6G2a Ext. Al.	8D3 Ca/Mg	Base saturation			
	6M2b Ca	6M2b Mg	6P2a Na	6Q2a K						5C3 Sum Cations	5C1 NH ₄ Cl		
0-2	4.0	1.4	Tr.	0.4	5.8	8.9	14.7	10.5	0.1		2.8	39	55
2-5	0.8	0.8	Tr.	0.2	1.8	7.5	9.3	6.2	1.8			19	29
5-9	0.7	0.8	Tr.	0.2	1.7	5.8	7.5	5.0	1.8			23	34
9-15	1.3	2.0	Tr.	0.2	3.5	6.8	10.3	7.6	2.2			34	46
15-19	3.8	3.0	Tr.	0.2	7.0	6.9	13.9	10.9	1.9		0.6	50	64
19-25	3.8	2.4	Tr.	0.2	6.4	5.2	11.6	9.2	1.2		1.3	34	46
25-36	3.0	1.7	Tr.	0.1	4.8	3.0	7.8	6.6	0.6		1.6	55	70
36-53	3.0	1.8	Tr.	0.1	4.9	2.3	7.2	5.9	0.3		1.8	62	73
53-65	2.3	1.2	Tr.	Tr.	3.5	1.4	4.9	3.7	0.1		1.7	68	83
											1.9	71	94

Depth (in.)	Ratios to Clay 8D1		
	NH ₄ OAc CEC	Ext. Iron	15-Bar Water
0-2	1.26	0.11	0.73
2-5	0.75	0.11	0.40
5-9	0.53	0.09	0.38
9-15	0.51	0.08	0.36
15-19	0.56	0.08	0.42
19-25	0.54	0.09	0.36
25-36	0.51	0.10	0.34
36-53	0.57	0.12	0.38
53-65	0.92	0.28	0.52

a. 25-50% organic matter.
b. Coefficient of linear extensibility.
Note: See descriptions for mineralogy.

Soil type: Santiago silt loam
 Soil Nos.: S60Mls-55-2
 Location: St. Croix County, Wisconsin; southeast quarter, northeast quarter, Section 1, T28N, R19W, Troy Township.
 Position and relief: Undulating ground moraine; 3 to 4 percent convex slope; west aspect.
 Drainage and permeability: Well drained; moderately permeable; no ground water within the 5-foot observed depth.
 Parent material: Loess over reddish brown loam to sandy loam glacial drift of Cary age and Patrician source.

Vegetation: Basswood, oak and maple trees.

Erosion: Slight to none.

Stoniness: None.

Root distribution: Abundant fibrous and coarse roots in the A1 and A21 horizons; fewer below.

Sampled by: Paul H. Carroll, William DeYoung, Robert Grossman and Jerry Post, July 29, 1960.

Described by: Paul H. Carroll.

Horizon and
 Lincoln
 Lab. Number

Aoo	2 to 0 inch. Undecomposed leaf litter.
A1 13659	0 to 2 inches. Very dark grayish brown (10YR 3/2) silt loam with weak fine granular structure; friable; abundant fibrous and coarse roots; medium acid; clear smooth boundary.
A21 13660	2 to 5 inches. Dark grayish brown (10YR 4/2) silt loam with weak very thin platy structure; very friable; abundant fibrous and coarse roots; strongly acid; clear smooth boundary.
A22 13661	5 to 9 inches. Dark grayish brown (10YR 4/2) silt loam with weak thin platy structure; friable; slightly vesicular; fibrous and coarse roots common; strongly acid; clear smooth boundary.
B1 13662	9 to 15 inches. Dark brown (10YR 4/3) silt loam; weak medium platy structure which breaks under pressure to weak fine subangular blocks; friable; vesicular; fibrous and coarse roots common; strongly acid; gradual smooth boundary.
B21 13663	15 to 19 inches. Dark brown (10YR 4/3) heavy silt loam with moderate medium subangular blocky structure; few patchy dark brown (10YR 3/3) clay films on blocky ped faces; firm; coarse roots common; strongly acid; clear smooth boundary.
IIB22 13664	19 to 25 inches. Dark brown (7.5YR 4/4) heavy loam (loess-influenced glacial till); weak medium prismatic structure breaks readily to moderate medium subangular blocks; 15 percent of the material greater than 3/4-inch size; firm, dark reddish brown (5YR 3/4) clay films are thin and patchy on blocky ped faces and often continuous along vertical cleavage planes; few iron spots; cobble and pebble line marks the upper horizon boundary; few tap roots; strongly acid; gradual smooth boundary.
IIB3 13665	25 to 36 inches. Reddish brown (5YR 4/4) loam, glacial till; weak coarse subangular blocky structure; 5 percent materials greater than 3/4-inch size in this horizon and the horizons below; clay films thin and patchy on blocky ped faces toward the upper horizon boundary and nearly continuous along some vertical cleavage planes; firm; few tap roots; strongly acid; gradual smooth boundary.
IIC1 13666	36 to 53 inches. Dark brown (7.5YR 4/4) light loam glacial till with generally weak medium platy structure; friable; medium to strongly acid; gradual smooth boundary.
IIC2 13667	53 to 65 inches. Brown (7.5YR 5/4) loamy sand glacial drift; generally loose and structureless; medium to strongly acid; clear smooth boundary.
IIC3	65 to 87 inches. Reddish brown (5YR 4/4) loamy sand glacial drift; generally loose and structureless; medium acid; clear smooth boundary.
IIIC4	87 to 111 inches. Yellowish brown (10YR 5/4) glaciofluvial medium sand; loose and structureless; medium to slightly acid.

Remarks: Unless otherwise indicated, all soil colors shown in the soil profile description are moist colors.

MINERALOGY: The following mineralogical observations are for very fine sands; percentages are only rough approximations: 40 percent quartz, 30 percent feldspar, and 30 percent altered feldspar aggregates and intergrowths of quartz and altered feldspar. Amphibole, epidote, garnet, pyroxene, a brownish mica-like mineral, and apatite are the observed accessories in order of abundance. Little difference exists between the loess and the till; amphiboles and pyroxenes may be somewhat higher in the till.

SOIL Santiago silt loam SOIL Nos. 6661a-55-3 LOCATION St. Croix County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 13753-13762 May 1965

Depth (in.)	Horizon	Size class and particle diameter (mm)											Coarse fragments			
		1B1a		3A1								2A2				
		Total		Sand				Silt				2-2	2-19	3B2		
		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)	Int. III (0.05-0.02)	Int. III (0.02-0.002)	Int. II (0.2-0.02)	(2-0.1)	V-2	2-19	3B2
Pct. of < 2 mm																
														Pct.	Pct. of < 76mm	
0-3	A1	15.5	71.8	12.7	0.2a	2.6a	2.6	3.9	6.2	38.5	33.3	46.2	9.3	Tr.	Tr.	-
3-6	A21	12.8	74.8	12.4	0.2b	1.7b	2.3b	2.8	5.8	41.0	33.8	47.8	7.0	Tr.	Tr.	-
6-9	A22	12.8	72.1	15.1	0.4b	1.9b	2.0b	2.5	6.0	40.0	32.1	46.9	6.8	Tr.	Tr.	-
9-15	B1	11.1	70.5	18.4	0.1b	1.2b	1.6b	2.0	6.2	40.6	29.9	47.5	4.9	Tr.	Tr.	-
15-19	B21	13.4	63.3	23.3	0.3b	1.4b	1.7b	2.1	7.9	38.6	24.7	47.4	5.5	Tr.	Tr.	-
19-23	B22	24.2	54.6	21.2	1.1b	3.6b	4.8b	5.5	9.2	34.9	19.7	45.3	15.0	Tr.	Tr.	-
23-27	1B23	60.1	25.0	14.9	2.9b	11.1	15.9	21.2	9.0	13.9	11.1	31.1	51.1	7	7	-
27-36	1B3	60.7	25.5	13.8	2.8	9.7	15.2	23.8	9.2	12.8	12.7	31.7	51.5	6	6	-
36-48	1B1	63.2	22.7	14.1	4.2	11.5	16.2	23.2	8.1	15.4	7.3	32.7	55.1	7	7	-
48-70	1B2	60.4	25.5	14.1	3.5	11.0	15.8	22.7	7.4	11.9	13.6	28.2	53.0	6	6	-

Depth (in.)	6A1a	6B1a	C/N	Carbonate as CaCO ₃	6C1a	Bulk density			Water Content				pH	8C1a (1:1)
	Org. carbon	Nitrogen			Ext. Iron as Fe ₂ O ₃									
	Pct.	Pct.		Pct.	Pct.	g/cc	g/cc	g/cc	Pct.	Pct.	Pct.	Pct.		
0-3	4.73	0.305	16		1.0							10.1		4.9
3-6	1.12	0.095	11		0.9							5.4		4.5
6-9	0.66	0.090	13		1.1							5.6		4.5
9-15	0.48	0.036	13		1.2							6.9		4.6
15-19	0.30	0.025	10		1.6							9.4		4.7
19-23	0.21	0.025			1.6							9.3		4.6
23-27	0.09	0.014			1.5							5.3		4.8
27-36	0.06				1.4							5.3		5.0
36-48	0.04				1.5							5.2		5.3
48-70	0.04				1.4							5.7		5.6

Depth (in.)	Extractable bases				5B1a	6B1a	Cat. Mech. Cap.		8D3	Base saturation		
	6N2b	6O2b	6P2a	6Q2a	Sum	Ext. Acidity	5A3a Sum	5A1a Cationic		Ca/Mg	5C3 Sum	5C1
	Ca	Mg	Na	K	Sum					Pct.	Pct.	
meq/100 g												
0-3	6.0	2.6	Tr.	0.4	9.0	16.4	25.4	17.7		2.3	35	51
3-6	0.9	0.8	Tr.	0.1	1.8	11.8	13.6	9.2			13	20
6-9	1.6	1.2	Tr.	0.1	2.9	10.2	13.1	9.2		1.3	22	32
9-15	2.7	2.0	0.1	0.1	4.9	9.7	14.6	11.0		1.4	34	44
15-19	5.5	3.4	0.1	0.2	9.2	10.7	19.9	14.8		1.6	46	62
19-23	5.8	3.6	0.1	0.2	9.7	8.8	18.5	14.3		1.6	52	68
23-27	4.2	2.4	0.1	0.1	6.8	4.5	11.3	9.1		1.8	60	75
27-36	4.8	2.6	0.1	0.1	7.6	3.8	11.4	9.2		1.8	67	83
36-48	5.0	2.7	0.1	0.1	7.9	3.0	10.9	8.6		1.8	72	92
48-70	5.6	3.4	0.1	0.2	9.3	2.8	12.1	9.5		1.6	77	98

Depth (in.)	Ratios to Clay			a. 25-50% organic matter. b. 5-25% Fe-Mn nodules. Note: See descriptions for mineralogy.
	Mg, OAc	Ext. Iron	15-Bar Water	
	C/C			
0-3	1.39	0.05	0.80	
3-6	0.74	0.07	0.44	
6-9	0.61	0.07	0.37	
9-15	0.60	0.06	0.38	
15-19	0.64	0.07	0.40	
19-23	0.67	0.08	0.44	
23-27	0.61	0.10	0.36	
27-36	0.67	0.10	0.38	
36-48	0.61	0.11	0.37	
48-70	0.67	0.10	0.40	

Soil type: Santiago silt loam

Soil Nos.: S60Wis-55-3

Location: St. Croix County, Wisconsin; northwest quarter, northeast quarter, Section 7, T28N, R18W, Kinnickinnic Twp.

Position and relief: Undulating ground moraine; approximately 3 percent convex slope; east aspect.

Drainage and permeability: Well drained; moderately permeable; ground water table below the 6-foot observed depth.

Parent material: Loess over reddish brown loam glacial till of Cary age and Patrician source.

Vegetation: Elm and oak trees.

Erosion: None to very slight.

Stoniness: None.

Root distribution: Many fibrous roots to a depth of 6 inches; some tap roots extend through till to a depth of 5 feet.

Sampled by: Paul H. Carroll, William DeYoung, Robert Grossman and Jerry Post, July 29, 1960.

Described by: Paul H. Carroll.

