

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

.. PENNSYLVANIA

Soil survey investigations reports already published:

SSIR No. 1 Soil Survey Laboratory Methods and Procedures for
Collecting Soil Samples

Soil Survey Laboratory Data and Descriptions for
Some Soils of:

SSIR No. 2 North Dakota
SSIR No. 3 Iowa
SSIR No. 4 Kansas
SSIR No. 5 Nebraska
SSIR No. 6 Arkansas, Louisiana, and Missouri
SSIR No. 7 Montana
SSIR No. 8 Wyoming
SSIR No. 9 Minnesota
SSIR No. 10 Colorado
SSIR No. 11 Oklahoma
SSIR No. 12 Puerto Rico and the Virgin Islands
SSIR No. 13 Mississippi
SSIR No. 14 Kentucky
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SSIR No. 16 North Carolina, South Carolina, and Georgia
SSIR No. 17 Wisconsin
SSIR No. 18 Indiana
SSIR No. 19 Illinois
SSIR No. 20 New England States
SSIR No. 21 A Toposequence of Soils in Tonalite Grus in the
Southern California Peninsular Range

Soil Survey Laboratory Data and Descriptions for
Some Soils of:

SSIR No. 22 Alabama and Florida
SSIR No. 23 Nevada
SSIR No. 24 California
SSIR No. 25 New York
SSIR No. 26 New Jersey

Soil Survey Investigations Report No. 27

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

... PENNSYLVANIA

August 1974

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

METHODS CODE SYMBOLS

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
2. CONVENTIONS
 - A. Size-fraction base for reporting
 1. <2-mm
 2. < size specified
 - B. Data sheet symbols

tr: trace, not measurable by quantitative procedure used or less than reportable amount

- : analysis run but none detected

blank: analysis not run

nd: analysis not run

< : less than reported amount or none present
3. PARTICLE-SIZE ANALYSES
 - A. Particles < 2-mm (pipet method)
 1. Airdry samples
 - a. Carbonate and noncarbonate clay
 2. Moist samples
 - a. Carbonate and noncarbonate clay
 - B. Particles >2-mm
 1. Weight estimates
 - a. By field and laboratory weighing
4. FABRIC-RELATED ANALYSES
 - A. Bulk density
 1. Saran-coated clods
 - a. Field state
 - b. Airdry
 - f. 1/3-bar desorption III
 - g. 1/10-bar desorption
 - h. Oven-dry
 3. Cores
 - a. Field moist
 - B. Water retention
 1. Pressure-plate extraction
4. FABRIC RELATED ANALYSES (con.)

(1/3 or 1/10-bar)

 - a. Sieved samples
 - b. Soil pieces
 - c. Natural clods
 - d. Cores
 2. Pressure membrane extraction (15-bars)
 - a. Field-moist samples
 4. Field state
 - C. Water-retention difference
 1. 1/3-bar to 15-bars
 2. 1/10-bar to 15-bars
 - D. Linear extensibility
 1. Dry to moist
5. ION-EXCHANGE ANALYSES
 - A. Cation-exchange capacity
 1. NH_4OAc , pH 7.0
 - a. Direct distillation
 - b. Displacement distillation
 3. Sum of cations
 - a. Acidity by BaCl_2 -TEA, pH 8.2; bases by NH_4OAc , pH 7.0
 - B. Extractable bases
 1. NH_4OAc extraction
 - a. Uncorrected
 4. NH_4OAc , pH 7.0 (modified)
 - a. Uncorrected
 - C. Base saturation
 3. Sum of cations
6. CHEMICAL ANALYSES
 - A. Organic carbon
 1. Acid-dichromate digestion
 - a. FeSO_4 titration
 - B. Nitrogen
 1. Kjeldahl digestion
 - a. Ammonia distillation
 2. Semimicro Kjeldahl
 - a. Ammonia distillation
 - C. Iron
 1. Dithionite extraction
 - a. Dichromate titration
 5. Sodium pyrophosphate extraction
 - a. Atomic absorption
 - E. Calcium carbonate
 1. HCl treatment
 - a. Gas volumetric
6. CHEMICAL ANALYSES (con.)
 - c. Weight loss
 - G. Aluminum
 5. Sodium pyrophosphate extraction
 - a. Atomic absorption
 - H. Extractable acidity
 1. BaCl_2 -triethanolamine I
 - a. Back-titration with HCl
 2. BaCl_2 -triethanolamine II
 - a. Back-titration with HCl
 - N. Calcium
 2. NH_4OAc extraction
 - b. Oxalate-permanganate I
 - d. Oxalate-cerate
 - O. Magnesium
 2. NH_4OAc extraction
 - a. EDTA-alcohol separation
 - b. Phosphate titration
 - c. Gravimetric, $\text{Mg}_2\text{P}_2\text{O}_7$
 - P. Sodium
 2. NH_4OAc extraction
 - a. Flame photometry
 - Q. Potassium
 2. NH_4OAc extraction
 - a. Flame photometry
7. MINERALOGY
 - A. Instrumental analysis
 1. Preparation
 - b. Organic-matter removal
 - c. Iron removal
 - d. Particle-size fractionation
 2. X-ray diffraction
 - a. Thin film on glass, solution
 3. Differential thermal analysis
8. MISCELLANEOUS
 - C. pH
 1. Soil suspensions
 - a. Water dilution
 - b. Saturated paste
 - c. KCl
 - e. CaCl_2
 - D. Ratios and estimates
 1. To total clay
 3. Ca to Mg (extractable)

PREFACE

The Soil Survey Investigations Report (SSIR) series was established to preserve and make available technical information resulting from soil survey investigations. SSIR No. 1, "Soil Survey Laboratory Methods and Procedures for Collecting Soil Samples," revised April 1972, describes in detail the methods used in the soil survey laboratories. One report involves a single specific study. Other reports in the series contain pedon descriptions and data from the individual states and Puerto Rico and the Virgin Islands. The entire series is listed on the inside front cover.

This report contains pedon descriptions and data obtained principally from 1955 to 1965. The majority of laboratory analyses were conducted at soil survey laboratories in Beltsville, Maryland, and Lincoln, Nebraska.

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

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

Many pedons no longer represent the soil series with which they were originally identified. All were classified during the period 1970 to 1974 and were checked against series classification as of December 1973. Some series names changed and are footnoted where the original name carries useful connotations. Pedons barely exceeding the limits of recognized series are designated as taxadjuncts but those with large departures are classified only to the family level. The latter are listed with the most closely related series in the geographical and series indexes. In the taxonomic index and in the body of the text, they are arranged by taxonomic unit.

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Neshaminy, taxadjunct	21	<u>UDULTS</u>	
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Fine-silty, mixed, mesic		<u>Typic Fragiudult</u>	
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Dalton, taxadjunct	41		

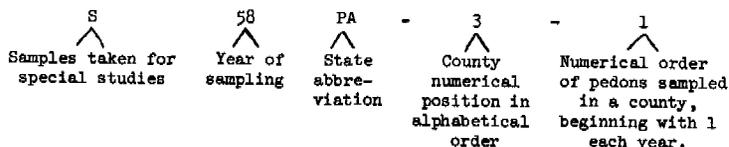
County	Soil Series	Soil Survey No. <u>1/</u>	Classification	Page	County	Soil Series	Soil Survey No. <u>1/</u>	Classification	Page	
Chester	Brecknock	S56PA-15-12	Hapludalf	29	Erie	Pierpont	S56PA-25-7	Fragiudalf	9	
	taxadjunct					taxadjunct				
	Not designated	S56PA-15-11	Hapludult	65		Platea	S56PA-25-9	Fragiaqualf	5	
	(sampled as Brecknock) ^{2/}					Platea	S56PA-25-12	Fragiaqualf	3	
	Glenelg	S56PA-15-2	Hapludult	71		taxadjunct				
	Glenville	S56PA-15-13	Fragiudult	61		Not designated	S56PA-25-10	Eutrochrept	57	
	Hollinger	S56PA-15-4	Hapludalf	19		(sampled as Rimer) ^{2/}				
	taxadjunct					Volusia	S56PA-25-4	Fragiaquept	39	
	Manor	S56PA-15-3	Eutrochrept	55		Chester	S55PA-36-15	Hapludult	67	
	taxadjunct					Chester	S55PA-36-16	Hapludult	69	
	Neshaminy	S56PA-15-9	Hapludalf	27		Chester	S55PA-36-12	Hapludult	77	
	taxadjunct					taxadjunct				
	Neshaminy	S56PA-15-10	Hapludalf	21		Conestoga	S55PA-36-11	Hapludult	25	
	taxadjunct					taxadjunct				
	Penn	S56PA-15-8	Hapludalf	31		Duffield	S55PA-36-5	Hapludult	79	
	Penn	S56PA-15-6	Hapludalf	23		taxadjunct				
	taxadjunct					Duffield	S55PA-36-6	Hapludult	33	
Not designated	S56PA-15-7	Hapludult	75	taxadjunct						
(sampled as Penn) ^{2/}				Hazleton	S55PA-36-13	Dystrochrept	49			
Urbana	S56PA-15-1	Fragiudalf	15	Hazleton	S55PA-36-14	Dystrochrept	51			
Urbana	S56PA-15-5	Fragiudalf	17	taxadjunct						
Erie	Cambridge	S56PA-25-6	Fragiudalf	11	Lansdale	S55PA-36-8	Hapludult	73		
	taxadjunct				taxadjunct					
	Dalton	S56PA-25-1	Fragiaquept	41	Lansdale	S55PA-36-9	Hapludult	81		
	taxadjunct				taxadjunct					
	Langford	S56PA-25-5	Fragiudalf	7	Montalto	S55PA-36-7	Hapludalf	35		
	Not designated	S56PA-25-3	Fragiochrept	43	Montalto	S55PA-36-10	Hapludalf	37		
	(sampled as Langford) ^{2/}				Allenwood	S54PA-41-2	Hapludult	63		
	Mardin	S56PA-25-2	Fragiochrept	45	Not designated	S54PA-41-1	Fragiudult	59		
	Minoa	S56PA-25-11	Eutrochrept	53	(sampled as Weikert) ^{2/}					
	taxadjunct				Potter	Lackawanna	S53PA-53-1	Fragiochrept	47	
Pierpont	S56PA-25-8	Fragiudalf	13	taxadjunct						

Footnotes are at the end of the soil series index.