Horizon and

Lincoln

Lab. Number

Aoo	1 to 0 inch. Undecomposed leaf litter.
A1 13753	0 to 3 inches. Very dark brown (10YR 2/2) to very dark grayish brown (10YR 3/2) silt loam with weak very fine granular structure; very friable; abundant fibrous and coarse roots; medium acid; clear smooth boundary.
A21 13754	3 to 6 inches. Dark grayish brown (10YR 4/2) silt loam with weak very thin platy structure; few very dark grayish brown (10YR 3/2) tongues of organic matter penetrate this horizon from the A1 above; very friable; abundant fibrous and coarse roots; medium to strongly acid; clear smooth boundary.
A22 13755	6 to 9 inches. Dark grayish brown (10YR 4/2) silt loam with weak thin platy structure; very friable; fibrous and coarse roots common; medium to strongly acid; clear smooth boundary.
B1 13756	9 to 15 inches. Dark brown (10YR 4/3) silt loam; weak fine to medium subangular blocky structure which displays a generally weak thin platiness throughout; thin discontinuous or patchy bleached silt coats on plate faces and along vertical cleavage planes; friable; few coarse roots; strongly acid; clear smooth boundary.
B21 13757	15 to 19 inches. Dark brown (10YR 4/3) silt loam with moderate fine to medium subangular blocky structure; thin continuous bleached silt coats on faces of structural pedis; friable; few coarse roots; clear smooth boundary.
B22 13758	19 to 23 inches. Dark brown (10YR 4/3) and dark yellowish brown (10YR 4/4) heavy silt loam with moderate fine subangular blocky structure; thin continuous bleached silt coats on faces of structural pedis; firm; very strongly acid; clear wavy boundary.
IIB23 13759	23 to 27 inches. Reddish brown (5YR 4/4) and dark brown (7.5YR 4/4) loam, loess-influenced glacial till; weak coarse prismatic structure which breaks readily to moderate fine to medium subangular blocks; relatively thick (1- to 2-mm.) bleached sand coats along primary structural cleavage planes; friable; cobble and pebble line marks the upper horizon boundary; very strongly acid; gradual wavy boundary.
IIB3 13760	27 to 36 inches. Yellowish red (5YR 4/6) loam glacial till; weak coarse prismatic structure which breaks under pressure to weak coarse subangular blocks; thin bleached sand coats along major vertical cleavage planes; friable; strongly acid; gradual smooth boundary.
IIC1 13761	36 to 48 inches. Reddish brown (5YR 4/4) to yellowish red (5YR 4/6) light loam with weak medium platy structure; friable; medium acid; gradual smooth boundary.
IIC2 13762	48 to 70 inches. Reddish brown (5YR 4/4) to yellowish red (5YR 4/6) light loam with thin discontinuous lenses of grayish brown (10YR 5/2) clay, weathered shale incorporated with the glacial drift; weak medium platy structure; friable; medium acid; clear smooth boundary.
IIIC	70 to 80 inches plus. Grayish brown (2.5Y 5/2) to yellowish brown (10YR 4/4 to 5/6) clay that is the weathered residuum of underlying shale bedrock; generally massive; medium acid.

Remarks: Unless otherwise indicated, all soil colors shown in the soil profile description are moist colors.

MINERALOGY: Very fine sand similar in mineralogy to that in Santiago, profile S60Wis-55-2. Altered feldspar aggregates more abundant in the till. Lab. No. 13761 contains a trace of glass shards and some sponge spicules(?).

SOIL SURVEY LABORATORY Lincoln, Nebr. 1/22/58

SOIL TYPE Seaton LOCATION La Crosse County, Wisconsin
silt loam

SOIL NOS. S56W1s-32-5 LAB. NOS. 5337-5344

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS
		1B1a		3A1					2A2			
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY	> 2			
2-1	1-0.5	0.5-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.02	0.02-0.002				
0-3	A1	0.1	0.2	0.2	0.7	4.9	82.7	11.2	56.6	31.5	-	si
3-7	A2	0.1	0.2	0.2	0.6	4.9	84.0	10.0	57.3	32.0	-	si
7-10	A3	-	0.1	0.1	0.3	5.3	84.3	9.9	59.3	30.5	-	si
10-18	B1	-	-	0.1	0.3	4.7	79.9	15.0	56.2	28.6	-	sil
18-28	B21	-	-	-	0.3	4.8	74.1	20.8	54.6	24.5	-	sil
28-38	B22	-	-	0.1	0.4	5.3	71.1	23.1	54.3	22.4	-	sil
38-48	B3	-	-	-	0.4	5.6	72.7	21.3	56.8	21.8	-	sil
48-64	C1	-	-	-	0.6	6.6	73.1	19.7	58.3	21.9	-	sil
pH 8C1a		ORGANIC MATTER					MOISTURE TENSIONS					
1:1		1:5	1:10	6A1a	6B1a	C/N		CaCO ₃ equivalent	1/10 ATMOS.	1/3 ATMOS.	15 ATMOS.	
			%	%	%			%	%	%	%	
5.6	5.7	5.7	2.10	.175	12						7.2	
4.8	4.9	5.0	0.52	.061	8						4.5	
4.7	4.9	5.0	0.22	.036							4.1	
4.6	4.8	5.0	0.20	.028							6.1	
4.7	4.8	4.9	0.14	.020							8.6	
5.0	5.2	5.4	0.12								10.1	
5.2	5.3	5.4	0.12								9.7	
5.3	5.6	5.6	0.09								9.0	
5A1a	EXTRACTABLE CATIONS					5B1a	BASE SAT. %	5C3	5B1a	5A3a	8D3	
CATION EXCHANGE CAPACITY	6N2b	6O2b	6H1a	6P2a	6Q2a	NH ₄ Ac		Base Sat. % on Cations	Sum Bases	Sum Cations	Ca/Mg	
NH ₄ Ac	← milliequivalents per 100g. soil →					5C1		← me/100g →				
13.0	7.2	2.4	7.4	0.1	0.2	76		57	9.9	17.3	3.0	
7.2	2.1	1.2	7.0	-	0.2	49		33	3.5	10.5	1.8	
6.6	2.1	1.4	6.1	0.1	0.2	58		38	3.8	9.9	1.5	
9.2	2.8	2.0	6.2	0.1	0.2	55		45	5.1	11.3	1.4	
12.9	4.9	3.9	8.3	0.1	0.3	71		52	9.2	17.5	1.2	
15.8	8.3	4.5	8.3	0.1	0.4	84		62	13.3	21.6	1.8	
15.2	8.5	4.5	5.0	0.2	0.4	89		73	13.6	18.6	1.9	
14.2	8.5	4.0	9.5	0.2	0.4	92		58	13.1	22.6	2.1	

Soil type: Seaton silt loam

Soil Nos.: S56W1s-32-5

Location: NW1/4 of SW1/4, Section 20, T16N, R6W, La Crosse County, Wisconsin.

Well drained Gray-Brown Podzolic soil developed in coarse Peorian loess on west-facing upland ridges bordering the Mississippi River and its major tributaries. This profile was sampled in a deciduous woods on an 18 percent north-facing convex slope. Surface runoff is rapid, internal drainage well, and permeability moderate. Soil colors are according to Munsell color chart under moist field conditions.

Collected and described by: A. J. Klingshoets and M. Beatty.

Horizon and
Lincoln
Lab. Number

A1 5337	0 to 3 inches. Very dark grayish brown (10YR 3/2) silt loam with weak fine granular structure; very friable when moist; grass roots abundant; pH 6.5; clear smooth boundary.
A2 5338	3 to 7 inches. Brown (10YR 5/3) silt loam with weak fine platy structure; very friable when moist; roots plentiful; pH 5.5; gradual smooth boundary.
A3 5339	7 to 10 inches. Yellowish brown (10YR 5/4) silt loam having weak fine subangular blocky structure; friable when moist; roots plentiful; pH 5.4; gradual smooth boundary.
B1 5340	10 to 18 inches. Yellowish brown to dark yellowish brown (10YR 5/4 to 4/4) silt loam having weak to moderate fine subangular blocky structure; friable when moist; roots plentiful; pH 5.3; gradual smooth boundary.
B21 5341	18 to 28 inches. Dark brown (7.5YR 4/4) heavy silt loam with moderate medium subangular breaking down into fine angular blocks; friable when moist; dark brown (7.5YR 4/3) organic stains on surface of peds; roots plentiful; pH 5.2; gradual smooth boundary.
B22 5342	28 to 38 inches. Dark brown (10YR 4/3) heavy silt loam with moderate medium to coarse subangular blocky structure; firm when moist; dark brown (7.5YR 3/2 to 4/4) organic stains on surface of peds; roots plentiful; pH 5.5; clear smooth boundary.
B3 5343	38 to 48 inches. Dark brown to yellowish brown (10YR 4/3 to 5/4) silt loam having weak coarse subangular blocky structure; friable when moist; few organic stains of dark brown and silica coatings of very pale brown on peds; few roots; pH 5.8; gradual smooth boundary.
C1 5344	48 to 64 inches. Yellowish brown (10YR 5/4 to 5/6) coarse silts; massive; friable when moist; light brownish gray (10YR 6/2) silica segregations in mass; pH 6.3.

SOIL SURVEY LABORATORY Lincoln, Nebr. 1/22/58

SOIL TYPE Seaton LOCATION La Crosse County, Wisconsin
silt loam

SOIL NOS. S56W1s-32-6 LAB. NOS. 5345-5351

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS
		1B1a		3A1		2A2						
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY	> 2			
0-3	A1	0.5	0.1	0.1	0.6	7.9	77.9	12.9	61.0	25.3	-	sil
3-7	A2	0.1	0.1	0.1	0.5	8.6	80.0	10.6	64.1	24.9	-	si
7-12	A3	-	-	-	0.5	8.3	72.7	18.5	59.0	22.4	-	sil
12-19	B1	-	-	-	0.3	7.3	68.6	23.8	55.9	20.2	-	sil
19-40	B2	-	-	-	0.3	8.5	69.6	21.6	60.1	18.3	-	sil
40-48	B3	-	0.1	0.5	2.8	8.2	70.8	17.6	62.1	18.9	-	sil
48-60	C1	-	0.1	0.8	17.2	34.8	38.5	8.6	82.3	5.6	-	1/vfsl

	pH 8C1a		ORGANIC MATTER			6E1a CaCO ₃ equivalent %	MOISTURE TENSIONS		
	1:5	1:10	6A1a ORGANIC CARBON %	6B1a NITROGEN %	C/N		1/15 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %
6.5	6.5	6.5	4.43	.342	13	-			12.5
5.3	5.5	5.5	0.91	.084	11				5.2
5.3	5.4	5.5	0.32	.046	7				7.1
5.2	5.3	5.3	0.25	.041	6				9.3
4.9	4.9	5.0	0.16	.030					8.9
5.3	5.4	5.5	0.10						7.4
6.4	6.5	6.6	0.07						3.6

5A1a CATION EXCHANGE CAPACITY NH ₄ Ac	EXTRACTABLE CATIONS					5B1a BASE SAT. % NH ₄ Ac Exch.	5C3 Base Sat. % on	5B1a Sum Bases	5A3a Sum Cations	8D3 Ca/Mg
	6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K					
	milliequivalents per 100g. soil									
21.7	16.7	4.4	5.8	-	0.4	99	79	21.5	27.3	3.8
9.6	5.9	1.8	4.9	-	0.1	81	61	7.8	12.7	3.3
11.5	7.4	2.2	5.0	-	0.2	85	66	9.8	14.8	3.4
14.2	8.6	3.1	5.4	0.1	0.3	85	69	12.1	17.5	2.8
14.5	8.4	3.0	5.8	0.1	0.3	81	67	11.8	17.6	2.8
13.2	8.7	3.3	6.2	0.1	0.3	94	67	12.4	18.6	2.6
6.6	4.7	2.6	6.6	0.1	0.2		54	7.6	14.2	1.8

Soil type: Seaton silt loam

Soil Nos.: 856Wis-32-6

Location: SE1/4 of NW1/4, Section 21, T16N, R6W, La Crosse County, Wisconsin.

Well drained Gray-Brown Podzolic soil developed in coarse Peorian loess on west-facing upland ridges bordering on the Mississippi River and its major tributaries. This profile was sampled in a deciduous woods on a 10 percent southwest convex slope. Soil colors were taken under moist conditions using the Munsell color chart.

Collected and described by: A. J. Klingelhoets and M. Beatty.

Horizon and
Lincoln
Lab. Number

- A1
5345 0 to 3 inches. Very dark gray (10YR 3/1) silt loam having moderate very fine granular structure; very friable when moist; tree roots abundant; pH 7.5(?); abrupt smooth boundary, 2 to 4 inches thick.
- A2
5346 3 to 7 inches. Dark grayish brown to brown (10YR 4/2 to 5/3) coarse silt with moderate fine platy structure; very friable when moist; light brownish gray (10YR 6/2) silica coatings on surface of plates; tree roots plentiful; pH 6.0; abrupt wavy boundary, 3 to 6 inches thick.
- A3
5347 7 to 12 inches. Dark brown to brown (7.5YR 4/4 to 5/4) silt loam with moderate fine subangular blocky structure; friable when moist; tree roots plentiful; pH 6.0; clear wavy boundary, 4 to 7 inches thick.
- B1
5348 12 to 19 inches. Dark brown to brown (7.5YR 4/4 to 5/4) silt loam having moderate medium subangular blocky structure; friable when moist; tree roots plentiful; pH 5.8; gradual wavy boundary, 5 to 9 inches thick.
- B2
5349 19 to 40 inches. Yellowish brown (10YR 5/4) silt loam having moderate medium subangular blocky structure; friable when moist; tree roots plentiful to few; pH 5.5; clear wavy boundary, 15 to 24 inches thick.
- B3
5350 40 to 48 inches. Brown to yellowish brown (10YR 5/3 to 5/4) silt loam having a weak medium subangular blocky structure; light brownish gray (10YR 6/2) silica coatings on surface of aggregates; pH 5.8; gradual wavy boundary, 6 to 9 inches thick.
- C1
5351 48 to 60 inches. Brown to pale brown (10YR 5/3 to 6/3) coarse silts; massive; very friable when moist; light brownish gray (10YR 6/2) silica aggregations; pH 6.5. Coarse silts continue on down for many feet.

SOIL Season silt loam SOIL Nos 10^A LOCATION Ia Crose County, Wisconsin
SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. D3460-D3471

Depth (in.)	Horizon	1B1b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments		
		Total		Sand						Silt				2A2 > 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
0-4	A _p	79.7	12.2	0.1	0.3	0.4	1.3	6.0			38.2	48.3		tr.		
4-7	A ₂₁	80.2	11.9	-	0.3	0.4	1.1	6.1			38.6	48.4		tr.		
7-10	A ₃	81.8	11.4	-	0.1	0.2	0.4	6.1			37.7	50.4		0		
10-13	B ₁	78.0	14.5	-	0.1	0.2	0.4	6.8			34.9	50.2		tr.		
13-16	B ₂₁	76.8	16.7	-	0.1	0.1	0.4	5.9			34.0	49.0		0		
16-18	B ₂₂	73.8	18.7	-	0.1	0.1	0.3	7.0			32.3	48.7		0		
18-22	B ₂₃	72.1	21.2	-	-	0.1	0.3	6.3			30.2	48.4		0		
22-26	B ₂₄	69.5	23.9	-	0.1	0.1	0.4	6.0			27.0	48.8		0		
26-31	B ₂₅	65.6	24.7	-	0.1	0.2	0.4	9.0			25.7	49.2		tr.		
31-34	B ₂₆	63.9	24.1	-	0.2	0.4	0.7	10.7			23.9	51.2		tr.		
34-37	B ₃	63.8	23.5	-	0.3	0.7	1.0	10.7			22.7	52.4		0		
37-41	CL	54.8	21.7	-	1.5	3.7	7.3	11.0			20.5	49.0		tr.		

Depth (in.)	6A3a Organic Matter by H2O2 Pct	Nitrogen Pct.	C/N	Carbonate as CaCO ₃ Pct.	Ext iron as Fe Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD m/n	pH	
						4A1e 1/2 bar g/cc	4A1h Oven dry g/cc	4A1i g/cc		4B1c 1/2 bar Pct.	4B2 15 bar Pct.	8C1c (1-1) KCl		8C1a (1-1) H ₂ O	
0-4	3.5														6.6
4-7	2.5														6.5
7-10	0.6														5.1
10-13	0.4														4.9
13-16	0.4														4.8
16-18	0.3														4.8
18-22	0.2														4.8
22-26	0.2														4.6
26-31	0.3														4.7
31-34	0.1														4.7
34-37	0.1														4.8
37-41	0.3														4.8

Depth (in.)	Extractable bases 5B1a					6H2a Ext. acidity	CEC		6G1d Ext Al	Ratios to clay			8D3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	Ext Al		CEC Sum	Ext. iron	15 bar water		5C3 Sum cations Pct.	5C1 NH ₄ OAc Pct.
0-4	8.8	2.0				4.0								74	
4-7	6.9	2.3				3.7								71	
7-10	3.0	1.2				4.0								51	
10-13	3.7	1.6				4.5								54	
13-16	3.9	2.0				5.0								54	
16-18	4.3	2.4				5.6								55	
18-22	5.3	2.9				6.0								58	
22-26	5.9	3.3				6.7								58	
26-31	6.9	3.6				6.5								62	
31-34	7.1	3.9				6.5								63	
34-37	7.3	3.9				6.0								65	
37-41	6.9	3.5				5.0								68	

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt	Chl	Vm.	Mi	Int	Qtz.	Kl	Gibbsite
	7A2 X ray				7A3			

^a Part of Project Z-1-2-8

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 type: Seaton silt loam
 Soil No.: 10^a
 Location: La Crosse County, Wisconsin. Upper Mississippi Valley Conservation Experiment Station.
 Vegetation: Hay
 Slope: 6 percent
 Collected by and date: R. J. Muckenhirn and C. J. Crumm, September 8, 1944

Horizon and
 Beltsville
 Lab. Nos.

- Ap
 D3460 0 to 4 inches. Weak brown silt loam; fine granular; crushes easily to weak brown soft silt loam. Grass roots of all sizes very abundant; worm casts abundant. Some mixture of yellowish brown material from lower layer present.
- A21
 D3461 4 to 7 inches. Weak brown silt loam, mixed with light yellowish brown silt loam (about one-third is light yellowish brown and two-thirds weak brown), structure is weakly developed medium granular and crushes readily to soft yellowish brown silt loam. Worm casts abundant amounting to about one-third the volume of this horizon. These casts are distinct weak brown in color. Root hairs and grass roots moderately abundant. Flowing apparently has mixed two materials into this horizon but has failed to mix them uniformly or completely.
- A3
 D3462 7 to 10 inches. Moderate yellowish brown silt loam; medium platy in place with light coating of silica flour on exterior of plates; crushes to light to moderate yellowish brown. Fine hair roots fairly common and a few alfalfa roots 1/4 inch in diameter. Tree root channels 1/2 inch in diameter present. The tree root channels are filled with weak brown worm casts. Aggregates are slightly vesicular.
- B1
 D3463 10 to 13 inches. Moderate yellowish brown silt loam, medium platy in place; breaks to irregularly flattened aggregates which crush to a moderate yellowish brown. The aggregates are slightly vesicular and have a slight coat of silica flour. Roots not abundant but include fine hair-like roots and a few large alfalfa and decomposed tree roots.
- B21
 D3464 13 to 16 inches. Moderate yellowish brown silt loam of weakly developed blocky structure. Blocks vary from 1/4 to 3/4 inches in diameter; some are flattened horizontally to give faint platy appearance and all have a sub-rounded to sub-angular shape. Silica flour on surfaces of aggregates which are slightly vesicular. Hair-like roots present but not abundant.
- B22
 D3465 16 to 18 inches. Moderate to dark yellowish brown heavy silt loam; medium blocky structure, aggregates slightly vesicular, lightly coated with silica flour and weakly resistant to crushing, crushes to moderate yellowish brown. A few fine roots present. This horizon grades imperceptibly into the one below which it resembles in appearance.
- B23
 D3466 18 to 22 inches. Moderate yellowish brown medium blocky silty clay loam. Aggregates crush with moderate resistance to moderate yellowish brown. They are slightly vesicular, lightly coated with silica flour and have occasional dark specks on their surfaces. Roots and root hairs few.
- B24
 D3467 22 to 26 inches. Moderate to dark yellowish brown, medium blocky silty clay loam. Aggregates crush with moderate difficulty to moderate yellowish brown. Irregular coatings of silica flour present. Roots few.
- B25
 D3468 26 to 31 inches. Dark yellowish brown silty clay loam of medium to coarse, blocky structure. Aggregates crush with moderate difficulty to moderate yellowish brown. They are slightly vesicular and somewhat darker on the exterior. They have occasional dark specks. Silica flour sparse and only occasional roots one-fourth inch in diameter present.
- B26
 D3469 31 to 34 inches. Moderate yellowish brown silty clay loam of medium blocky structure. Aggregates crush with moderate difficulty to moderate yellowish brown, are very slightly vesicular and have occasional dark specks and splotches on their surfaces. Aggregates are firm and appear to be more compact and better developed than in horizons above. Roots very few. Silica flour practically absent.
- B3
 D3470 34 to 37 inches. Moderate to dark yellowish brown silt loam of coarse blocky structure. Aggregates crush with slight resistance to light yellowish brown, are slightly vesicular and splotched with dark brown or brownish black. Roots of 1/4 inch size present. Little or no silica flour present.
- C1
 D3471 37 to 41 inches. Same as above horizon but admixture of reddish brown clay and sand from underlying limestone present.
- C2 41 inches. Moderate to dark yellowish brown silt loam mixed with sand, chert, and stones from underlying limestone, and residual reddish clay.

^a Part of Project Z-1-2-8

SOIL Seaton silt loam SOIL Nos. 8601a-47-4 LOCATION Pierce County, Wisconsin
SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 13668-13676 May 1965

Depth (in.)	Horizon	1R1a Size class and particle diameter (mm) 3A1											2A2 Coarse fragments			
		Total			Sand					Silt			> 2 Pct.	2-19 Pct.	19-76 Pct.	
		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)	Int. III (0.05-0.02)	Int. II (0.02-0.002)	Int. I (2-0.1)				
Pct. of < 2 mm																
0-4	A1	7.7	78.0	14.3	-	0.4a	0.7a	1.4a	5.2	37.8	40.2	43.5	2.5	-	-	-
4-7	A21	8.8	81.0	10.2	0.1a	0.4a	0.7a	1.6a	6.0	41.5	39.5	48.1	2.8	-	-	-
7-9	A22	9.6	80.0	10.4	-	0.4a	0.8a	1.6a	6.8	49.8	30.2	57.2	2.8	-	-	-
9-15	B1	12.6	69.6	17.8	-	0.6b	1.2b	1.9b	8.9	43.0	26.6	52.6	3.7	-	-	-
15-23	B21	18.4	64.1	17.5	-	0.7	1.8	3.0	12.9	46.2	17.9	60.2	5.5	-	-	-
23-31	B22	11.3	71.6	17.1	-	-	0.3	1.3	9.7	52.5	19.1	62.8	1.6	-	-	-
31-39	C1	14.6	71.1	14.3	-	0.1	0.3	1.7	12.5	57.3	13.8	70.8	2.1	-	-	-
39-50	C2	10.3	73.0	16.7	-	-	0.1	0.6	9.6	53.0	20.0	63.0	0.7	-	-	-
50-72	C3	10.2	73.4	16.4	-	0.1	0.2	0.8	9.1	53.1	20.3	62.7	1.1	-	-	-

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6E1c Carbonate as CaCO ₃ Pct.	6C1a Ext. Iron as Fe ₂ O ₃ Pct.	Bulk density				Water Content					pH	8C1a (1)
						4A1a Field-State g/cc	4A1c 30-Cm. g/cc	4A1h Oven-Dry g/cc	4M COLE	4B4 Field-State Pct.	4B3 30-Cm. Pct.	4B1b 1/3-Bar Pct.	4B2 1/5-Bar Pct.	4C1 1/3- to 1/5-Bar in. per in.		
0-4	8.37	0.554	15	Tr.	0.9	1.0	1.44	1.44	1.47	0.007	21.6	28.2	26.8	6.0	0.30	6.4
4-7	0.96	0.091	10		1.0	1.58	1.57	1.59	0.003	16.7	23.1	24.2	5.2	0.30	6.2	
7-9	0.35	0.073	5		1.3	1.58	1.54	1.62	0.017	16.6	22.5	22.7	8.2	0.22	6.1	
9-15	0.26	0.050	5		1.4	1.60	1.54	1.60	0.014	14.4	23.2	19.4	7.5	0.18	5.5	
15-23	0.17	0.038			1.4	1.52	1.50	1.56	0.014	18.1	25.5	24.4	8.4	0.24	5.1	
23-31	0.18	0.026			1.4										5.1	
31-39	0.17				1.6								6.7		5.2	
39-50	0.14				1.6	1.44	1.42	1.50	0.017	25.6	26.6	23.4	8.4	0.21	5.2	
50-72	0.14				1.5								8.2		5.3	

Depth (in.)	Extractable bases				6E1a Sum	6E1a Ext. Acidity	Cat. Cap.	Cath. Cap.	Cationic Exchange	BD3 Ca/Mg	Base saturation	
	6E2b Ca	6E2b Mg	6E2a Na	6E2a K							5C3 Sum	5C1 Pct.
0-4	29.8	3.3	Tr.	0.7	33.8	9.4	43.2	32.4		9.0	78	104
4-7	7.8	1.2	Tr.	0.3	9.3	5.7	15.0	10.8		6.5	62	86
7-9	6.1	1.2	Tr.	0.3	7.6	4.0	11.6	8.5		5.1	66	89
9-15	8.2	2.0	Tr.	0.4	10.6	5.4	16.0	12.3		4.1	66	86
15-23	6.8	2.0	Tr.	0.4	9.2	5.7	14.9	11.9		3.4	62	77
23-31	7.5	2.3	Tr.	0.3	10.1	6.2	16.3	12.3		3.3	62	82
31-39	6.4	2.0	0.1	0.2	8.7	5.4	14.1	10.3		3.2	62	84
39-50	7.9	2.6	0.1	0.2	10.8	5.5	16.3	13.0		3.0	66	83
50-72	8.1	3.1	0.1	0.2	11.5	5.2	16.7	13.3		2.6	69	86

Depth (in.)	Ratios to Clay 5M1			a.	b.	c.
	MH ₂ O/C	Ext. Iron	1/5-Bar Water			
0-4	2.26	0.04	1.16	> 50% Fe-Mn nodules.	5-25% Fe-Mn nodules.	Coefficient of Linear Extensibility.
4-7	1.06	0.07	0.59	Note: See descriptions for mineralogy.		
7-9	0.82	0.07	0.50			
9-15	0.69	0.05	0.46			
15-23	0.68	0.06	0.43			
23-31	0.72	0.06	0.49			
31-39	0.72	0.07	0.47			
39-50	0.78	0.06	0.50			
50-72	0.81	0.06	0.50			

Soil type: Seaton silt loam
 Soil Nos.: S50W1s-47-4
 Location: Pierce County, Wisconsin; southeast quarter, southwest quarter, Section 26, T27N, R15W, Rock Elm Township.
 Position and relief: Gently sloping uplands; approximately 3 percent convex slope.
 Drainage and permeability: Well drained; moderately permeable; ground water beyond depth of observed profile.
 Parent material: Loess.
 Vegetation: Basswood, elm and maple trees; understory of raspberries and ferns.
 Erosion: None to very slight. Stoniness: None.
 Root distribution: Many fibrous roots in the A1 horizon; fewer below.
 Sampled by: Paul H. Carroll, William DeYoung, Robert Grossman and Jerry Post, July 30, 1960.
 Described by: Paul H. Carroll.