SOIL SERIES INDEX

Series	Soil Survey No. ^{1/}	Classification	Page	Series	Soil Survey No. ^{1/}	Classification	Page
Allenwood	S54PA-41-2	Hapludult	63	Lansdale	S55PA-36-9	Hapludult	81
Brecknock	S56PA-15-12	Hapludalf	29	taxadjunct			
taxadjunct				Manor	S56PA-15-3	Eutrochrept	55
Not designated	S56PA-15-11	Hapludult	65	taxadjunct			
(sampled as Brecknock) ^{2/}				Mardin	S56PA-25-2	Fragiochrept	45
Cambridge	S56PA-25-6	Fragiudalf	11	Minoa	S56PA-25-11	Eutrochrept	53
taxadjunct				taxadjunct			
Chester	S55PA-36-15	Hapludult	67	Montalto	S55PA-36-7	Hapludalf	35
Chester	S55PA-36-16	Hapludult	69	Montalto	S55PA-36-10	Hapludalf	37
Chester	S55PA-36-12	Hapludult	77	Neshaminy	S56PA-15-9	Hapludalf	27
taxadjunct				taxadjunct			
Conestoga	S55PA-36-11	Hapludalf	25	Neshaminy	S56PA-15-10	Hapludalf	21
taxadjunct				taxadjunct			
Dalton	S56PA-25-1	Fragiaquept	41	Penn	S56PA-15-8	Hapludalf	31
taxadjunct				Penn	S56PA-15-6	Hapludalf	23
Duffield	S55PA-36-5	Hapludult	79	taxadjunct			
taxadjunct				Not designated	S56PA-15-7	Hapludult	75
Duffield	S55PA-36-6	Hapludalf	33	(sampled as Penn) ^{2/}			
taxadjunct				Pierpont	S56PA-25-8	Fragiudalf	13
Gleneig	S56PA-15-2	Hapludult	71	Pierpont	S56PA-25-7	Fragiudalf	9
Glenville	S56PA-15-13	Fragiudult	61	taxadjunct			
Hazleton	S55PA-36-13	Dystrochrept	49	Platea	S56PA-25-9	Fragiaqualf	5
Hazleton	S55PA-36-14	Dystrochrept	51	Platea	S56PA-25-12	Fragiaqualf	3
taxadjunct				taxadjunct			
Hollinger	S56PA-15-4	Hapludalf	19	Not designated	S56PA-25-10	Eutrochrept	57
taxadjunct				(sampled as Rimer) ^{2/}			
Lackawanna	S53PA-53-1	Fragiochrept	47	Urbana	S56PA-15-1	Fragiudalf	15
taxadjunct				Urbana	S56PA-15-5	Fragiudalf	17
Langford	S56PA-25-5	Fragiudalf	7	Volusia	S56PA-25-4	Fragiaquept	39
Not designated	S56PA-25-3	Fragiochrept	43	Not designated	S54PA-41-1	Fragiudult	59
(sampled as Langford) ^{2/}				(sampled as Weikert) ^{2/}			
Lansdale	S55PA-36-8	Hapludult	73				
taxadjunct							

^{1/}Soil numbers are coded as follows:



^{2/} Pedons that are classified only to the family level because of major departures from current series.

Pedon Classification: Aeric Fragiaqualf; fine-loamy, mixed, mesic

Soil: Platea taxadjunct 1

Soil Nos.: 856fa-25-12

Location: Cranesville Township, Erie County, Pennsylvania, 2 miles east of Cranesville; 70 feet south of Cranesville Franklin Centre Road; 40 feet east of power pole that is the second pole from west edge of field.

Vegetation: Idle cropland (Poverty grass, ragweed, goldenrod, asters, mühlenbergia, timothy, red clover).

Parent Material: Calcareous glacial till, probably Tazewell substage of Wisconsin glaciation.

Physiography: Upland of the glaciated Allegheny Plateau.

Relief: Smooth.

Slope: 1 percent south.

Erosion: Slight.

Permeability: Slow.

Drainage: Poor.

Moisture: Wet when sampled.

Stoniness: None.

Sampled and described by: E. J. Pedersen, F. G. Loughry, L. T. Kardos, D. C. Taylor, and party, September 18, 1956.

Horizon and

Lincoln

Lab. No.

Ap 7698	0 to 7 inches. Very dark gray (10YR 3/1) silt loam; weak fine granular structure; friable when moist. pH 6.6; abrupt smooth lower boundary; 6 to 8 inches thick.
A2 7699	7 to 8 inches. Gray brown (2.5Y 5/2) silt loam; weak fine subangular blocky structure; friable when moist; pH 6.4; clear and wavy lower boundary; 0 to 3 inches thick.
B2g 7700	8 to 18 inches. Reddish brown (7.5YR 6/8) to yellowish brown (10YR 5/6) silty clay loam with light brownish gray (2.5Y 6/2) coatings on ped; weak fine prisms breaking to weak fine and medium subangular blocky structure; firm when moist; pH 6.2; a few iron concretions; gradual and wavy lower boundary; 8 to 12 inches thick.
Bx1 7701	18 to 26 inches. Yellowish brown (10YR 5/8) silt loam with light olive brown (2.5Y 5/4) coatings and streaks of gray (2.5Y 6/0); polygons breaking into weak coarse platy structure; very firm when moist; pH 7.2; abrupt irregular lower boundary; 5 to 10 inches thick.
Bx2 7702	26 to 34 inches. Light Brownish gray (2.5Y 6/2) loam with light olive brown (2.5Y 5/4) coatings of silty clay loam and streaks of gray (2.5Y 6/0); polygons with streaks or thick coatings; firm when moist; pH 7.2 +; loam interior of polygons sampled.

Notes: Colors are for moist soil.

1/ This pedon is a taxadjunct because of the family particle size class and because of small solum color deviations. The Platea series is in the fine-silty class.

PEDON CLASSIFICATION: Aeric Fragiaqualf; fine-silty, mixed, mesic

SOIL Plateau silt loam SOIL Nos. S56Pa-25-9 LOCATION Erie County, Pennsylvania

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 7664 - 7672

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1			
		1B1b Total				Sand				Silt				2A2 > 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)					(2-0.1)
0-7	Ap	17.1	61.3	21.6	1.6 ^a	1.8 ^a	1.7 ^a	5.5 ^a	6.5 ^a	19.3	42.0	29.2	10.6	0.99	2.5		
7-9	B1g	15.6	62.2	22.2	1.1 ^a	1.4 ^a	1.6 ^a	4.8 ^a	6.7 ^a	19.0	43.2	28.6	8.9	0.98	3.9		
9-17	B2g	19.0	60.6	20.4	1.1 ^a	1.9 ^a	1.9 ^a	5.9 ^a	8.2 ^a	21.9	38.7	33.8	10.8	0.98	2.9		
17-25	B'x1	16.6	58.3	25.1	1.6 ^a	1.8 ^a	1.6 ^a	5.0 ^a	6.6 ^a	17.6	40.7	27.4	10.0	0.98	2.3		
25-33	B'x2	16.7	58.7	24.6	2.0 ^b	2.0 ^b	1.6 ^b	4.4 ^b	5.7 ^b	14.2	44.5	23.6	11.0	0.98	2.7		
33-45	B'x3	11.6	65.5	22.9	1.7 ^b	1.1 ^b	0.9 ^b	2.8 ^b	5.1 ^b	17.6	47.9	24.5	6.5	0.96	5.4		
45-52	B'x3	11.0	68.5	20.5	2.4 ^b	1.2 ^b	1.0 ^c	2.7 ^c	3.7 ^c	16.9	51.6	22.2	7.3		1.4		
52-58	IIIC1	42.8	39.0	18.2	16.7 ^b	10.7 ^b	3.9 ^c	6.9 ^c	4.6 ^c	10.6	28.4	19.0	38.2		32.8		
58-72	IIIC2	5.2	63.4	31.4	0.5 ^d	0.6 ^d	0.5 ^d	1.5 ^d	2.1 ^d	10.7	52.7	13.7	3.1				

Depth (in.)	6A1a Organic carbon Pct.	6B1a		6E1a Carbonate as CaCO ₃ Pct.	6C1a Ext. iron as Fe Pct.	Bulk density			4D1 COLE	Water content			4C1 WRO in/in	pH	
		Nitrogen	C/N			4A3a e g/cc	4A1e 1/2 bar g/cc	4A1h Oven dry g/cc		4B1c 1/2 bar Pct.	4B2 16 bar Pct.	8C1c (1:1) KCl		8C1e (1:1) H ₂ O	
		Pct.	Pct.												
0-7	2.94	0.216	13.6		1.5	1.18									4.4
7-9	0.76	0.076	10.0		1.3	1.33									4.7
9-17	0.39	0.052	8.0		1.7	1.50									5.0
17-25	0.23	0.048	5.0		1.8	1.74									6.9
25-33	0.23			1	1.5	1.82									7.8
33-45	0.20			5	1.5	1.78									7.9
45-52	0.19			7	1.4	1.80									8.0
52-58	0.12			13	1.4										8.0
58-72	0.23			6	1.4										7.9

Depth (in.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay 8D1			8D3 Ca/Mg	Base saturation		
	6N2b Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	5A1a NH ₄ OCa		CEC Sum	Ext. iron	15-bar water		5C3 Sum cations Pct.	5C1 NH ₄ OAc Pct.	
	meq/100 g															
0-7	2.2	0.6	tr.	0.2	3.0	17.2	20.2	14.5					0.94	0.07	15	21
7-9	1.5	0.6	tr.	0.2	2.3	9.8	12.1	9.0					0.55	0.06	19	26
9-17	2.8	1.0	tr.	0.2	4.0	7.7	11.7	8.7				2.8	0.57	0.08	34	46
17-25	9.7	3.4	0.1	0.1	13.3	2.9	16.2	12.7					0.65	0.07	82	105
25-33			0.1	0.1	20.9	tr.		10.5						0.06		
33-45			tr.	0.1	23.7	tr.		9.2						0.07		
45-52			tr.	0.1	23.2	tr.		8.1						0.07		
52-58			tr.	0.1	21.7	tr.		7.1						0.08		
58-72			tr.	0.2	24.4	tr.		9.9						0.04		

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

^aFew light brown and black concretions (Fe-Mn?).
^bFew light brown and black concretions (Fe-Mn?).
 Also few CaCO₃ concretions.
^cFew light brown and black concretions (Fe-Mn?).
 Also few CaCO₃ concretions. Also few mica
 flakes.
^dFew CaCO₃ concretions.
^eBulk density by Beltsville laboratory.