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Aoo 2 to 0 inch. Leaf litter.

A1 13668 0 to 4 inches. Black (10YR 2/1) and very dark brown (10YR 2/2) silt loam with moderate fine crumb structure; very friable; numerous very fine fibrous roots; neutral reaction; clear wavy boundary.

A21 13669 4 to 7 inches. Very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2) silt loam with weak thin platy structure; dark-colored organic tongues and worm casts extend into the A21 from the A1 above; very friable; very fine fibrous roots common; slightly acid; clear smooth boundary.

A22 13670 7 to 9 inches. Dark brown (10YR 4/3) silt loam with weak medium to thin platy structure; friable; very fine fibrous roots common; slightly acid; abrupt smooth boundary.

B1 13671 9 to 15 inches. Dark brown (10YR 4/3) silt loam with weak medium and thin platy structure that breaks under disturbance to weak very fine subangular blocks; very thin patchy dark yellowish brown (10YR 3/4) clay films on plate surfaces at approximately one-quarter inch depth intervals; friable; fine fibrous roots common; slightly acid; clear smooth boundary.

B21 13672 15 to 23 inches. Dark yellowish brown (10YR 3/4) silt loam with moderate medium subangular blocky and weak medium platy structure; thin patchy bleached silt coats of pale brown (10YR 6/3) color; dark yellowish brown (10YR 3/4) ped interiors and dark brown (10YR 4/3) surface coats; friable; few fibrous and few coarse roots; slightly to medium acid; gradual smooth boundary.

B22 13673 23 to 31 inches. Dark brown (10YR 4/3) heavy silt loam with moderate medium subangular blocky structure; thin patchy clay films on ped surfaces and continuous as linings in small root and worm holes; dark brown (10YR 4/3) ped interiors and dark yellowish brown (10YR 3/4) surface coats; few fibrous and few coarse roots; friable; strongly acid; gradual smooth boundary.

C1 13674 31 to 39 inches. Dark brown (10YR 4/3) silt loam with weak medium platy structure; many fine faint mottles of dark yellowish brown (10YR 4/4) occupy approximately 50 percent of the horizon body and follow a lateral band through the soil profile; friable; few coarse roots; slightly to medium acid; clear smooth boundary.

C2 13675 39 to 50 inches. Dark brown (10YR 4/3) silt loam though somewhat finer-textured than the horizon above; weak medium platy structure that breaks under pressure to weak medium subangular blocks; friable; medium acid; gradual smooth boundary.

C3 13676 50 to 72 inches. Dark brown (10YR 4/3) silt loam with weak medium platy structure; friable; medium acid; clear smooth boundary.

IID 72 to 82 inches. Dark brown (7.5YR 4/4) sandy clay loam glacial till with generally massive to very weak coarse platy structure; firm; slightly acid; abrupt smooth boundary.

IIID 82 inches plus. Indurated, thinly bedded dolomitic limestone.

Remarks: Unless otherwise indicated, all colors shown in the soil profile description are moist colors.

MINERALOGY: The following mineralogical observations are for very fine sands; percentages are only rough approximations: 40 percent quartz, 50 percent feldspar, and 10 percent aggregates of altered feldspar. Some chert. Epidote, garnet, amphibole are accessories. A count of 300 grains was made on lab. No. 13673: 31 percent quartz and 69 percent non-quartz, the latter including 14 percent intermediate calcium plagioclase.

SOIL Seaton silt loam SOIL Nos. 360Wis-47-5 LOCATION Pierce County, Wisconsin
SOIL SURVEY LABORATORY Lincoln, Nebraska LAB Nos 13677-13685 May 1965

Depth (in.)	Horizon	1B1a Size class and particle diameter (mm) 3A1											2A2 coarse fragments			
		Total			Sand					Silt			> 2 Pct.	2-19 Pct.	19-76 Pct.	
		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 of < 2 mm																
0-3	A1	7.5	80.9	11.6	0.1a	0.6a	0.6a	1.2a	5.0	44.4	36.5	50.0	2.5	-	-	-
3-6	A21	7.3	82.9	9.8	0.3a	0.5a	0.4a	0.7a	5.4	45.1	37.8	50.9	1.9	-	-	-
6-10	A22	7.2	83.2	9.6	0.2a	0.3a	0.3a	0.5a	5.9	47.7	35.5	53.9	1.3	-	-	-
10-15	B1	7.6	75.5	16.9	-	0.1a	0.1a	0.4a	7.0	49.2	26.3	56.4	0.6	-	-	-
15-23	B21	7.6	72.7	19.7	-	-	0.1a	0.3	7.2	50.4	22.3	57.8	0.4	-	-	-
23-33	B22	6.0	70.2	23.8	-	-	-	0.5	5.5	47.0	23.2	52.6	0.5	-	-	-
33-44	B3	7.3	72.4	20.3	-	-	0.1	0.5	6.7	48.4	24.0	55.3	0.6	-	-	-
44-58	C1	6.7	72.3	21.0	-	-	0.1	1.2	5.4	48.5	23.8	54.1	1.3	-	-	-
58-70	C2	6.4	75.2	18.4	-	0.1	0.2	0.5	5.6	52.4	22.8	58.2	0.8	-	-	-
Pct of < 2 mm																
Depth (in.)	6A1a	6B1a	C/N	6E1c	6C1a	Bulk density			4M Water Content					pH		
	Organic carbon	Nitrogen			Ext. Iron as Fe ₂ O ₃ Pct.	4A1a Field-State	4A1c 30-Cm. Dry	4A1h Oven-Dry	4M COLE	4B4 Field-State	4B3 30-Cm. 1/3-Bar	4B1b 15-Bar	4B2 15-Bar		4C1 1/3 to 15-Bar in. per in.	6C1a (1:1)
	Pct	Pct		Pct		g/cc	g/cc	g/cc	Pct	Pct	Pct	Pct.				
0-3	6.22	0.451	14	Tr.	0.9				0.010	10.8	24.0	22.0	13.5	6.5		
3-6	1.31	0.124	10		1.0		1.24	1.28					6.0	5.9		
6-10	0.35	0.046	8		0.9	1.44	1.43	1.44	0.007	10.8	24.0	22.0	4.4	6.0		
10-15	0.24	0.031			1.2	1.52	1.49	1.53	0.010	14.9	22.7	22.7	7.1	5.8		
15-23	0.24	0.029			1.5	1.55	1.51	1.58	0.014	14.8	23.3	24.0	9.0	4.9		
23-33	0.21	0.047			1.8	1.49	1.44	1.51	0.017	18.8	26.1	21.6	11.0	4.7		
33-44	0.18				1.4	1.44	1.42	1.50	0.017	25.0	26.6	27.5	9.5	4.9		
44-58	0.17				1.6	1.40	1.38	1.46	0.020	23.1	29.4	27.5	10.2	5.1		
58-70	0.13				1.5								8.5	5.3		
Depth (in.)	Extractable bases 5B1a					6H1a	Cat. Acidity	Exch. Cap. 5A1a	6C2a KCl-Ext. Al	8D3 Ca/Mg	Base saturation					
	6M2b Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	Aridity	Sum	Sum	Ca/Mg		5C3 Sum Pct	5C1 Sum Pct				
	meq/100 g										Pct	Pct				
0-3	22.3	3.4	Tr.	0.8	26.5	7.0	33.5	19.4		6.6	79	136				
3-6	7.6	0.9	Tr.	0.3	8.8	6.1	14.9	11.1			59	79				
6-10	4.5	0.6	Tr.	0.1	5.2	4.7	9.9	6.8			52	76				
10-15	6.8	1.9	Tr.	0.2	8.9	5.2	14.1	10.6	0.4		63	84				
15-23	6.6	2.2	0.1	0.2	9.1	8.6	17.7	13.4	2.1		51	68				
23-33	8.3	3.0	0.1	0.2	11.6	10.0	21.6	15.8	2.4		54	73				
33-44	8.1	3.0	0.1	0.2	11.4	7.6	19.0	14.7	1.7		60	70				
44-58	9.0	3.4	0.1	0.2	12.7	7.6	20.3	15.8	1.6		62	80				
58-70	8.3	3.4	0.1	0.2	12.0	6.0	18.0	13.8	1.0		67	87				
Depth (in.)	Ratios to Clay 8D1			a. > 50% Fe-Mn nodules. b. Coefficient of Linear Extensibility. Note: See descriptions for mineralogy.												
	NH ₄ OAc CEC	Ext. Iron	15-Bar Water													
0-3	1.67	0.08	1.16													
3-6	1.13	0.10	0.61													
6-10	0.71	0.09	0.46													
10-15	0.63	0.07	0.42													
15-23	0.68	0.08	0.46													
23-33	0.66	0.08	0.46													
33-44	0.72	0.07	0.47													
44-58	0.75	0.08	0.48													
58-70	0.75	0.08	0.46													

Soil type: Seaton silt loam
 Soil Nos.: S60Wis-47-5
 Location: Pierce County, Wisconsin; southeast quarter, northwest quarter, Section 14, T26N, R15W, Rock Elm Township.
 Position and relief: Gently sloping uplands; 2 to 3 percent convex slope.
 Drainage and permeability: Well drained; moderately permeable; ground water beyond depth of observed profile.
 Parent material: Loess.
 Vegetation: Elm, oak and maple trees; understory of raspberries.
 Erosion: None to very slight. Stoniness: None.
 Root distribution: Many fibrous roots to 10 inches; fewer fibrous roots and tap roots below.
 Sampled by: Paul H. Carroll, William DeYoung, Robert Crossman and Jerry Post, July 30, 1960.
 Described by: Paul H. Carroll.

Horizon and
 Lincoln
 Lab. Number

A1 13677	0 to 3 inches. Very dark brown (10YR 2/2) silt loam with weak fine granular structure; very friable; abundant fibrous roots; slightly acid; abrupt smooth boundary.
A21 13678	3 to 6 inches. Dark grayish brown (10YR 4/2) silt loam with moderate thin platy structure; very friable; abundant fibrous roots; slightly acid; clear smooth boundary.
A22 13679	6 to 10 inches. Brown (10YR 5/3) silt loam with moderate medium to thin platy structure; few widely spaced patches of dark brown (10YR 4/3) on background of brown (10YR 5/3) distinguishes undegraded B horizon remnants; plates and occasional weak vertical cleavage planes show very thin light gray (10YR 7/2) bleached silt coats; friable; abundant fine fibrous roots; slightly acid; gradual smooth boundary.
B1 13680	10 to 15 inches. Dark brown (10YR 4/3) silt loam with weak medium platy structure that breaks under disturbance to moderate fine subangular blocks; patchy thin bleached silt coats on major cleavage planes; apart from elutriated ped faces are found dark yellowish brown (10YR 3/4) coats and few thin clay films; friable; fine fibrous roots numerous to common; slightly to medium acid; clear smooth boundary.
B21 13681	15 to 23 inches. Dark brown (10YR 4/3) heavy silt loam with moderate medium platy structure that breaks readily to moderate fine subangular blocks; few thin bleached silt coats on some ped faces; most peds have continuous thin clay films on all faces but they are most prominent along the vertical cleavage planes; friable to firm; few fine fibrous and few coarse roots; very strongly acid; clear smooth boundary.
B22 13682	23 to 33 inches. Dark brown (10YR 4/3) heavy silt loam with weak medium platy structure that breaks on disturbance to moderate medium subangular blocks; thin patchy clay films on ped faces; they are most prominent along vertical structural cleavage planes; friable; few coarse roots; very strongly acid; gradual smooth boundary.
B3 13683	33 to 44 inches. Dark brown (10YR 4/3) silt loam with weak coarse subangular blocky structure that displays a generally weak medium platiness throughout; thin patchy clay films, less in number than in the horizon above, on ped faces along vertical cleavage planes and continuous in worm holes and root cavities; friable; few coarse roots; strongly acid; gradual smooth boundary.
C1 13684	44 to 58 inches. Dark brown (10YR 4/3) silt loam with weak medium platy structure; few roots and worm holes display clay linings; friable; strongly acid; gradual smooth boundary.
C2 13685	58 to 70 inches. Dark brown (10YR 4/3) silt loam with weak medium platy structure; friable; strongly acid; diffuse smooth boundary.
C3	70 inches plus. Dark brown (10YR 4/3) to yellowish brown (10YR 5/4) silt loam with generally weak thin platy structure; color gains value and chroma with depth to 9 feet; very friable; strongly acid at 70 inches but only slightly acid at 108 inches.