Pedon Classification: Aeric Fluvaqualf; fine-silty, mixed, mesic

Soil: Plateau silt loam

Soil Nos.: S56Pa-25-9

Location: Conneaut Township, Erie County, Pennsylvania. On State Game Lands No. 101, east of Township Route 312, 700 feet south of Township Route 341, in open area surrounded by brush and bounded on the south by scotch pine windbreak, 75 feet east of road, 60 feet north of windbreak. Location is shown on aerial photo APD-1-44.

Vegetation: Idle field cover of moonshine grass (*Danthonia compressa*), timothy, cinquefoil, goldenrod, milkweed, lycopodium, hardhack (*spirea*). There are a few scattered quaking aspen, red osier dogwood, wild crab-apple, staghorn sumac, blackberries, black locust, and red maple. The field has been idle for a long time. Trees are at least 12 years old. An A₀ horizon of rotted grass leaves and roots is starting to develop.

Parent material: Fine textured glacial till of Wisconsin Glacial Age.

Physiography: Upland plain. **Relief:** Smooth.

Elevation: 960 feet.

Slope and aspect: 1 percent toward south.

Erosion: Slight. **Permeability:** Very slow.

Drainage: Poor, approaching somewhat poor.

Ground water: Water table at 28 inches when sampled.

Moisture: Wet when sampled.

Stoniness: Nonstony. A few gravels and cobbles make up about 1 percent of volume. Gravelly and sandy strata were found in lower part of the profile. They varied in depth and thickness. In pit the D horizon sampled at 52 to 58 inches varied from 45 to 55 inches in depth to upper surface.

Root distribution: Many grass roots to 6 inches, a few to 22 inches.

Sampled and described by: E. J. Pedersen, F. G. Loughry, L. T. Kardos, D. C. Taylor and party, September 13, 1956.

Horizon and

Lincoln

Lab. No.

- 01 3/4 inch to 0. Dark reddish brown (5YR 2/2) knot of rotted grass and leaves containing roots; abrupt smooth lower boundary; thickness ranges from 1/2 to 1 inch.
- Ap 0 to 7 inches. Dark grayish brown (2.5Y 4/2) silt loam with weak fine granular structure with some platiness; friable when moist, nonplastic when wet; pH 5.6; abrupt smooth lower boundary; thickness ranges from 6 to 8 inches.
- 7664
- B1g 7 to 9 inches. Grayish brown to light olive brown (2.5Y 5/2 to 5/4) silt loam with common medium distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/8) mottles; weak medium platy and weak fine sub-angular blocky structure; friable when moist, slightly plastic when wet; pH 5.8; clear wavy lower boundary; thickness ranges from 1 1/2 to 3 inches.
- 7665
- B2g 9 to 17 inches. Light olive brown (2.5Y 5/4) fine silt loam with common medium distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/8) mottles; moderate medium blocky structure; ped surfaces have clay coats 1/2 mm thick; tops of polygons recognizable; hard when dry, firm when moist, slightly plastic when wet; pH 4.8; clear wavy lower boundary; thickness ranges from 6 to 10 inches.
- 7666
- B'x1 17 to 25 inches. Olive brown (2.5Y 4/4) silty clay with few medium distinct gray (2.5Y 5/0) and strong brown (7.5YR 5/6) mottles; polygons breaking to moderate coarse blocky structure; ped surfaces coated with gray (10YR 5/1) clay 1/2 to 1 mm thick; hard when dry, very firm when moist, sticky and plastic when wet; pH 7.0; gradual wavy lower boundary; thickness ranges from 6 to 10 inches.
- 7667
- B'x2 25 to 33 inches. Olive brown (2.5Y 4/4) silty clay with few medium distinct gray (2.5Y 5/0) and strong brown (7.5YR 5/6) mottles; polygons breaking to moderate coarse blocky structure; somewhat platy toward bottom; gray (10YR 5/1) clay coats on peds 1/2 to 2 mm thick; hard when dry, very firm when moist, plastic and slightly sticky when wet; pH 7.2 plus; abrupt wavy lower boundary; thickness ranges from 6 to 10 inches.
- 7668
- B'x3 33 to 45 inches. Olive brown (2.5Y 4/4) silty clay; polygons breaking to moderate medium coarse blocky structure; dark gray (10YR 4/1) clay coats 1/2 to 2 mm thick on peds underlain by yellowish brown (10YR 5/6) streaks; hard when dry, very firm when moist, plastic and slightly sticky when wet; effervesces with dilute HCl.
- 7669
- B'x3 45 to 52 inches. Appears identical to horizon above in macro characteristics separated in sampling because of total thickness which ranges from 10 to 22 inches. Lower boundary is abrupt and wavy.
- 7670
- IIIC1 52 to 58 inches. Dark yellowish brown (10YR 4/4) to olive brown (2.5Y 4/4) gravelly sandy loam; structureless; loose when moist, slightly sticky when wet due to coating on sand and gravel; pH 7.0; abrupt irregular lower boundary; thickness ranges from 0 to 11 inches. Gravel includes many shale fragments.
- 7671
- IIIC2 58 to 72 inches. Dark grayish brown (10YR 4/2) silty clay with a few gray mottles and a few dark brown spots; moderate medium to coarse platy structure that appears to be stratification of materials; firm when moist, plastic when wet; effervesces with dilute HCl; abrupt lower boundary; thickness ranges from 10 to 20 inches.
- 7672
- IVC3 72 inches plus. Gravelly stratum.

Notes: Colors are for moist soil.

PEDON CLASSIFICATION: Aqueptic Fragiuudalf; coarse-loamy, mixed, mesic

SOIL Langford silt loam

SOIL Nos. S56Pa-25-5

LOCATION Erie County, Pennsylvania

SOIL SURVEY LABORATORY Lincoln, Nebraska

LAB. Nos. 7629 - 7636

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1											3B2 Cw	Coarse fragments 3B1			
		Total			Sand					Silt				2A2 ≥ 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)	Int. III (0.05-0.02)	Int. II (0.02-0.002)	(2-0.1)					
Pct. of ≤ 2 mm																	
0-2	A1	24.4	60.7	14.9	5.2 ^a	3.4 ^a	2.4 ^a	5.8 ^a	7.6 ^a	23.8	36.9	34.0	16.8	0.96	11.7		
2-9	A2	16.4	65.1	18.5	2.2 ^a	2.0 ^a	1.5 ^a	4.1 ^a	6.6 ^a	26.6	38.5	35.8	9.8	0.95	13.2		
9-14	B1	43.2	48.8	8.0	6.0 ^a	6.4 ^a	4.6 ^a	11.2 ^a	15.0 ^a	28.4	20.4	50.1	28.2	0.92	15.9		
14-21	B2lg	36.4	53.6	10.0	4.0 ^a	4.7 ^a	3.8 ^a	10.2 ^a	13.7 ^a	28.6	25.0	48.4	22.7	0.89	16.4		
21-29	B'x1	37.8	47.8	14.4	10.2 ^a	5.0 ^a	3.2 ^a	8.7 ^a	10.7 ^a	23.6	24.2	39.4	27.1	0.88	16.2		
29-38	B'x2	39.4	48.3	12.3	5.3 ^a	5.8 ^a	4.5 ^a	11.3 ^a	12.5 ^a	24.6	23.7	43.7	26.9	0.94	8.5		
38-43	C1g	37.8	51.0	11.2	5.0 ^a	6.0 ^a	4.2 ^a	10.4 ^a	12.2 ^a	25.0	26.0	43.2	25.6	0.89	15.1		
43-51	C2	43.2	45.5	11.3	10.0 ^b	6.4 ^b	4.2 ^b	10.6 ^b	12.0 ^b	22.5	23.0	40.8	31.2	0.83	22.2		

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6E1a Carbonate as CaCO ₃ Pct.	6C1a Ext. iron as Fe ²⁺ Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH	
						4A3a c g/cc	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	
0-2	11.34	0.668	17.0		1.2	0.79									4.2
2-9	3.00	0.263	11.4		1.5	0.95									4.4
9-14	0.91	0.082	11.0		0.8	1.30									4.6
14-21	0.21	0.029	7.0		1.1	1.64									4.9
21-29	0.12	0.023	5.0		1.3	1.79									5.3
29-38	0.19				1.2	1.80									6.5
38-43	0.10			tr.	1.1	1.85									7.2
43-51	0.09			7	1.0	1.91									8.0

Depth (in.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay 5D1			8D3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3e Sum cations	5A1a NH ₄ Cl		CEC Sum	Ext. iron	15-bar water		5C3 Sum cations Pct.	5C1 NH ₄ OAc Pct.
	meq/100 g														
0-2	8.4	1.4	tr.	0.3	10.1	32.4	42.5	25.5		2.85	0.08	6.0	24	40	
2-9	1.2	0.4	tr.	0.2	1.8	26.0	27.8	15.1		1.50	0.08		6	12	
9-14	tr.	tr.	tr.	0.1	0.1	11.0	11.1	5.5		1.39	0.10		1	2	
14-21	1.3	0.4	tr.	0.1	1.8	6.5	8.3	4.8		0.83	0.11		22	38	
21-29	3.7	0.9	tr.	0.1	4.7	4.5	9.2	6.4		0.64	0.09		51	73	
29-38	3.8	0.7	tr.	tr.	4.5	2.4	6.9	4.9		0.56	0.10		65	92	
38-43	5.2	0.8	tr.	0.1	6.1	1.6	7.7	5.5		0.69	0.10		79	111	
43-51						tr.		4.7			0.09				

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

^aFew smooth light brown concretions (Fe-Mn?).
^bFew smooth light brown concretions (Fe-Mn?).

Also common, CaCO₃ concretions.

^cBulk density by Beltsville laboratory.

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.

Pedon Classification: Aqueptic Fragiudalf; coarse-loamy, mixed, mesic

Soil: Langford silt loam

Soil Nos.: 856Pa-25-5

Location: Greene Township, Erie County, Pennsylvania on S. S. Firewich farm 3/5 mile southeast of West Greene School. In woods 400 feet south of line fence, 170 feet west of road T640, 20 feet northwest of large boulder. Location shown on aerial photo APD-42-53.

Vegetation: Beech. Red Maple Forest. Ground cover is ferns, tree seedlings, moss and beech drops.

Parent material: Calcareous glacial till, probably of Tazewell substage of Wisconsin glaciation, north of Cleveland Moraine.

Physiography: Sloping upland of Glaciated Allegheny Plateau.

Relief: General relief smooth, hummocky microrelief due to cradle knolls.

Elevation: 1,460 feet.

Slope and aspect: 5 percent toward east.

Erosion: None apparent.

Permeability: Moderately slow.

Drainage: Somewhat poor, almost poor.

Ground water: Water table at 26 inches when sampled, distinct lateral flow through 38 to 43 inch horizon.

Moisture: Wet when sampled.

Stoniness: Occasional glacial boulders.

Root distribution: Many tree roots to 14 inches, a few to 27 inches.

Sampled and described by: E. J. Pedersen, F. G. Loughry, L. T. Kardos, D. C. Taylor and party, September 12, 1956.

Horizon and

Lincoln

Lab. No.

- Aoo 2 to 1 inch. Mixed hardwood leaf litter.
- Ao 1 inch to 0. Dark reddish brown (5YR 2/2) mull, pH 5.4.
- A1 0 to 2 inches. Black (5YR 2/1) silt loam; weak fine granular structure; friable; pH 5.2; about 5 percent gravel; clear irregular lower boundary; thickness ranges from 1 to 4 inches.
- A2 2 to 9 inches. Dark brown (7.5YR 3/2) silt loam; weak fine and medium subangular blocky structure with slight platiness; friable when moist; pH 5.2; about 5 percent gravel; clear wavy lower boundary; thickness ranges from 5 to 8 inches.
- B1 9 to 14 inches. Brown (10YR 5/3) silt loam with few medium faint yellowish brown (10YR 5/8) mottles; moderate medium platy breaking to weak medium blocky structure; hard when dry, firm when moist, nonplastic when wet; pH 5.2; about 5 percent gravel; clear wavy lower boundary; thickness ranges from 4 to 6 inches.
- B21g 14 to 21 inches. Yellowish brown (10YR 5/4) silt loam with common large distinct gray (10YR 5/1) and strong brown (7.5YR 5/8) mottles; polygon caps that have a mixed moderate medium blocky and medium platy structure; hard when dry, firm when moist, nonplastic when wet; pH 5.8; about 5 percent gravel; clear wavy lower boundary; thickness ranges from 6 to 10 inches.
- B'x1 21 to 29 inches. Dark yellowish brown (10YR 4/4) silty clay loam with common medium distinct dark gray (10YR 4/1) and strong brown (7.5YR 5/8) mottles; coarse polygons breaking to moderate medium blocky structure; hard when dry, firm when moist, slightly plastic when wet; pH 5.9; about 5 percent gravel; gradual wavy lower boundary; thickness ranges from 5 to 9 inches.
- B'x2 29 to 38 inches. Grayish brown (2.5Y 5/2) gravelly silty clay loam with few medium distinct strong brown (7.5YR 5/6) mottles; coarse polygons breaking to moderate medium blocky structure with distinct clay coats on the ped surfaces; hard when dry, firm when moist, moderately plastic when wet; pH 6.6; about 20 percent gravel and small boulders; gradual wavy lower boundary; thickness ranges from 6 to 12 inches.
- C1g 38 to 43 inches. Grayish brown (2.5Y 5/2) silty clay loam with few fine distinct strong brown (7.5YR 5/8) mottles; moderate medium blocky structure with some platiness; firm in place, slightly plastic when wet; pH above 7.2; about 20 percent gravel and small boulders, abrupt wavy lower boundary; thickness ranges from 2 to 8 inches.
- C2 43 to 51 inches plus. Dark grayish brown to olive brown (2.5Y 4/2 to 4/4) gravelly silty clay loam; moderate medium to fine platy structure; firm in place, slightly plastic when wet; effervesces with dilute HCl, about 20 percent gravel and small boulders.

Remarks: This site was sampled as typical of the Erie silt loam in Erie County, Pennsylvania, on gentle slopes with undisturbed profile in 1956 as the somewhat poorly drained member of the Valois-Langford-Erie-Elery-Alden Catena. Colors are for moist soil unless indicated otherwise.

PEDON CLASSIFICATION: Aquentic Fragiudalf; coarse-loamy, mixed, mesic

SOIL Pierpont taxadjunct SOIL Nos. S56Pa-25-7 LOCATION Erie County, Pennsylvania

SOIL SURVEY LABORATORY Lincoln, Nebraska

LAB. Nos. 7647 - 7656

Depth (in.)	Horizon	1B1b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments			
		Total		Sand					Silt					2A2 > 2 < 19 Pct of < 76mm	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)					
0-4	A1	25.8	57.6	16.6	1.4 ^a	2.1 ^a	2.5 ^a	8.7 ^a	11.1 ^a	23.6	34.0	40.2	14.7	0.99	2.0		
4-7 1/2	A2	27.1	56.7	16.2	1.6 ^a	2.4 ^a	2.6 ^a	9.0 ^a	11.5 ^a	23.5	33.2	40.6	15.6	0.96	7.7		
7 1/2-10	B1	28.1	57.1	14.8	1.3 ^a	2.6 ^a	3.2 ^a	9.2 ^a	11.8 ^a	24.1	33.0	41.6	16.3	0.88	18.8		
10-20	B21g	29.2	56.0	14.8	2.2 ^a	3.0 ^a	3.1 ^a	9.0 ^a	11.9 ^a	23.4	32.6	40.8	17.3	0.97	5.3		
20-32	B'x1	28.6	52.6	18.8	1.4 ^a	3.0 ^a	3.0 ^a	8.9 ^a	12.3 ^a	22.2	30.4	40.0	16.3	0.97	5.4		
32-42	B'x2	28.4	52.4	19.2	2.8 ^b	3.1 ^b	2.5 ^b	8.4 ^b	11.6 ^b	20.5	31.9	37.5	16.8	0.92	11.4		
42-53	C1	28.2	53.4	18.4	2.2 ^b	3.2 ^b	2.5 ^b	8.6 ^b	11.7 ^b	20.4	33.0	37.5	16.5	0.92	12.2		
53-61	C2	24.5	59.7	15.8	1.7 ^b	2.4 ^b	2.2 ^b	7.6 ^b	10.6 ^b	21.6	38.1	37.2	13.9	0.97	3.8		
61-68	C3	33.2	54.4	12.4	4.2 ^c	4.0 ^c	3.1 ^c	10.0 ^c	11.9 ^c	20.7	33.7	39.0	21.3	0.96	6.0		
68-77	IIC4	3.6	65.4	31.0	0.4 ^c	0.6 ^c	0.3 ^c	1.0 ^c	1.3 ^c	5.6	59.8	7.5	2.3	0.98	2.9		

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen C/N		6E1a Carbonate as CaCO ₃ Pct.	6C1a Ext iron as Fe Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH	
		Pct.	Pct.			C/N	4A3a d g/cc	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
0-4	7.91	0.474	16.7		1.5	0.94									4.6
4-7 1/2	2.08	0.172	12.1		1.3	1.22									4.6
7 1/2-10	1.06	0.096	11.0		1.3	1.62									4.5
10-20	0.56	0.062	9.0		1.5	1.45									4.5
20-32	0.29	0.046	6.0		1.7	1.35									4.7
32-42	0.23				1.8	1.83									6.3
42-53	0.22				1.6	1.73									6.8
53-61	0.20				1.6	1.83									7.6
61-68	0.21				4	1.4	1.86								7.7
68-77	0.40				5	1.8	1.73								7.5

Depth (in.)	Extractable bases 5B1a				6H1a Lxt acidity	CEC		6G1d Ext. Al	Ratios to clay 8D1			8D3 Ca/Mg	Base saturation		
	6N2b Ca	6O2b Mg	6P2a Na	6Q2a K		Sum	5A3a Sum cations		5A1a NH ₄ OA ^c	CEC Sum	Ext iron		15-bar water	5C3 Sum cations Pct.	5C1 NH ₄ OA ^c Pct.
0-4	9.5	2.2	tr.	1.2	12.9	23.9	36.8	26.2				4.3	35	49	
4-7 1/2	3.5	1.0	tr.	0.3	4.8	14.7	19.5	12.7				3.5	25	38	
7 1/2-10	1.4	0.4	tr.	0.2	2.0	11.0	13.0	8.7					15	23	
10-20	0.7	0.1	tr.	0.2	1.0	9.4	10.4	6.9					10	14	
20-32	1.8	0.8	tr.	0.2	2.8	9.0	11.8	8.1					24	34	
32-42	6.8	2.5	tr.	0.1	9.4	3.2	12.6	9.5				2.7	75	99	
42-53	6.5	2.2	0.1	0.1	8.9	2.0	10.9	8.6				3.0	82	103	
53-61						0.4		8.1							
61-68						tr.		6.3							
68-77						tr.		12.7							

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt.	Chl	Vm	M1	Int	Qtz	Kl	Gibbsite

^aFew smooth light brown and black concretions (Fe Mn?).
^bFew smooth black concretions (Mn-Fe?).
^cFew smooth black concretions (Mn-Fe?). Also few CaCO₃ concretions.
^dBulk density by Beltsville laboratory.

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

Pedon Classification: Aqueptic Fragiudalf; coarse-loamy, mixed, mesic

Soil: Pierpont taxadjunct^{1/}

Soil Nos.: 556Pa-25-7

Location: Village of Platea, Erie County, Pennsylvania on Cary Scott farm near south edge of village, in woods 400 feet east of Pennsylvania Route 18, 140 feet east of west edge of woods, 90 feet north of south boundary of woods. Location shown on aerial photograph APD-2-23.

Vegetation: Second growth forest, red oak, red maple, ash, beech, basswood, witch hazel. Ground cover is false spikenard, trillium, solomonseal, tree seedlings, and moss.