Remarks: Unless otherwise indicated, all colors shown in the soil profile description are moist colors.

MINERALOGY: Very fine sand similar in mineralogy to that in Seaton, profile S60Wis-47-4. More altered feldspar aggregates in the B and C than in the A.

SOIL TYPE Sparta LOCATION Ia Crosse County, Wisconsin
loamy sand

SOIL NOS. S57W1s-32-4 LAB. NOS. 7041-7046

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS	
		1B1a					3A1						2A2
		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	0.02-0.001	< 19mm		> 2
0-9	Ap	0.6	20.9	39.8	29.8	1.1	4.2	3.6	8.6	2.3	-	S	
9-14	A1	0.7	19.8	39.7	29.4	0.9	5.2	4.3	8.4	3.1	Tr.	S	
14-25	A3	0.5	18.0	40.3	31.6	1.0	5.2	3.4	8.7	3.2	Tr.	S	
25-35	AC	1.1	18.4	42.4	31.3	0.9	4.1	1.8	8.4	2.1	Tr.	S	
35-42	C1	2.7	12.6	45.9	37.5	0.4	0.3	0.6	2.8	0.4	1	S	
42-60+	C2	0.7	9.2	46.7	42.5	0.1	0.3	0.5	3.8	0.1	Tr.	S	
pH		ORGANIC MATTER				6C1a	4A3a						
8C1a		6A1a		6B1a		Free Iron	Vol.						
	1:5	1:10	ORGANIC CARBON	NITRO-GEN	C/N	Fe ₂ O ₃	Wt.						
	1:1		%	%		%	g/cc						
	6.7		0.50	0.044	11	0.4							
	5.5		0.49	0.047	10	0.4							
	5.6		0.32	0.028	11	0.4	1.54						
	5.7		0.15			0.2							
	6.0		0.04			0.2							
	6.2		0.01			0.1	1.64						
5A1a	EXTRACTABLE CATIONS					5B1a	5C3	5B1a	5A3a				
CATION EXCHANGE CAPACITY NH ₄ Ac	6N2b	6O2b	6H1a	6P2a	6Q2a	BASE SAT. % NH ₄ Ac EXCH.	Base Sat. % on Sum Cations	Sum Ect. Bases	Sum Ect. Cations				
	Ca	Mg	H	No	K			me/100g					
	← milliequivalents per 100g. soil →					5C1							
3.3	1.8	0.8	2.0	<0.1	0.1	82	57	2.7	4.7				
3.5	0.8	0.4	3.9	<0.1	<0.1	34	24	1.2	5.1				
2.5	0.4	<0.1	3.6	<0.1	<0.1	16	10	0.4	4.0				
1.2	0.1	<0.1	2.0	<0.1	<0.1	8	5	0.1	2.1				
0.5	0.1	<0.1	1.2	<0.1	<0.1	20	8	0.1	1.3				
0.3	<0.1	0.1	0.8	<0.1	<0.1	33	11	0.1	0.9				
										MOISTURE AT SATURATION			
										%			

Soil type: Sparta loamy sand

Soil Nos.: 857Nls-32-4

Location: La Crosse County, Wisconsin; southeast quarter of southeast quarter of Section 23, T18N, R3W.

Virgin sites could not be located for sampling this series, so cultivated areas were selected. This soil occurs on sandy glacial outwash associated with the Mississippi River in the "Driftless Area" of Wisconsin. The sandy outwash contains over 5 percent of minerals by volume other than quartz. Glacial gravels generally are found throughout the profile. Native vegetation is believed to have been prairie grasses with scattered burr oak. Generally, the relief is very gently undulating with 1-percent slopes predominating. Drainage is excessive, ground water is deep, and permeability is rapid. This description is modal for much of the Sparta series as mapped in Wisconsin. It has been classified as a Prairie intergrading to Regosol.

Sampled by: A. J. Klingelhoets, G. B. Lee, William DeYoung, and R. H. Jordan, October 31, 1957.

Described by: A. J. Klingelhoets.

Horizon and

Lincoln

Lab. Number

- Ap 0 to 9 inches. Very dark brown (10YR 2/2) to very dark grayish brown (10YR 3/2) loamy sand which is massive due to compaction by tillage implements; very friable when moist; some evidence of Eolian sands on the surface; temperature 10.4 degrees C.; pH 7.0; abrupt smooth boundary; 7 to 10 inches thick.
- 7041
- A1 9 to 14 inches. Very dark brown (10YR 2/2) loamy sand, appears massive in place, weak fine subangular blocky when disturbed; very friable when moist; some compaction due to plowing; temperature 7.8 degrees C.; pH 6.5; clear wavy boundary; 3 to 8 inches thick.
- 7042
- A3 14 to 25 inches. Dark brown (7.5YR 3/2) loamy sand grading to dark yellowish brown (10YR 3/4) in the lower portions; weak medium subangular blocky structure; very friable when moist; temperature 7.8 degrees C.; pH 5.5; clear wavy boundary; 8 to 13 inches thick. (Two core samples at 15 to 18 inches.)
- 7043
- AC 25 to 35 inches. Dark yellowish brown (10YR 4/4) to yellowish brown (10YR 5/4) medium sand having very weak coarse subangular blocky structure; loose; slight consistence; temperature 8.9 degrees C.; pH 5.5; clear smooth boundary; 8 to 12 inches thick.
- 7044
- C1 35 to 42 inches. Yellowish brown (10YR 5/6) to brownish yellow (10YR 6/6) medium sand, single grained; loose; few glacial pebbles; temperature 10.0 degrees C.; pH 5.8; abrupt smooth boundary; 8 to 11 inches thick. (Two core samples taken at 38 to 41 inches.)
- 7045
- C2 42 to 60 inches plus. Very pale brown (10YR 7/4 to 8/4) medium and fine sands; single grained; loose; stratified; temperature 11.2 degrees C.; pH 5.8.
- 7046

Remarks: All pH readings by use of Hellige-Truog kit. All colors were taken under moist field conditions.

SOIL SURVEY LABORATORY

Lincoln, Nebr.

Dec. 1958

SOIL TYPE

Sparta

LOCATION

La Crosse County, Wisconsin

loamy sand

SOIL NOS.

S57Wis-32-5

LAB. NOS.

7047-7052

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS
		1B1a 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	2A1 0.2-0.02	0.02-0.002	2A2 > 2	
0-8	Ap	1.2	30.0	32.9	18.9	1.0	8.2	7.8	8.6	5.0	Tr.	lcos
8-13	A1	1.5	34.6	35.4	15.8	0.8	6.4	5.5	6.7	4.0	Tr.	cos
13-21	A3	1.8	28.6	35.1	20.6	1.2	6.7	6.0	9.7	3.5	Tr.	cos
21-30	AC	1.6	27.9	37.8	24.0	1.1	3.8	3.8	9.9	2.2	Tr.	cos
30-45	C1	3.4	47.7	36.9	10.6	0.1	0.7	0.6	2.1	0.7	Tr.	cos
45-55+	C2	2.0	30.5	43.1	23.5	0.2	0.4	0.3	3.6	0.4	Tr.	cos
pH		ORGANIC MATTER				6C1a	4A3a					
8C1a		6A1a	6B1a			Free Iron	Vol.					
1:5		1:10	ORGANIC CARBON %	NITROGEN %	C/N	Fe ₂ O ₃ %	Wt. g/cc					
6.7			0.84	0.066	13	0.7						
5.6			0.60	0.037	16	0.7						
5.7			0.37	0.030	12	0.6	1.46					
5.7			0.16	0.015		0.5						
6.0			0.04			0.3	1.60					
6.0			<0.01			0.3						
5A1a	EXTRACTABLE CATIONS					5B1a	5C3	5B1a	5A3a	8D3		MOISTURE AT SATURATION %
CATION EXCHANGE CAPACITY NH ₄ Ac	6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K	BASE SAT. % NH ₄ Ac EXCH.	Base Sat. % on Sum Cations	Sum Ext. Bases me/100g.	Sum Ext. Cations me/100g.	Ca/Mg		
	← milliequivalents per 100g. soil →					5C1						
6.6	3.2	2.1	4.0	<0.1	0.1	82	57	5.4	9.4	1.5		
5.4	1.6	1.2	5.9	<0.1	0.1	54	33	2.9	8.8	1.3		
3.7	1.5	1.5	3.6	<0.1	<0.1	81	45	3.0	6.6	1.0		
2.3	1.1	0.2	2.0	<0.1	<0.1	56	39	1.3	3.3			
0.7	<0.1	0.2	1.6	<0.1	<0.1	28	11	0.2	1.8			
0.5	<0.1	0.1	0.8	<0.1	<0.1	20	11	0.1	0.9			

Soil type: Sparta loamy sand

Soil Nos.: S57Wis-32-5

Location: La Crosse County, Wisconsin; northwest quarter of northeast corner of Section 35, T18N, R3W.

Virgin sites could not be located for sampling this series, so cultivated areas were selected. This soil occurs on sandy glacial outwash associated with the Mississippi River in the "Driftless Area" of Wisconsin. The sandy outwash contains over 5 percent of minerals by volume other than quartz. Glacial gravels generally are found throughout the profile. Native vegetation is believed to have been prairie grasses with scattered burr oak. Generally, the relief is very gently undulating with 1-percent slopes predominating. Drainage is excessive, ground water is deep, and permeability is rapid. This description is modal for much of the Sparta series as mapped in Wisconsin. It has been classified as a Prairie intergrading to Regosol.

Sampled by: A. J. Klingelhoets, G. B. Iee, William DeYoung, and R. H. Jordan, November 1, 1957.

Described by: A. J. Klingelhoets.

Horizon and
Lincoln
Lab. Number

Ap 7047	0 to 8 inches. Black (10YR 2/1) loamy sand, massive in place due to compaction by tillage; very friable when disturbed; pH 6.5; abrupt smooth boundary; 7 to 10 inches thick.
A1 7048	8 to 13 inches. Very dark brown (10YR 2/2) loamy sand, massive in place, weak fine granular when disturbed; very friable when moist; pH 5.3; clear wavy boundary; 4 to 7 inches thick.
A3 7049	13 to 21 inches. Dark brown (7.5YR 3/4) loamy sand with weak medium subangular blocky structure; very friable when moist; pH 5.3; clear wavy boundary; 8 to 12 inches thick. (Two core samples taken at 17 to 21 inches.)
AC 7050	21 to 30 inches. Dark brown (7.5YR 4/4) grading to dark yellowish brown (10YR 4/4) in lower part, medium sand with few glacial pea gravel; very weak coarse subangular blocky structure; loose; pH 5.3; clear wavy boundary; 8 to 14 inches thick.
C1 7051	30 to 45 inches. Dark yellowish brown (10YR 4/4) grading to yellowish brown (10YR 5/4) coarse and medium sands, single grained; loose; few glacial pea gravel; pH 5.5; clear irregular boundary; 11 to 16 inches thick. (Two core samples at 32 to 35 inches.)
C2 7052	45 to 55 inches plus. Pale brown (10YR 6/3) medium and fine sands; single grained; loose; stratified; pH 5.5.

Remarks: All pH readings by use of Hellige-Truog kit. All colors were taken under moist field conditions.