Parent material: Glacial till or mixed till and lacustrine deposits, corresponding with late stages of Glacial Lake Maumee of Wisconsin Glaciation. Moderately calcareous silts, clays and fine sands and a few gravels and small boulders.

Physiography: Rolling bench at edge of Erie Lake Plain.

Relief: Almost smooth with a few low hummocks.

Elevation: 910 feet.

Slope and aspect: 4 percent toward west.

Erosion: None apparent.

Permeability: Moderately slow.

Drainage: Somewhat poor.

Ground water: Deep when sampled.

Moisture: Wet when sampled.

Stoniness: Very few stones, gravels and cobbles make up less than 1/2 percent of the soil volume.

Root distribution: Numerous roots to 12 inches, some roots along ped faces to 66 inches, with profuse branching below 42 inches.

Sampled and described by: E. J. Pedersen, F. G. Loughry, L. T. Kardos, D. C. Taylor and party, September 12, 1956.

Horizon and

Lincoln

Lab. No.

Aoo 1 to 1/2 inch. Hardwood leaf litter.

AO 1/2 inch to 0. Black mull.

A1 0 to 4 inches. Black (7.5YR 2/1) silt loam with weak fine granular structure; very friable when moist, non-plastic when wet; pH 5.6; clear wavy lower boundary; thickness ranges from 3 to 5 inches.

A2 4 to 7-1/2 inches. Light yellowish brown (10YR 6/4) silt loam with weak fine granular and some fine platy structure; friable when moist; nonplastic when wet; pH 5.4; clear wavy lower boundary; thickness ranges from 3 to 5 inches.

B1 7-1/2 to 10 inches. Yellowish brown (10YR 5/6) silt loam with few medium faint light brownish gray (10YR 6/2) mottles; weak fine platy structure; friable when moist, slightly plastic when wet; pH 5.2; clear wavy lower boundary; thickness ranges from 2 to 3 inches.

B2lg 10 to 20 inches. Yellowish brown (10YR 5/4) silt loam with common medium prominent gray (10YR 6/1) and strong brown (7.5YR 5/8) mottles; weak fine to medium blocky structure with some platiness; numerous clay coats on peds; hard when dry, firm when moist, and plastic when wet; pH 5.2; clear irregular lower boundary as this horizon forms tops of polygons; thickness ranges from 8 to 12 inches.

B'x1 20 to 32 inches. Olive brown (2.5Y 4/4) silt loam with common fine distinct yellowish brown (10YR 5/8) and grayish brown (10YR 5/2) mottles; polygons breaking into weak medium and fine blocks with some clay coats; hard when dry, firm when moist, plastic when wet; pH 6.6; gradual wavy lower boundary; thickness ranges from 10 to 16 inches.

B'x2 32 to 42 inches. Olive brown (2.5Y 4/4) silty clay loam with few medium distinct yellowish brown (10YR 5/8) and grayish brown (10YR 5/2) mottles; polygons breaking into moderate medium blocky structure with some fine platiness; some clay coats on peds with polygon faces fully coated; hard when dry, firm when moist, plastic when wet; pH 7.0; gradual wavy lower boundary; thickness ranges from 7 to 12 inches.

C1 42 to 53 inches. Olive brown (2.5Y 4/4) stratified silt and silty clay loam with few small faint mottles; polygons with moderate medium platy structure; firm when moist, slightly plastic when wet; effervesces with dilute HCl; abrupt wavy lower boundary; thickness ranges from 10 to 12 inches. This horizon contains the bottom of the distinct polygons.

C2 53 to 61 inches. Olive brown (2.5Y 4/4) very fine sandy loam; weak medium to fine platy structure; friable when moist, nonplastic when wet; effervesces with dilute HCl; abrupt wavy lower boundary; thickness ranges from 7 to 9 inches.

C3 61 to 68 inches. Olive brown (2.5Y 4/4) silty clay with few medium distinct gray (2.5Y 5/0) mottles; blocky structure with some platiness; firm when moist, very plastic when wet; abrupt wavy lower boundary; thickness ranges from 6 to 8 inches.

IIC4 68 to 77 inches plus. Olive brown (2.5Y 4/4) very fine sandy loam; weak fine platy structure; firm when moist, nonplastic when wet; effervesces with dilute HCl.

Remarks: This site was sampled as typical of an extensive area of this soil type in Erie County, Pennsylvania. Colors are for moist soil.

^{1/} This pedon is a taxadjunct because it is in the coarse-loamy family particle size class, whereas the Pierpont series is in the fine-silty class. This was originally sampled as the Platea series.

PEDON CLASSIFICATION; Aqueptic Fragiuudalf; fine-loamy, mixed, mesic

SOIL Cambridge taxadjunct

SOIL Nos. S56Pa-25-6

LOCATION Erie County, Pennsylvania

SOIL SURVEY LABORATORY Lincoln, Nebraska

LAB. Nos. 7637 - 7646

Depth (in.)	Horizon	1B1b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments				
		Total			Sand						Silt			Int. II (0.2-0.02)	(2-0.1)	2A2 ≥ 2 < 19 Pct.	2-19 Pct.	19-76 Pct.
		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) (0.25-0.1)	Fine (0.1-0.05)	Very fine (0.05-0.02)	Int. III (0.02-0.002)	Int. II (0.2-0.02)	Pct. of < 76mm						
0-4	A1	18.0	54.4	27.6	1.9 ^a	2.4 ^a	1.6 ^a	5.0 ^a	7.1 ^a	17.8	36.6	28.0	10.9	0.99	3.7			
4-10	A2	20.2	55.9	23.9	1.1 ^a	2.5 ^a	2.1 ^a	6.0 ^a	8.5 ^a	19.0	36.0	32.0	11.7	0.97	7.6			
10-15	B1g	23.5	56.2	20.3	1.7 ^a	3.5 ^a	2.5 ^a	6.6 ^a	9.2 ^a	20.5	35.7	33.6	14.3	0.96	8.0			
15-21	B2g	18.2	59.7	22.1	1.6 ^a	2.5 ^a	1.8 ^a	4.8 ^a	7.5 ^a	21.6	38.1	32.1	10.7	0.95	7.7			
21-28	B'x1	20.1	58.8	21.1	2.2 ^a	2.5 ^a	1.8 ^a	5.3 ^a	8.3 ^a	22.2	36.6	33.8	11.8	0.96	6.3			
28-38	B'x2	22.7	54.6	22.7	1.5 ^a	2.7 ^a	2.1 ^a	6.4 ^a	10.0 ^a	20.6	34.0	34.6	12.7	0.96	6.1			
38-48	B'x3	24.8	53.5	21.7	1.9 ^a	2.7 ^a	2.1 ^a	6.9 ^a	11.2 ^a	19.8	33.7	35.4	13.6	0.91	12.3			
48-60	B'x4	23.5	56.0	20.5	1.4 ^b	2.2 ^b	2.0 ^b	6.9 ^b	11.0 ^b	20.3	35.7	35.9	12.5	0.96	5.5			
60-72	C1	29.5	52.5	18.0	4.7 ^b	4.1 ^b	2.7 ^b	7.4 ^b	10.6 ^b	18.4	34.1	33.7	18.9	0.95	6.8			
72-80	C2	28.8	53.7	17.5	3.2 ^b	3.3 ^b	2.7 ^b	7.8 ^b	11.8 ^b	21.1	32.6	37.8	17.0	0.90	14.4			

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6E1a Carbonate as CaCO ₃ Pct.	6C1a Ext iron as Fe. Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH	
						4A3a c g/cc	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	
0-4	6.97	0.534	13.0		1.8	0.72									4.1
4-10	1.87	0.177	10.6		1.6	1.07									4.3
10-15	0.51	0.074	7.0		1.7	1.38									4.4
15-21	0.37	0.059	6.0		1.7	1.53									4.6
21-28	0.28	0.049	6.0		1.5	1.64									4.8
28-38	0.20				1.8	1.76									5.0
38-48	0.19				1.8	1.79									5.6
48-60	0.16				1.7	1.78									6.5
60-72	0.18				1.6	1.74									6.8
72-80	0.17			11	1.1	1.78									7.8

Depth (in.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay 5D1			8D3 Ca/Mg	Base saturation			
	6N2b Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	5A1a NH ₄ Ca		CEC Sum	Ext. iron	15-bar water		5C3 Sum cations Pct.	5C1 NH ₄ OAc Pct.		
	meq/100 g																
0-4	2.9	1.8	tr.	0.5	5.2	33.6	38.8	26.3					1.41	0.07	13	20	
4-10	0.6	0.8	tr.	0.3	1.7	20.5	22.2	14.2					0.93	0.07	8	12	
10-15	0.4	0.4	tr.	0.2	1.0	14.3	15.3	8.5					0.75	0.03	6	12	
15-21	0.7	0.2	tr.	0.2	1.1	9.4	10.5	8.8					0.48	0.08	10	12	
21-28	1.2	0.6	tr.	0.2	2.0	8.1	10.1	7.1					0.48	0.07	20	28	
28-38	2.7	1.4	tr.	0.1	4.2	7.7	11.9	8.4					0.52	0.08	35	50	
38-48	5.3	2.2	0.1	0.1	7.7	4.9	12.6	9.2					0.58	0.08	61	84	
48-60	7.5	2.5	tr.	0.1	10.1	3.2	13.3	10.6					0.65	0.08	76	95	
60-72	6.8	2.0	tr.	0.1	8.9	2.8	11.7	8.8					0.65	0.09	76	101	
72-80						0.8		7.2						0.06			

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

a Few smooth light brown and black concretions (Fe-Mn?).
 b Few smooth black concretions (Mn-Fe?).
 c Bulk density by Beltsville laboratory.

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.

Pedon Classification: Aqueptic Fragiudalf; fine-loamy, mixed, mesic

Soil: Cambridge taxadjunct^{1/}

Soil Nos.: S56Pa-25-6

Location: Girard Township, Erie County, Pennsylvania on David Blair farm, 2 3/4 miles southeast of Girard along route 25014, in woods 115 feet north of edge of road, 185 feet west of gravel road at sharp bend in highway. Location shown on aerial photograph APD-42-53.

Vegetation: Forest beech, red maple, a few hemlock trees, wild grape, basswood, elm and ash. Ground cover of tree seedlings, solomonseal, beech drops, false solomonseal, moss and jewelweed.

Parent Material: Glacial till or mixed till and lacustrine deposits, corresponding with late stages of Glacial Lake Maumee of Wisconsin glaciation, moderately calcareous material with a few gravels and cobbles.

Physiography: Upland at edge of Erie Lake Plain.

Relief: Generally smooth, low hummocky microrelief due to a few cradle knolls.

Elevation: 1,460 feet.

Slope and aspect: 10 percent toward north.

Erosion: None apparent.

Permeability: Moderately slow.

Drainage: Somewhat poor.

Ground water: Water table at 60 inches when sampled.

Moisture: Wet when sampled.

Stoniness: A few pebbles, gravels and cobbles make up less than 1/2 percent of the soil volume.

Root distribution: Numerous tree roots to 15 inches, some to 40 inches along polygon faces.

Sampled and described by: E. J. Pedersen, F. G. Loughry, L. T. Kardos, D. C. Taylor and party, September 12, 1956.

Horizon and

Lincoln

Lab. No.

Aoo	2 to 1 inch. Hardwood leaf litter.
AO	1 inch to 0. Dark reddish brown (5YR 3/2) leaf mold; pH 5.2.
A1 7637	0 to 4 inches. Dark reddish brown (5YR 3/2) silt loam with weak fine granular structure; very friable when moist; nonplastic when wet; pH 5.0; clear wavy lower boundary; thickness ranges from 3 to 6 inches.
A2 7638	4 to 10 inches. Dark brown (10YR 3/3 to 4/3) silt loam with weak fine granular and weak fine platy structure; friable when moist; nonplastic when wet; pH 4.8; clear wavy lower boundary; thickness ranges from 5 to 8 inches.
B1g 7639	10 to 15 inches. Brown (10YR 5/3) fine silt loam with common medium distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) mottles; weak medium platy and subangular blocky structure; friable when moist, nonplastic when wet; pH 4.8; clear wavy lower boundary; thickness ranges from 4 to 6 inches.
B2g 7640	15 to 21 inches. Yellowish brown (10YR 5/6) fine silt loam with common medium distinct gray (10YR 5/1) and strong brown (7.5YR 5/8) mottles; moderate medium platy and moderately medium blocky structure forming tops of polygons; hard when dry, firm when moist, slightly plastic when wet; pH 5.6; gradual wavy lower boundary; thickness ranges from 4 to 8 inches.
B'x1 7641	21 to 28 inches. Yellowish brown (10YR 5/6) silt loam with common medium prominent gray (10YR 5/1) and strong brown (7.5YR 5/8) mottles; polygons breaking to moderate medium blocky structure with thick clay coatings on peds; hard when dry, very firm when moist, slightly plastic when wet; pH 5.8; clear irregular lower boundary; thickness ranges from 5 to 11 inches.
B'x2 7642	28 to 38 inches. Dark yellowish brown (10YR 4/4) silt loam with common coarse prominent gray (10YR 5/1) and dark brown (7.5YR 4/4) mottles; polygons with mixed platy and moderate medium blocky structure; thick clay coats on peds; hard when dry, firm when moist, slightly plastic when wet; pH 5.8; gradual wavy lower boundary; thickness ranges from 8 to 12 inches.
B'x3 7643	38 to 48 inches. Dark yellowish brown (10YR 4/4) silt loam with medium distinct gray (10YR 5/1) mottles; polygons breaking to moderate medium platy structure; thick clay coats on peds; firm when moist, slightly plastic when wet; pH 5.8; gradual wavy lower boundary; thickness ranges from 8 to 16 inches.
B'x4 7644	48 to 60 inches. Dark yellowish brown (10YR 3/4) fine silt loam with few medium distinct gray (10YR 5/1) mottles; polygons breaking to moderate medium platy structure; distinct clay coats on peds; firm when moist, slightly plastic when wet; pH 6.8; a few gravel; gradual wavy lower boundary; thickness ranges from 10 to 14 inches.
C1 7645	60 to 72 inches. Dark grayish brown to olive brown (2.5Y 4/2 to 4/4) fine silt loam; moderate coarse platy structure; distinct clay coats on peds; firm when moist, slightly plastic when wet; pH 6.8; few gravel; gradual wavy lower boundary; thickness ranges from 10 to 14 inches.
C2 7646	72 to 80 inches plus. Dark grayish brown to olive brown (2.5Y 4/2 to 4/4) fine silt loam; moderate coarse platy structure with partial clay coats on peds; firm when moist, slightly plastic when wet; pH 7.2; a few gravel and shale fragments.

Remarks: This site was sampled as typical of an extensive area of this soil in Erie County, Pennsylvania. Colors are for moist soil.

^{1/}This pedon is outside the series range of colors and mottles in the upper solum and C horizon. The Cambridge series is moderately well drained. This was sampled in 1956 as a representative of the Platea series, which is now in the Fragiaqualf suborder.

PEDON CLASSIFICATION: Aqueptic Fragiuudalf; fine-silty, mixed, mesic
SOIL Pierpont silty clay loam

SOIL Nos. 856Pa-25-8

LOCATION Erie County, Pennsylvania

SOIL SURVEY LABORATORY Lincoln, Nebraska

LAB. Nos. 7657 - 7663

Depth (in.)	Horizon	181b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments			
		Total			Sand					Silt				2A2 2-19 Pct	Pct. of 2-19 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)	(2-0.1)					
Pct. of <= 2 mm																	
0-3	A1	11.2	57.6	31.2	1.2 ^a	1.4 ^a	1.1 ^a	3.7 ^a	3.8 ^a	20.7	36.9	26.7	7.4	1.00	tr.		
3-7	A2g	13.1	55.0	31.9	0.6 ^a	1.3 ^a	1.4 ^a	4.5 ^a	5.3 ^a	15.2	39.8	23.2	7.8	0.99	1.2		
7-12	Bx1	12.1	50.5	37.4	0.5 ^a	1.4 ^a	1.3 ^a	4.1 ^a	4.8 ^a	13.3	37.2	20.6	7.3	1.00	tr.		
12-24	Bx2	7.3	58.5	34.2	0.4 ^b	0.9 ^b	0.7 ^b	2.2 ^b	3.1 ^b	11.8	46.7	16.2	4.2	1.00	tr.		
24-30	Bx3	6.1	61.5	32.4	0.5 ^b	0.7 ^b	0.6 ^b	1.7 ^b	2.6 ^b	11.7	49.8	15.4	3.5	0.99	1.7		
30-39	Bx4	6.2	63.6	30.2	0.7 ^b	0.8 ^b	0.5 ^b	1.7 ^b	2.5 ^b	12.0	51.6	15.6	3.7	1.00	tr.		
39-80	C	7.1	62.5	30.4	1.1 ^c	0.8 ^c	0.6 ^c	1.7 ^c	2.9 ^c	12.5	50.0	16.5	4.2	0.98	2.0		

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6E1a Carbonate as CaCO ₃ Pct.	6C1a Ext. iron as Fe ⁺ Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH	
						4A3a d g/cc	4A1e 1/2 bar g/cc	4A1h Oven dry g/cc		4B1c 1/2 bar Pct.	4B2 15 bar Pct.	8C1c (1:5) H ₂ O		8C1a (1:1) H ₂ O	
						0-3	8.22	0.582		14.1		2.1		0.81	
3-7	2.28	0.264	8.6		2.7	1.13									4.3
7-12	1.00	0.136	7.4		2.8	1.18									4.4
12-24	0.31	0.065	5.0		2.0	1.63									6.2
24-30	0.28			1	1.6	1.69									7.4
30-39	0.28			13	1.5	1.75									7.9
39-80	0.26			18	1.5	1.74									7.9

Depth (in.)	Extractable bases 5B1a					6H1a Ext acidity	CEC		6G1d Ext. Al	Ratios to clay 8D1			8U3 Ca/Mg	Base saturation	
	6N2b Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	5A1a NH ₄ OH		CEC Sum	Ext. iron	15 bar water		5C3 Sum cations Pct	5C1 NH ₄ OAc Pct.
	meq/100 g														
0-3	3.3	3.0	tr.	0.8	7.1	34.2	41.3	28.9		1.32	0.07	1.1	17	24	
3-7	1.5	1.8	tr.	0.4	3.7	25.2	28.9	21.5		0.77	0.07	0.8	13	17	
7-12	0.8	0.9	tr.	0.3	2.0	18.1	20.1	13.7		0.63	0.09		10	14	
12-24	7.1	5.2	0.1	0.2	12.6	4.9	17.5	13.6		0.51	0.06	1.4	72	93	
24-30	7.8	5.6	0.1	0.2	13.7	2.0	15.7	11.7		0.48	0.05	1.4	87	117	
30-39						tr.		9.8			0.05				
39-80						tr.		9.2			0.05				

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

^a Many light brown concretions (Fe?) and few black concretions (Mn-Fe?).
^b Few light brown to black concretions (Fe-Mn?).
^c Few light brown to black concretions (Fe-Mn?).
 Also few CaCO₃ concretions.
^d Bulk density by Beltsville laboratory.

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

Pedon Classification: Aqueptic Fragiudalf; fine-silty, mixed, mesic

Soil: Pierpont silty clay loam

Soil Nos.: S56Pa-25-8

Location: Conneaut Township, Erie County, Pennsylvania on Harold Williams farm, in woods south of Township Route 883, 2,200 feet east of Township Route 312, 160 feet east of northwest corner of woods, 80 feet south of road, 20 feet north of large white oak tree. Location shown on aerial photo APD-1-44.

Vegetation: Forest. Red maple, ironwood, black oak, white oak. Ground cover of trillium, poison ivy, and moss.

Parent material: Fine-textured glacial till of Wisconsin glacial period.

Physiography: Upland plain.

Relief: Slightly undulating.

Elevation: 925 feet.

Slope and aspect: 1 percent toward west.

Erosion: None.

Permeability: Very slow.

Drainage: Poor, approaching somewhat poor.

Ground water: Water table deep when sampled, usually near surface.

Moisture: Moist when sampled.

Stoniness: None.

Root distribution: Many tree roots to 7 inches, few along prism and polygon faces to 42 inches.

Sampled and described by: E. J. Pedersen, F. G. Loughry, L. T. Kardos, D. C. Taylor and party, September 13, 1956.

Horizon and

Lincoln

Lab. No.