SOIL Spencer silt loam SOIL Nos. 47WLS-3-28 LOCATION Barron County, Wisconsin
SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 47L452-47L457

Depth (in.)	Horizon	1B1b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments		
		Total			Sand					Silt				2A2 > 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)	Int. III (0.05-0.02)	Int. II (0.02-0.002)	(2-0.1)		Pct.	Pct. of < 76mm	
0-3	A1	7.5	76.1	16.4	0.1	0.6	0.9	1.6	4.3	39.6	36.5	44.7	3.2	tr.		
3-11	A2	7.6	81.9	10.5	0.1	0.6	0.8	1.3	4.8	43.7	38.2	49.1	2.8	0		
11-14	A2-B1	7.4	85.0	7.6	0.2	0.4	0.5	0.7	5.6	46.2	38.8	52.2	1.8	0		
14-25	B21t	10.3	70.4	19.3	0.2	0.5	0.5	0.8	8.3	32.1	28.3	50.8	2.0	2		
25-36	B22t	19.0	60.3	20.7	0.7	2.6	3.5	4.3	7.9	38.2	22.1	48.3	11.1	1		
36+	TTC1	62.4	21.3	16.3	3.8	11.8	16.5	22.6	7.7	10.4	10.9	29.4	54.7	18		

Depth (in.)	6A1a Organic carbon	Nitrogen	C/N	Carbonate as CaCO ₃	Ext. iron as Fe	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH	
						4A1e 1/2 bar	4A1h Oven dry	g/cc		4B1c 1/2 bar	4B2 15 bar	Pct.		8C1c (1 I)	8C1a (1 I)
						Pct.	Pct.	Pct.		Pct.	Pct.	KCl		H ₂ O	
0-3	7.37														5.1
3-11	1.39														4.8
11-14	0.27														5.0
14-25	0.19														4.9
25-36	0.12														4.9
36+	0.08														5.4

Depth (in.)	Extractable bases 5B1a					6H2a	CEC		6G1d	Ratios to clay			8D3	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum	Ext. acidity	5A3a Sum cations	Ext. Al	CEC Sum	Ext Iron	15-bar water	Ca/Mg	5C3 Sum cations Pct.	5C1 NH ₄ OAc Pct.	
	med/100 g														
0-3	16.0	2.9	0.2	0.5		21.2	40.8						48		
3-11	1.1	0.5	tr.	0.1		10.5	12.2						14		
11-14	0.9	0.4	tr.	tr.		5.4	6.7						19		
14-25	3.9	1.8	0.1	0.1		11.1	17.0						35		
25-36	4.8	2.2	0.2	0.2		9.4	16.8						44		
36+	4.3	2.0	0.1	tr.		3.8	10.2						62		

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt.	Chl	Vm	Mi.	Int.	Qtz.	Kl.	Gibbsite
	7A2 X-ray				7A3			

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 type: Spencer silt loam

Soil No.: 47Wis-3-28 Collected by; G. H. Robinson.

Location: Barron County, Wisconsin. North side NE 1/4 of SW 1/4 section 2, township 34N., range 14W.

Horizon and
Beltsville
Lab. Nos.

A1 471452	0 to 3 inches. Very dark gray silt loam which has a platy structure that breaks into weak gradules.
A2 471453	3 to 11 inches. Brown silt loam with platy structure.
A2 & B1 471454	11 to 14 inches. Pale brown heavy silt loam with weak block structure tending toward platy structure. Very slightly mottled.
B21t 471555	14 to 25 inches. Brown mottled with yellowish brown blocky silty clay loam.
B22t 471456	25 to 36 inches. Light brownish gray, light gray and yellowish red silt loam with massive structure.
IIC1 471457	36+ inches. Dark reddish brown sandy clay loam glacial till with massive structure.

SOIL TYPE Varna LOCATION Racine County, Wisconsin
silt loam

SOIL NOS. S58W1s-51-1. LAB. NOS. 9313-9318

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cc.)								3A1		2A2	TEXTURAL CLASS
		VERY COARSE SAND 2-1	COARSE SAND 1-0.5	MEDIUM SAND 0.5-0.25	FINE SAND 0.25-0.10	VERY FINE SAND 0.10-0.05	SILT 0.05-0.002	CLAY < 0.002	0.2-0.02	0.02-0.002	> 2		
0-8	Ap	0.9a	2.3a	4.7a	7.9a	4.4a	45.3	34.5	20.9	33.0	Tr.	cl/sic1	
8-16	B21	0.6a	1.2a	2.0a	4.4a	3.6a	41.9	46.3	14.8	33.3	Tr.	sic	
16-23	IIB22	0.9b	1.6b	1.8b	3.9b	3.9b	50.9	37.0	19.2	37.9	Tr.	sic1	
23-37	IIB3	1.7b	1.9b	1.7b	3.5b	4.3b	55.6	31.3	20.2	41.4	Tr.	sic1	
37-48	IIC1	1.6b	1.6b	1.6b	3.7b	3.8b	53.7	34.0	21.4	38.4	4.5	sic1	
48-56+	IIC2	3.6b	3.3b	3.2b	5.8b	4.8b	52.5	26.8	24.1	36.4	7.5	sil/sic1	

8C1a	pH	ORGANIC MATTER			6C1a Free Iron Fe ₂ O ₃ %	ELECTRI- CAL CONDUCTI- VITY EC-103 MILLIMOS PER CM 25°C.	6E1a CaCO ₃ equiv- alent %	MOISTURE TENSIONS			
		6A1a ORGANIC CARBON %	6B1a NITRO- GEN %	C/N				4E2 1/10 ATMOS. %	1/3 ATMOS. %	15 ATMOS. %	
1:1	1:5	1:10									
6.7			3.37	0.302	11	1.8	<1				14.4
7.5			0.76	0.076	10	2.3	1				15.1
7.9			0.42	0.040	10	1.4	21				13.0
3.0			0.33	0.030	11	1.1	30				11.6
8.0			0.32			1.1	33				12.2
8.1			0.28			1.2	30				10.5

5A1a CATION EXCHANGE CAPACITY NH ₄ Ac	EXTRACTABLE CATIONS					5B1a BASE SAT. % NH ₄ Ac EXCH.	5C3 Base Sat. % on Sum Cations	5B1a Sum Bases me/100g	5A3a Sum Cat- ions me/100g	8D3 Ca/Mg	4B4 Field State Water %	4A1a Vol. Wt. g/cc
	6N2b Ca	6O2b Mg	6H1a H	6P2a Na	6Q2a K							
27.6	19.8	7.2	6.4	0.1	0.5	100	81	27.6	34.0	2.8		
19.5		7.8	4.8	0.1	0.4						15.0	1.60
12.8				<0.1	0.2							
9.2				<0.1	0.2						12.1	1.30
8.1				<0.1	0.2							
6.8				<0.1	0.2							

a. Trace smooth and irregular brown to black concr. (Fe-Mn)
 b. Trace smooth and irregular brown to black concr. (Fe-Mn); few CaCO₃ concr.

Soil type: Varna silt loam
 Soil Nos.: S58W1s-51-1
 Location: SE of NE, Section 6, T3N, R22E, Racine County, Wisconsin.
 Vegetation: Prairie grasses and forbs.
 Parent material: Thin loess over silty clay loam till.
 Physiographic position: Glacial till plain.
 Topography: Gently sloping.
 Slope: 2 percent plain.
 Salt or alkali: None.
 Drainage: Moderately well.
 Described by: A. J. Klingelhoets, October 6, 1958.

Horizon and
 Lincoln
 Lab. Number

Ap 0 to 8 inches. Black (10YR 2/1) silt loam with moderate medium subangular blocky structure which breaks down into moderate fine granules; friable when moist; many earthworm holes and casts; plant roots plentiful; slightly acid in reaction; developed in loess; abrupt smooth boundary, 7 to 9 inches thick.
 9313
 Less 1 inch of transition between Ap and B21 of very dark grayish brown (10YR 3/2) light silty clay loam with moderate medium subangular blocky structure which is either A3 or B1; this transition horizon was not sampled.

B21 8 to 16 inches. Dark grayish brown (10YR 4/2) to dark brown (10YR 4/3) heavy silty clay loam having moderate to strong fine subangular to angular blocky structure; slightly hard when dry, slightly plastic when wet; plant roots plentiful; some earthworm holes and casts; black (10YR 2/1) organic stains on vertical faces of peds; prominent clay skins; neutral in reaction; developed in loess; clear wavy boundary, 6 to 10 inches thick.
 9314

IIB22 16 to 23 inches. Dark brown (10YR 4/3) silty clay loam with compound moderate medium prismatic and strong medium angular blocky structure; slightly hard when dry and plastic when wet; few fine distinct 7.5YR 5/6 and 10YR 6/2 mottles; plant roots plentiful; clay skins on peds and prominent skins on vertical faces of peds facing large cracks extending down into substratum; few glacial pebbles less than 1-1/2 inches in diameter and some grit (glacial till); some lime coatings, 2.5Y 5/2, on horizontal ped faces; effervesces slightly; gradual irregular boundary, 6 to 9 inches thick.
 9315

IIB3 23 to 37 inches. Brown (7.5YR 5/4) silt clay loam having compound moderate medium prismatic and moderate to strong medium angular blocky structure; slightly hard when dry and plastic when wet; plant roots plentiful; soft 10YR 8/2 lime streaks and concretions; clay skins on vertical faces of peds only; few medium distinct 7.5YR 5/6 and 5/2 mottles; few glacial pebbles and shale fragments (till); effervesces strongly; gradual irregular boundary, 10 to 15 inches thick.
 9316

IIC1 37 to 48 inches. Brown (7.5YR 5/4 to 10YR 5/3) silty clay loam with compound weak medium prismatic and moderate coarse angular blocky structure; slightly hard when dry and plastic when wet; few fine roots; mottled same as horizon above; light gray (2.5Y 7/2) lime streaks and coatings on faces of peds; few large cracks extending down from horizon above, 1 to 3 inches in width with thick clay skins and some organic stains on vertical faces of peds facing on the cracks; few glacial pebbles and shale chips (till); effervesces strongly; diffuse boundary 9 to 12 inches thick.
 9317

IIC2 48 to 56 inches plus. Brown (10YR 5/3) silty clay loam till which is massive in place but breaks into weak coarse plates when disturbed; slightly hard when dry and plastic when wet; many medium distinct mottles, 7.5YR 5/6 and 5/2; few glacial pebbles and shale chips; some gray (10YR 5/1) lime coatings on horizontal faces of peds; effervesces strongly; many feet thick.
 9318

Remarks: All pH readings by Hellige-Truog kit. All colors under moist field conditions unless stated otherwise. Profile extremely dry when sampled.

SOIL TYPE Varna LOCATION Racine County, Wisconsin
silt loam

SOIL NOS. 858Wls-51-2 LAB. NOS. 9319-9325

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS	
		1B1a					3A1						2A2
		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 (<u>< 19mm</u>)		
0-7	Allp	0.4a	1.2a	2.1a	4.6a	3.4a	51.5	36.8	19.9	37.5	Tr.	sic1	
7-10	A12p	0.5a	1.2a	1.8a	4.3a	3.3a	51.8	37.1	21.2	36.3	Tr.	sic1	
10-16	B1	1.5b	1.9b	2.0b	4.4b	3.6b	47.1	39.5	18.5	34.6	1.9	sic1	
16-23	IIB21	0.4a	1.0a	1.5a	3.6a	2.8a	37.8	52.9	12.0	30.6	Tr.	c	
23-30	IIB22	1.4c	1.5c	1.3c	3.1c	2.8c	49.4	40.5	15.4	38.5	3.8	sic	
30-43	IIB3	1.7c	1.6c	1.3c	2.9c	2.7c	48.9	40.9	16.8	36.4	3.9	sic	
43-55+	IIC1	1.1c	1.2c	1.3c	2.9c	2.6c	48.5	42.4	15.1	37.6	3.6	sic	

pH	ORGANIC MATTER			6C1a	ELECTRICAL CONDUCTIVITY EC-1/3 MILLIMHOS PER CM @25-C.	6E1a	MOISTURE TENSIONS			
	8C1a	6A1a	6B1a	Free Iron Fe ₂ O ₃ %		CaCO ₃ equiv. %	GYPSSUM me./100g. SOIL	1/10 ATMOS.	1/3 ATMOS.	15 ATMOS.
1:1	1:5	1:10	ORGANIC CARBON %	NITROGEN %	C/N					
6.3			3.68	0.282	13	1.9				14.7
6.3			3.28	0.251	13	2.0				14.8
6.7			1.20	0.110	11	2.3				13.9
7.4			0.82	0.066	12	2.2		< 1		16.9
8.0			0.48	0.042	11	1.3		28		14.2
8.0			0.41			1.2		32		13.9
8.0			0.41			1.2		27		14.5

5A1a	EXTRACTABLE CATIONS					5B1a	BASE SAT. % EXCH.	5C3	5B1a	5A3a	8D3	4B1	4A1a
CATION EXCHANGE CAPACITY NH ₄ Ac	6N2b	6O2b	6H1a	6P2a	6Q2a	NH ₄ Ac	%	Base Sat. % on Sum	Sum Bases	Sum Cations	Ca/Mg	Field State Water %	Vol. Wt. g/cc
	Ca	Mg	H	Na	K				me/100g	me/100g			
	millequivalents per 100g. soil							5C1 Cations					
26.7	18.0	6.6	9.3	<0.1	0.4	94	73	25.0	34.3	2.7			
25.7	16.9	6.8	8.9	<0.1	0.4	94	73	24.1	33.0	2.5			
20.4	12.5	6.7	6.0	0.1	0.3	96	76	19.6	25.6	1.9			
21.1		8.4	2.4	0.1	0.4							16.1	1.62
11.9				0.1	0.2							12.9	1.85
10.0				<0.1	0.2								
9.6				<0.1	0.3								

a. Trace smooth to irregular dark brown to black concr. (Fe-Mn?)
 b. Few smooth to irregular dark brown to black concr. (Fe-Mn?)
 c. Trace smooth to irregular dark brown to black concr. (Fe-Mn?); few CaCO₃ concr.

Soil type: Varma silt loam
 Soil Nos.: S58Wis-51-2
 Location: NW of NW, Section 34, T3N, R22E, Racine County, Wisconsin.
 Vegetation: Prairie grasses and forbs.
 Parent material: Thin loess over silty clay loam till.
 Physiographic position: Glacial till plain.
 Topography: Gently sloping.
 Slope: 2 percent concave.
 Salt or alkali: None.
 Drainage: Moderately well.
 Described by: A. J. Klingelhoets, October 6, 1958.

Horizon and
 Lincoln
 Lab. Number

A11p 0 to 7 inches. Black (10YR 2/1) silt loam with compound moderate medium subangular blocky and moderate fine granular structure; friable when moist; abundance of plant roots and many earthworm casts and holes; developed in loess; slightly acid in reaction; diffuse wavy boundary, 6 to 8 inches thick.
 9319

A12p 7 to 10 inches. Black (10YR 2/1) silt loam with compound moderate medium subangular blocky and moderate fine granular structure; friable when moist; plant roots abundant and much earthworm activity; developed in loess; slightly acid; abrupt smooth boundary, 2 to 4 inches thick.
 9320

B1 10 to 16 inches. Very dark grayish brown (10YR 3/2) silty clay loam with moderate fine subangular blocky structure; firm when moist; plant roots plentiful; few earthworm holes; stains and streaks of black (10YR 2/1) organic material on ped faces; developed in loess; neutral in reaction; clear wavy boundary, 4 to 7 inches thick.
 9321

I1B21 16 to 23 inches. Dark grayish brown (10YR 4/2) to dark brown (10YR 4/3) light silty clay with moderate medium prismatic structure which breaks down into moderate to strong fine angular blocky; hard when dry and plastic when wet; roots plentiful; stains of black (10YR 2/1) organic matter and prominent clay skins on peds; few glacial pebbles, mostly dolomite; developed in till; neutral in reaction; clear wavy boundary, 5 to 8 inches thick.
 9322

I1B22 23 to 30 inches. Brown (7.5YR 5/4) silty clay loam with moderate medium prisms which break down into moderate medium angular blocks; slightly hard when dry and plastic when wet; roots plentiful; several large cracks carrying down from horizon above with thick grayish brown (2.5Y 5/2) clay skins and black (10YR 2/1) organic stains on the peds facing the cracks; other peds in horizon also have some black to very dark brown organic stains; few fine distinct mottles, 7.5YR 5/6 and 5/2; few glacial pebbles and shale chips; mildly alkaline; gradual irregular boundary, 5 to 9 inches thick.
 9323

I1B3 30 to 43 inches. Brown (7.5YR 5/4 to 10YR 5/3) silty clay loam with moderate medium prismatic structure which breaks down into moderate medium angular blocks when disturbed; slightly hard when dry and plastic when wet; few medium distinct mottles of 7.5YR 5/6 and 5/2; few plant roots; grayish brown (2.5Y 5/2) clay skins on vertical faces of peds; spots and streaks of soft lime concentrations, 10YR 8/2, throughout; few glacial pebbles and shale chips; strong effervescence; gradual irregular boundary, 10 to 16 inches thick.
 9324

I1C1 43 to 55 inches plus. Brown (10YR 5/3) silty clay loam which is massive in place but breaks out into moderate coarse plates; slightly hard when dry and plastic when wet; mottled same as horizon above; few dolomitic pebbles and shale chips; some 10YR 5/2 lime coatings on horizontal faces of plates; strong effervescence; many feet thick.
 9325

Remarks: Profile extremely dry when sampled.

SOIL TYPE **Withiee* LOCATION Marathon County, Wisconsin
silt loam

SOIL NOS. S61W1s37-3 LAB. NOS. 15954-15962

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)								3A1		2A2	TEXTURAL CLASS
		1B1a VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY	0.2-0.02	0.02-0.002	> 2 (<19mm)		
0-9	Ap	1.4a	2.2a	2.1a	3.3c	3.4c	71.5	16.1	36.0	40.4	4	sil	
9-12	A21	1.4a	2.2a	2.0a	3.3c	4.5c	74.3	12.3	42.5	37.8	5	sil	
12-15	A22	1.8c	1.9c	1.8b	2.8	4.4	68.8	18.5	39.0	35.5	6	sil	
15-21	A& B	1.6b	2.7b	2.8	4.3	5.1	61.5	22.0	38.9	29.6	4	sil	
21-26	IIB& A	3.4	5.8	7.0	13.0	8.0	41.4	21.4	35.6	19.8	4	l	
26-37	IIB21	5.5	8.2	9.2	17.3	9.5	27.5	22.8	29.6	15.6	7	scl	
37-48	IIB22	6.7	9.8	10.4	18.6	9.1	25.4	20.0	28.4	14.9	10	scl/fsl	
48-57	IIB3	4.7	8.7	10.6	20.5	10.5	27.5	17.5	32.2	15.7	10	fsl	
57-67	IIC	6.1	9.4	10.0	19.1	10.4	27.3	17.7	31.9	15.1	8	fsl	
8C1a	ORGANIC MATTER			BULK DENSITY				WATER RETENTION					
pH	6A1a	6B1a	C/N	Field State		30-Cm.		A. D.		4B1b	4B2		
	O.C.	N		4B4	4A1a	4B3	4A1c	4A1b	1/3-Bar	15-Bar			
1:1	%	%		Water	g/cc	Water	g/cc	g/cc	Pieces	Sieved			
5.0	2.28	0.209	11	32.8	1.20	30.2	1.18	1.24	28.1	9.1			
4.9	0.51	0.058	9	23.5	1.48	25.8	1.46	1.48	22.4	6.1			
4.6	0.22	0.029							20.7	8.4			
4.6	0.15	0.021		22.2	1.52	24.1	1.48	1.57	21.2	9.5			
4.4	0.10	0.016							20.6	9.0			
4.3	0.06			13.6	1.82	15.7	1.74	1.90	14.7	9.0			
4.3	0.05								14.8	8.3			
4.6	0.02			12.7	1.92	13.8	1.87	1.98	13.5	7.0			
4.5	0.08								13.8	7.4			
5A1a	EXTRACTABLE CATIONS					5C1	5C3	5B1a	5D1	5D3	6C1a	6C1a	
CATION EXCHANGE CAPACITY NH ₄ OAc	6N2b	6O2b	6H1a	6P2a	6Q2a	Base Sat. % NH ₄ OAc	Base Sat. % on Sum Cations	Sum Ext. Bases me/100g	CEC e 100g Clay	Ext. Ca/Mg	Free Iron as Fe ₂ O ₃ %	Al KCl Ext. me/100g	
	Ca	Mg	H	Na	K								
	← milliequivalents per 100g. soil →												
13.9	5.0	1.1	15.1	0.1	0.1	45	29	6.3	86	4.5	1.6	1.1	
9.1	2.1	0.6	10.5	0.1	0.1	32	22	2.9	74		1.4	2.8	
13.3	2.3	1.8	13.6	0.1	0.2	33	24	4.4	72	1.3	1.5	6.0	
14.8	2.6	2.6	14.4	0.2	0.2	38	23	5.6	67	1.0	1.5	6.7	
14.7	3.2	3.3	12.0	0.2	0.2	47	36	6.9	69	1.0	1.5	5.0	
16.3	4.4	4.5	10.8	0.2	0.2	57	46	9.3	71	1.0	1.5	3.5	
15.3	5.0	5.0	8.7	0.2	0.2	68	54	10.4	76	1.0	1.4	2.2	
14.1	5.1	4.9	5.8	0.2	0.2	74	64	10.4	80	1.0	1.3	1.1	
14.2	5.9	5.2	7.7	0.2	0.2	81	60	11.5	80	1.1	1.4	0.9	

- a. Many Fe-Mn? nodules.
- b. Few Fe-Mn? nodules.
- c. Common Fe-Mn? nodules.
- d. 8.4 Kg/M² to 60 inches (Method 6A).
- e. Derivative, calculated ratio.

Soil type: *Withee silt loam

Soil Nos.: S61Wis-37-3

Location: Marathon County, Wisconsin; southeast quarter of southwest quarter of Section 23, T26N, R2E, Spencer Township.

Vegetation and use: Soil Bank land; timothy and clover.

Slope and land form: Gently undulating ground moraine having slopes of 0 to 2 percent.

Drainage and permeability: Somewhat poorly (imperfectly) drained with slow to medium runoff and slow internal drainage; permeability is slow.

Parent material: Shallow to moderately shallow loess over reddish brown clay loam glacial till.

Collected by: R. B. Grossman, Gerald Post, Harvey Strelow, Robert Bartleme, G. B. Lee, Charles Reynolds and Paul H. Carroll, September 20, 1961.

Described by: Paul H. Carroll and G. B. Lee.

Horizon and

Lincoln

Lab. Number

Ap 15954	0 to 9 inches. Very dark grayish brown (10YR 3/2) silt loam with weak very fine subangular blocky structure; friable; fine fibrous roots common; strongly acid; clear wavy boundary.
A21 15955	9 to 12 inches. Brown (10YR 5/3) silt loam with weak very thin platy structure; very friable; common large prominent strong brown (7.5YR 5/8) mottles; very strongly acid; clear smooth boundary.
A22 15956	12 to 15 inches. Brown (10YR 5/3) silt loam with weak thin and medium platy structure; friable; many large prominent strong brown (7.5YR 5/6 - 5/8) mottles; extremely acid; clear wavy boundary.
A and B 15957	15 to 21 inches. Brown (10YR 5/3) silt loam with weak fine subangular blocky structure; friable; thick tongues of silt from the A2 above (much greater than 50 percent of this horizon) exhibit light gray (10YR 7/2) colors where not mottled and often isolate remnants of B material; many medium prominent strong brown (7.5YR 5/6 - 5/8) mottles; extremely acid; clear wavy boundary.
IIB and A 15958	21 to 26 inches. Dark brown (7.5YR 4/4) gritty silty clay loam with moderate medium prismatic structure that breaks under disturbance to moderate fine angular blocks; firm; moderately thick (15-mm.) light gray (10YR 7/2) tongues of bleached silt extend along prism faces and occupy approximately 20 percent of the horizon; many medium distinct strong brown (7.5YR 6/5 - 5/8) mottles; extremely acid; abrupt irregular boundary.
IIB21 15959	26 to 37 inches. Reddish brown (5YR 4/4) slightly pebbly clay loam with moderate medium and coarse prismatic structure that breaks under disturbance to moderate medium angular blocks; firm; nearly continuous reddish brown (5YR 4/3) clay films extend along most prism faces and onto some lateral blocky ped faces; very thin patchy bleached silt coats occur on some prism faces; few fine distinct strong brown (7.5YR 5/8) mottles; extremely acid; clear smooth boundary.
IIB22 15960	37 to 48 inches. Reddish brown (5YR 4/4) and yellowish red (5YR 4/6) slightly pebbly clay loam with weak coarse prismatic structure that breaks under pressure to weak medium subangular blocks; firm; few patchy coats of clay film and bleached silt on prism faces; few fine distinct strong brown (7.5YR 5/8) mottles; extremely acid; gradual smooth boundary.
IIB3 15961	48 to 57 inches. Reddish brown (5YR 3/4 to 4/4) slightly pebbly clay loam with weak coarse subangular blocky structure; firm; few patchy coats of clay film and bleached silt on blocky ped faces; extremely acid; gradual smooth boundary.
IIC 15962	57 to 67 inches. Reddish brown (5YR 4/4) slightly pebbly clay loam glacial till; massive; very strongly acid.