Aoo	1-1/2 to 3/4 inch. Hardwood leaf litter.
AO	3/4 inch to 0. Dark reddish brown (5YR 2/2) hardwood leaf mold; pH 5.2.
Al 7657	0 to 3 inches. Black (7.5YR 2/1) silt loam; weak fine granular structure; very friable when moist, slightly sticky when wet; pH 5.0; clear wavy lower boundary; thickness ranges from 2 to 4 inches.
A2g 7658	3 to 7 inches. Brown (10YR 5/3) fine silt loam with common small faint light brownish gray (10YR 6/2) mottles; weak fine granular and weak fine platy structure; friable when moist, slightly plastic when wet; pH 5.4; clear wavy lower boundary; thickness ranges from 3 to 6 inches.
Bx1 7659	7 to 12 inches. Yellowish brown (10YR 5/8) silty clay with common coarse prominent strong brown (7.5YR 5/8) and gray (10YR 6/1) mottles; moderate medium blocky structure; ped faces are coated with gray (10YR 5/1) silt; hard when dry, very firm when moist, sticky and plastic when wet; pH 5.7; clear wavy lower boundary; thickness ranges from 4 to 7 inches.
Bx2 7660	12 to 24 inches. Light olive brown (2.5Y 5/4) silty clay with common medium distinct yellowish brown (10YR 5/6) and gray (10YR 5/1) mottles; strong coarse prismatic structure breaking to strong coarse blocky; ped faces have dark gray (10YR 4/1) clay coatings 1/2 to 1 mm thick; hard when dry, very firm when moist, plastic when wet; pH 6.8; gradual wavy lower boundary; thickness ranges from 10 to 14 inches.
Bx3 7661	24 to 30 inches. Dark yellowish brown (10YR 4/4) silty clay with common fine faint to distinct olive brown (2.5Y 4/4) and gray (10YR 5/1) mottles; polygons 6 to 12 inches in diameter breaking to moderate coarse blocky structure; ped faces have gray (10YR 5/1) clay coatings 1/2 to 2 mm thick; hard when dry, very firm when moist, plastic when wet; pH 7.2 plus; abrupt wavy lower boundary; thickness ranges from 5 to 9 inches.
Bx4 7662	30 to 39 inches. Dark yellowish brown (10YR 4/4) silty clay with few fine faint olive brown (2.5Y 4/4) and gray (10YR 5/1) mottles; polygons 6 to 8 inches in diameter breaking to strong coarse blocky; ped faces have gray (10YR 5/1) clay coatings 1/2 to 2 mm thick; very firm when moist, plastic when wet; effervesces rapidly with dilute HCl, gradual wavy lower boundary; thickness ranges from 7 to 9 inches.
C 7663	39 to 80 inches plus. Olive brown (2.5Y 4/4) silty clay with few yellowish brown streaks; large polygons changing downward to massive structure; ped faces in upper part have gray (10YR 5/1) clay coatings 1/2 to 2 mm thick; very firm when moist, plastic when wet; effervesces rapidly with dilute HCl.

Notes: Colors are for moist soil.

FEDON CLASSIFICATION: Aquic Fragiudalf; fine-loamy, mixed, mesic

SOIL Urbana silt loam

SOIL Nos. S56Pa-15-1

LOCATION Chester County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 561487 - 561495

Depth (in.)	Horizon	181b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments			
		Total			Sand					Silt				2A2 > 2 < 76 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 (0.02-0.002)	Int. III (0.02-0.002)	Int. II (0.2-0.02)					(2-0.1)
0-5	A1	30.8	50.8	18.4	2.6	5.7	4.4	9.0	9.1	18.0	32.8	32.4	21.7	0.99	2		
5-12	A2	30.2	49.1	20.7	3.4	5.8	4.0	8.5	8.5	16.8	32.3	30.3	21.7	0.99	2		
12-18	B21	26.8	51.7	21.5	3.8	5.4	3.4	7.1	7.1	16.4	35.3	27.7	19.7	0.97	5		
18-22	B22	21.6	57.6	20.8	3.3	4.4	2.8	6.2	5.8	18.6	39.0	27.1	15.8	0.99	2		
22-28	Bx1	26.1	56.1	17.8	3.6	5.5	3.1	7.1	6.8	19.0	37.1	30.0	19.3	0.99	2		
28-35	Bx2	25.2	55.9	18.9	3.1	5.3	3.5	7.2	6.1	18.5	37.4	28.7	19.1	0.99	1		
35-47	B31	52.0	37.7	10.3	7.3	11.8	7.5	14.4	11.0	13.5	24.2	32.7	41.0	0.94	8		
47-51	B32	49.8	39.0	11.2	6.7	11.7	7.2	13.8	10.4	14.1	24.9	32.4	39.4	0.96	6		
51-75	C	27.4	64.5	8.1	4.2	5.4	3.4	7.1	7.3	34.0	30.5	45.3	20.1	0.97	4		

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	Carbonate as CaCO ₃ Pct.	6C1a Ext. iron as Fe Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH	
						4A1e g/cc	4A1h g/cc	4B1c g/cc		4B2 g/cc	8C1c KCl	8C1a H ₂ O			
														8B/Field (1:5)	
0-5	3.25	0.208	16		1.8		0.86		30.4	9.3	0.18	5.2	4.8		
5-12	0.47	0.045	10		2.5		1.30		26.4	8.6	0.23	5.2	4.5		
12-18	0.17				2.9		1.38		29.2	9.7	0.26	5.2	4.6		
18-22	0.11				2.6		1.42		31.5	9.8	0.31	5.2	4.7		
22-28	0.08				2.0		1.43		29.5	8.7	0.29	5.2	4.6		
28-35	0.04				0.7		1.69		26.6	8.3	0.31	5.6	5.2		
35-47	0.08				2.4		1.80		18.9	7.2	0.20	6.0	5.7		
47-51	0.08				2.2		1.79		18.8	7.1	0.20	5.9	5.4		
51-75	0.08				1.5		1.69		22.2	5.2	0.28	5.8	5.3		

Depth (in.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC	6G1d Ext. Al	Ratios to clay 8D1			8D3 Ca/Mg	Base saturation		
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum				5A3a Sum cations	CEC Sum	Ext. iron		15-bar water	Sum cations Pct.	5C3 NH ₄ OAc Pct.
0-5	2.2	1.4	0.1	0.5	4.2	15.2	19.4		1.05	0.10	0.51	1.6	22		
5-12	0.6	0.4	0.1	0.2	1.3	10.6	11.9		0.57	0.12	0.42		11		
12-18	0.3	1.1	0.1	0.2	1.7	10.8	12.5		0.58	0.13	0.45		14		
18-22	0.5	2.1	0.1	0.2	2.9	10.4	13.3		0.64	0.13	0.47		22		
22-28	0.6	3.0	0.2	0.2	4.0	9.8	13.8		0.78	0.11	0.49		29		
28-35	2.4	7.2	0.6	0.2	10.4	5.1	15.5		0.82	0.04	0.44	0.3	67		
35-47	4.0	6.3	0.5	0.1	10.9	5.7	16.6		1.61	0.23	0.70	0.6	66		
47-51	4.0	5.5	0.3	0.1	9.9	6.5	16.4		1.46	0.20	0.63	0.7	60		
51-75	2.5	2.6	0.2	0.2	5.5	4.5	10.0		1.23	0.19	0.64	1.0	55		

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

8B/Field (1:5) Determined with pH indicator.

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.

Pedon Classification: Aquic Fragiudalf; fine-loamy, mixed, mesic
 Soil: Urbana silt loam —
 Soil No.: S56Pa-15-1
 Location: Chester County, Pennsylvania. H. B. Speckman farm, Thornbury Township, 1/2 mile west of
 Darlington Corners on Street Road, 150 feet south of road, 500 feet from east edge of woods.
 Vegetation and land use: Forest, protected from grazing, tulip poplar, beech, red maple, white oak, red
 oak, black oak. Undergrowth of dogwood, viburnums and hornbeam.
 Slope and land form: 7 percent.
 Erosion: None.
 Drainage: Moderately well drained.
 Permeability: Moderate.

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O1	1 to 1/2 inch.	Mixed hardwood leaves.
Not sampled		
O2	1/2 inch to 0.	Black weak fine granular mull; pH 6.2
Not sampled		
A1	0 to 5 inches.	Dark brown (7.5YR 3/2) silt loam, with mixed weak fine platy and weak fine granular structure; friable; pH 5.2; many roots; boundary clear wavy; 3 to 7 inches thick.
561487		
A2	5 to 12 inches.	Yellowish brown (10YR 5/4) fine silt loam with weak medium subangular blocky structure; friable; pH 5.2; many roots; some wormholes; most ped surfaces have clay coats, clear wavy boundary; 4 to 8 inches thick.
561488		
B21	12 to 18 inches.	Yellowish brown (10YR 5/6) silty clay loam with weak medium subangular blocky structure; firm consistence; pH 5.2; clear wavy boundary; 3 to 8 inches thick.
561489		
B22	18 to 22 inches.	Yellowish brown (10YR 5/6) with many medium distinct dark yellowish brown (10YR 4/4) and light gray (10YR 7/1) mottles near bottom of horizon; silty clay loam with weak coarse prisms breaking to moderate fine to medium platy structure; firm consistence; pH 5.2; clay coatings on all peds; gradual wavy boundary; 2 to 6 inches thick.
561490		
Bx1	22 to 28 inches.	Light brownish gray (10YR 6/2) with many coarse prominent yellowish brown (10YR 5/6) mottles; silty clay loam with moderate coarse prisms breaking to weak fine platy; very firm when moist, hard when dry (fragipan); pH 5.2; heavy clay coatings on prisms and some on plates; a few roots along polygon faces; gradual wavy boundary; 5 to 7 inches thick.
561491		
Bx2	28 to 35 inches.	Light brownish gray (10YR 6/2) with many coarse prominent yellowish brown (10YR 5/6) mottles; silty clay loam with moderate coarse prisms breaking to weak fine platy; very firm when moist; hard when dry; pH 5.6; heavy clay coatings on prism faces; clear wavy boundary; 6 to 8 inches thick.
561492		
B31	35 to 47 inches.	Dark yellowish brown (10YR 4/4) loam with weak coarse prism structure; firm consistence; pH 6.0; clay coatings on prisms; a few quartz fragments; contains a few tree roots; clear wavy boundary. Near top of this horizon there are many black concretions and some gray and dark brown mottling; 10 to 14 inches thick.
561493		
B32	47 to 51 inches.	Brown to dark brown (10YR 5/3 - 4/3) silt loam with moderate coarse prisms, breaking to weak medium subangular blocky structure; firm consistence; pH 5.9; partial clay coatings on ped surfaces; a few medium distinct mottles; clear wavy boundary; 2 to 5 inches thick.
561494		
C	51 to 75 inches.	Yellowish brown and grayish brown micaceous loam with weak fine platy structure; friable; pH 5.8; with many medium faint mottles.
561495		

Notes: Colors are for moist soil.