Mineralogy: The very fine sand from the particle-size analysis was examined under the petrographic microscope. Quartz is the most common mineral. A substantial percentage of feldspar is present. Highly altered feldspar is common; a portion of the altered grains are essentially aggregates of clay minerals. Some of the feldspar grains appear quite fresh. Quartz and possibly fresh feldspar increase towards the surface. (Method 7B1) Clay mineralogy as follows: (Methods 7A2, 7A3)

Horizon	(By Beltsville Laboratory)					
	'Montmorillonite'	'Vermiculite'	'Montmorillonite-' Interlayer	'Mica'	'Mica' Interlayer	'% Kaolinite' (by DFA)
Ap	t	-	xxx	-	t	5
A22	xx	x	xx	-	t	5
IIB and A	xx	xx	x	-	t	5
IIB21	xx	xx	x	-	-	-
IIC	xx	xx	x	-	t	-

dash, none detected; t, trace; x, small; xx, moderate; xxx, abundant; xxxx, dominant

SOIL TYPE ^{*with}the silt loam LOCATION Wood County, Wisconsin

SOIL NOS. S61Wis-71-1 LAB. NOS. 15927-15937

DEPTH INCHES	HORIZON	PARTICLE SIZE DISTRIBUTION (in mm.) (per cent)										TEXTURAL CLASS
		1B1a		3A1						2A2		
		VERY COARSE SAND	COARSE SAND	MEDIUM SAND	FINE SAND	VERY FINE SAND	SILT	CLAY	> 2	< 19mm		
	2.1	1.0-5	0.5-0.25	0.25-0.10	0.10-0.05	0.05-0.002	< 0.002	0.2-0.02	0.02-0.002			
0-8	Ap	0.9a	2.2a	2.0a	2.8a	4.2b	73.5	14.4	41.8	37.1	2	sil
8-11	A2	1.1a	1.9a	1.7a	2.6a	3.9b	76.2	12.6	41.0	40.2	3	sil
11-18	A & B	1.2b	2.7b	3.7	5.9	5.0	61.8	19.7	41.1	28.2	2	sil
18-24	B & A	2.1	7.0	12.9	21.5	8.4	34.0	14.1	37.1	13.9	4	1/fs1
24-36	IIB2	3.2	7.6	15.1	26.4	10.1	18.6	19.0	30.7	9.2	6	fs1
36-44	IIB3	3.9	7.1	9.8	20.6	10.3	28.8	19.5	35.5	13.5	5	1/fs1
44-52	IIC1	3.3	6.5	9.7	20.1	11.4	29.5	19.5	36.2	14.4	4	1
52-60	IIC2	2.8	6.6	10.1	20.5	10.9	31.1	18.0	37.7	14.0	5	1
22-26	c	2.4	7.8	18.2	28.3	8.5	22.3	12.5	32.0	9.3	5	s1
11-18	e	0.9b	3.2b	4.6	8.0	5.9	56.5	20.9	39.9	25.9		sil
11-18	f	0.3b	2.6b	3.8	6.8	5.7	63.2	17.6	42.5	29.2		sil
8C1a		ORGANIC MATTER			BULK DENSITY				WATER RETENTION			
pH		6A1a	6B1a		Field State	30-Cm.		A. D.	4B1b		4B2	
1:1		O.C.	N	C/N	4B4	4A1a	4B3	4A1c	4A1b	1/3-Bar	15-Bar	
		%	%		Water	g/cc	Water	g/cc	g/cc	Heces	Sieved	
5.7d		2.12	0.198	11	19.3	1.38	29.7	13.3	1.39	26.1	8.8	
4.7		0.30	0.054	6						22.4	6.1	
4.4		0.18	0.026							16.9	8.1	
4.5		0.09	0.011							13.2	5.1	
4.5		0.06	0.008							13.4	6.8	
4.4		0.05								15.3	7.4	
4.7		0.04								15.5	7.5	
4.8		0.03								18.6	7.0	
4.6		0.05									4.7	
		0.25									8.4	
4.4		0.18									7.0	
7A1a		EXTRACTABLE CATIONS 5B1a				5C1	5C3	5B1a	8D1	8D3	6C1a	6G1a
CATION EXCHANGE CAPACITY NH ₄ OAc		6N2b	6O2b	6H1a	6P2a	6Q2a	Base Sat. % NH ₄ OAc	Base Sat. % on Sum Cations	Sum Ext. 100g Bases	CEC e 100g Clay	Ext. Ca/Mg	Free Ions Fe ₂ O ₃ Ext. me/100g
		Ca	Mg	H	Na	K			me/100g			
15.3		8.4	3.8	7.3	0.1	0.3	82	63	12.6	106	2.2	1.5
9.6		2.8	2.0	8.0	0.1	0.1	52	38	5.0	76	1.4	1.6
13.3		3.7	2.8	10.8	0.1	0.2	51	39	6.8	68	1.3	1.5
9.6		2.8	2.6	6.5	0.1	0.2	59	47	5.7	68	1.1	1.1
13.7		5.2	4.5	6.6	0.1	0.2	73	60	10.0	72	1.2	1.3
13.5		5.4	4.4	5.6	0.1	0.2	75	64	10.1	69	1.2	1.2
14.0		5.9	4.8	5.6	0.2	0.2	79	66	11.1	72	1.2	1.2
12.3		5.8	4.8	4.2	0.2	0.2	89	72	11.0	68	1.2	1.0
8.5		4.7	2.3	5.6	0.1	0.1	85	56	7.2	68	2.0	1.0
12.3		3.4	3.2		0.1	0.2	56		6.9	59	1.1	2.0
15.1		2.3	2.4		0.1	0.1	32		4.9	86	1.0	1.0

- a. Many Fe-Mn? nodules
- b. Few Fe-Mn? nodules.
- c. See profile description.
- d. 1:5 soil-water ratio because of high organic matter content.
- e. Derivative, calculated ratio.

Soil type: *Withes silt loam
Soil Nos.: S61W1s-71-1

Location: Wood County, Wisconsin; northwest quarter of northwest quarter of Section 22, T25N, R3E, Marshfield Township.

Vegetation and use: Corn, small grain, and hay.

Slope and land form: Nearly level (approximately 1 percent) gradient on gently undulating, Cary-age, ground moraine.

Drainage and permeability: Somewhat poorly (imperfectly) drained with slow to medium runoff and slow internal drainage; permeability is slow.

Parent material: Shallow to moderately shallow loess over reddish brown clay loam glacial till.

Collected by: R. B. Grossman, Gerald Post, Harvey Strelow, Robert Bartelme, G. B. Lee, Charles Reynolds, and Paul H. Carroll, September 19, 1961.

Described by: Paul H. Carroll and G. B. Lee.

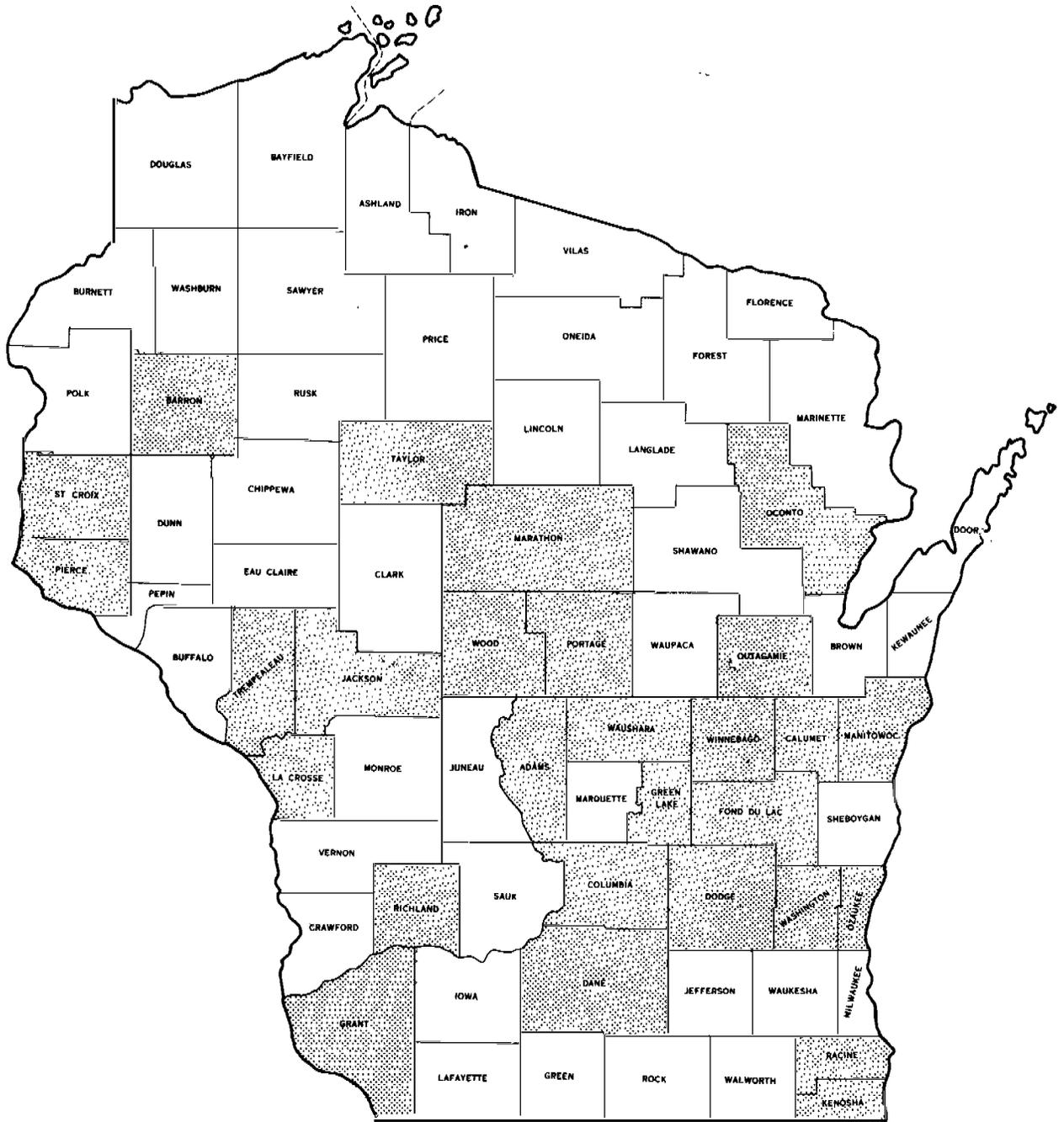
Horizon and
Lincoln
Lab. Number

- Ap
15927 0 to 8 inches. Dark grayish brown (10YR 4/2) and very dark grayish brown (10YR 3/2) silt loam with weak medium subangular blocky structure; friable; fine fibrous roots common; neutral; abrupt smooth boundary.
- A2
15928 8 to 11 inches. Grayish brown (10YR to 2.5Y 5/2) silt to silt loam with weak thin platy structure; friable; has common medium prominent mottles of yellowish brown (10YR 5/6 - 5/8) color; very strongly acid; abrupt smooth boundary.
- A and B
15929 11 to 18 inches. Pale brown (10YR 6/3) and light yellowish brown (2.5Y 6/3) gritty, slightly pebbly, silt loam; has weak medium prismatic structure that displays included weak coarse plates that break under slight pressure to weak fine and medium subangular blocks; friable; thick tongues of silt from A2 above which invade greater than 50 percent of this horizon and exhibit light gray (10YR 7/2) where not mottled, often isolate remnants of B material; few patchy remnants of clay films occur on some blocky ped faces; contains many medium and large distinct mottles of strong brown (7.5YR 5/2 - 5/8) color; very strongly acid; clear wavy boundary.
- 15936, red parts
15937, gray parts
- B and A
15930 18 to 24 inches. Pale brown (10YR 6/3) and light yellowish brown (2.5Y 6/4) silt loam with weak medium prismatic structure that breaks under slight pressure to weak medium subangular blocks; friable; moderately thick light gray (10YR 7/2) tongues of bleached silt extend along prism faces, occupying approximately 25 percent of the horizon body; few patchy remnants of clay films occur on some blocky ped faces; contains many large distinct strong brown (7.5YR 5/6) mottles; very strongly acid; abrupt wavy boundary. (Lab. No. 15935 taken at lower B and A and upper IIB2 horizons).
- (15935)
- IIB2
15931 24 to 36 inches. Reddish brown (5YR 4/3) pebbly and somewhat cobbly clay loam with weak and moderate coarse prismatic structure that breaks under disturbance to weak and moderate medium subangular blocks; firm; prism faces frequently are dark brown (7.5YR 4/4) in color; contains many patchy brown (7.5YR 5/2) clay films on prism and some blocky ped faces; infiltrations of powdery bleached silt cover the clay films along many prism faces; common medium distinct reddish yellow (5YR 9/6) mottles; very strongly acid; gradual smooth boundary.
- IIB3
15932 36 to 44 inches. Reddish brown (5YR 4/3 to 5/3) clay loam that is somewhat coarser textured than horizon above; weak coarse subangular blocky structure; firm; common medium distinct and prominent yellowish red (5YR 4/6) and brown (7.5YR 5/2) mottles; very strongly acid; gradual smooth boundary.
- IIC1
15933 44 to 52 inches. Reddish brown (5YR 4/4) clay loam glacial till interlain with lenses of silty material; very weak coarse subangular blocky structure to generally massive; firm; few gray (5Y 5/1) clay flows in root and worm channels; few large faint yellowish red (5YR 5/6) mottles; very strongly acid; gradual smooth boundary.
- IIC2
15934 52 to 60 inches. Reddish brown (5YR 4/4) generally massive clay loam glacial till; few large faint yellowish red (5YR 5/6) mottles; very strongly acid.

Remarks: All colors shown in the soil profile description are moist colors.

Mineralogy: The very fine sand from the particle-size analysis was examined under the petrographic microscope. Quartz is the most common mineral. A substantial percentage of feldspar is present. Highly altered feldspar is common; a portion of the altered grains is essentially aggregates of clay minerals. Some of the feldspar grains appear quite fresh. Quartz and possibly fresh feldspar increase towards the surface. (Method 7B1)

WISCONSIN



SCALE
0 10 20 30 40 50 MILES