PEDON CLASSIFICATION: Aquic Fragiudalf; fine-loamy, mixed, mesic
SOIL Urbana silt loam

SOIL Nos. 856Pa-15-5

LOCATION Chester County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 561513-561518

Depth (In.)	Horizon	Size class and particle diameter (mm) 3A1													3B2 Cm	Coarse fragments 3B1		
		1B1b Total				Sand				Silt						2A2 % < 2 > 76	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				
0-8	Apl	22.0	63.4	14.6	1.9	3.6	3.4	6.5	6.6	30.0	33.4	40.4	15.4	0.99	3			
8-16	Ap2	22.1	62.7	15.2	1.7	4.1	3.5	6.5	6.3	27.1	35.6	37.1	15.8	0.97	6			
16-20	A2	22.1	62.7	15.2	1.7	4.1	3.5	6.5	6.3	27.1	35.6	37.1	15.8	0.97	6			
20-26	B21t	24.9	56.9	18.2	2.9	4.6	3.9	7.0	6.5	27.2	29.7	37.7	18.4	0.99	2			
26-33	B22gx	31.1	48.4	20.5	4.4	6.0	4.6	8.5	7.6	21.7	26.7	34.0	23.5	0.96	6			
33-38	B31gx	31.6	50.9	17.5	3.0	6.4	5.0	9.4	7.8	26.6	24.3	39.5	23.8	0.98	4			

Depth (In.)	6A1a Organic carbon	Nitrogen	C/N	Carbonate as CaCO ₃	6C1a Ext iron as Fe	Bulk density			4D1 COLE	Water content			4C1 WRD m/m	pH		
						4A1e 1/2 bar	4A1h Oven dry	4B1c 1/2 bar		4B2 15 bar	Field pH	8C1c (1-1) KCl		8C1a (1-1) H ₂ O		
						g/cc	g/cc	g/cc		Pct	Pct	Pct				
0-8	2.18	0.226	10		2.2		1.15			28.6	7.2	0.25	6.6		5.2	
8-16	0.78	0.075	10		1.6		1.28			24.2	11.3	0.16	6.2		5.2	
16-20	0.35				1.5		1.38			23.7	6.7	0.23			5.2	
20-26	0.18				2.0		1.51			23.6	8.0	0.23	6.6		5.5	
26-33	0.18				2.6		1.58			23.7	9.7	0.21	6.8		5.4	
33-38	0.08				2.7		1.58			24.8	9.4	0.24	7.0		5.4	

Depth (In.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay 8D1			8D3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	Ext. iron		CEC Sum	Ext iron	15-bar water		Sum cations Pct	5C1 NH ₄ OAc Pct.
	meq/100 g														
0-8	6.1	2.1	0.1	0.2	8.5	12.6	21.1							40	
8-16	2.2	0.9	0.1	0.2	3.4	8.3	11.7							29	
16-20	1.8	0.8	0.1	0.2	2.9	6.1	9.0							32	
20-26	2.4	1.5	0.1	0.2	4.2	5.5	9.7							43	
26-33	3.5	2.1	0.1	0.2	5.9	6.1	12.0							49	
33-38	3.2	1.1	0.1	0.2	4.6	5.1	9.7							47	

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.

Pedon Classification: Aquic Fragiudalf; fine-loamy, mixed, mesic

Soil : Urbana silt loam

Soil No.: S56Pa-15-5

Location: Chester County, Pennsylvania. Thomas Harney farm, East Bradford Township, in pasture east of Brandywine Creek, north of Taylor Run, 90 feet northwest of beech tree, 160 feet west of stone house.

Vegetation and land use: This site is in a bluegrass pasture.

Slope and land form: 5 percent toward southwest.

Erosion: Moderate deposition, estimated as 8 to 10 inches at sample site.

Drainage: Moderately well drained.

Permeability: Moderately to 26 inches, moderately slowly permeable 26 to 38 inches.

Horizon and
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- Apl 0 to 8 inches. Dark brown (10YR 4/3) silt loam with weak fine granular to weak medium sub-angular blocky structure; friable; pH 6.6 (limed), numerous grass roots; many earthworms; clear wavy boundary. 7 to 9 inches thick. This is recent colluvium over the horizons below.
- Ap2 8 to 16 inches. Dark brown (10YR 4/3) silt loam with weak medium subangular blocky structure; friable; pH 6.2 (limed); contains many grass roots, many earthworms, some black concretions, and some bits of charcoal; traces of clay coatings on some peds; clear wavy boundary; 7 to 9 inches thick.
- A2 16 to 20 inches. Dark yellowish brown (10YR 4/4) silt loam with a few small faint mottles; weak fine to medium subangular blocky structure friable; earthworm burrows; clear wavy boundary; 3 to 5 inches thick.
- B21t 20 to 26 inches. Strong brown (7.5YR 5/6) faintly mottled with dark grayish brown (10YR 4/2) silt loam with weak medium subangular blocky structure; friable; pH 6.6 (limed); moderate clay coating on peds; worm holes; gradual wavy boundary; 5 to 7 inches thick.
- B22gx 26 to 33 inches. Dark yellowish brown (10YR 4/4) with common medium faint grayish brown mottling silty clay loam; with weak medium prismatic structure breaking to weak coarse blocky; firm when moist, hard when dry; pH 6.8 (limed); clay coats on prism surfaces; clear wavy boundary; 6 to 8 inches thick.
- B31gx 33 to 38 inches. Strong brown (7.5YR 5/8) silty clay loam, faintly mottled with dark brown (10YR 4/3); weak medium prismatic structure breaking to weak medium blocky; firm when moist, hard when wet; pH 7.0, clay coating on prism surfaces; abrupt broken boundary; 4 to 6 inches thick.
- B32x 38 to 48 inches. Strong brown (7.5YR 5/6 - 5/8) silt loam which glitters with mica; weak medium prismatic structure breaking to weak medium platy; friable; pH 6.8.
Not sampled

Notes: Colors refer to moist soil.

FEDON CLASSIFICATION: Typic Hapludalf; coarse-loamy, mixed, mesic
SOIL Hollinger taxadjunct

SOIL Nos. 856Pa-15-4 LOCATION Chester County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 561507 - 561512

Depth (In.)	Horizon	1B1b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments			
		Total			Sand					Silt				2A2 > 2 < 76 Pct.	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)	Int III (0.05-0.02)	Int II (0.02-0.002)	(2-0.1)					
Pct. of \leq 2 mm														Pct. of \leq 76mm			
0-8	Ap	54.5	35.7	9.8	2.8	7.6	8.0	19.2	16.9	15.9	19.8	44.0	37.6	0.92	13		
8-15	B21t	54.6	33.1	12.3	3.7	7.5	7.7	18.6	17.1	14.2	18.9	42.3	37.5	0.98	3		
15-21	B22t	58.5	26.6	14.9	3.0	8.7	8.1	20.9	17.8	12.6	14.0	43.4	40.7	0.98	3		
21-26	B3	64.8	25.8	9.4	2.9	10.9	8.7	21.9	20.4	13.3	12.5	46.8	44.4	0.99	1		
26-32	C1	64.7	29.9	5.4	2.9	9.7	7.4	20.1	24.6	17.7	12.2	54.7	40.1	1.00	0		
32-42	C2	72.0	25.0	3.0	2.5	11.6	10.2	23.4	24.3	16.1	8.9	54.4	47.7	0.95	9		

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	Carbonate as CaCO ₃ Pct.	6C1a 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	4B1c 1/2 bar Pct.		4B2 15 bar Pct.	8C1c (1:1) KCl	8C1a (1:1) H ₂ O					
0-8	1.44	0.132	11		1.2												
8-15	0.21				1.9												5.8
15-21	0.10				2.2												6.3
21-26	0.06				1.5												6.3
26-32	0.06				1.5												6.3
32-42	0.04				0.6												6.3

Depth (In.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay 8D1			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	
0-8	5.4	1.1	0.1	0.2	6.8	6.9	13.7			1.40	0.12	0.60	4.9		50
8-15	4.0	1.2	0.1	0.1	5.4	4.7	10.1			0.82	1.30	0.54	3.3		53
15-21	5.5	1.2	0.1	0.1	6.9	4.9	11.8			0.79	1.50	0.54	4.6		58
21-26	4.5	1.0	0.1	0.1	5.7	4.1	9.8			1.04	0.16	0.63	4.5		58
26-32	5.2	0.9	0.1	0.1	6.3	4.1	10.4			1.93	0.28	0.76			60
32-42	2.2	1.0	0.1	0.1	3.4	1.8	5.2			1.73	0.20	0.73	2.2		65

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

Pedon Classification: Typic Hapludalf; coarse-loamy, mixed, mesic

Soil: Hollinger taxadjunct ^{1/}

Soil No.: S56Pa-15-4

Location: Chester County, Pennsylvania. Thomas Harney farm, West Bradford Twp., 1/2 mile east of Marshallton on hill near northwestern corner of farms. 400 feet NW. of plantation of pines, 325 feet south of sycamore tree. Aerial photo AHK-48-70.

Vegetation and land use: Cropland, sampled in old alfalfa field with some bluegrass, orchardgrass and dandelions.

Slope and land form: 8-1/2 percent slope toward the north.

Erosion: Moderately severe sheet erosion.

Drainage: Well drained.

Permeability: Moderate.

Sampled by: Merrill Kunkle, F. G. Loughry, E. J. Pedersen, J. J. Noll, J. B. Carey, and C. M. Phibbs.

Horizon and

Beltsville

Lab. No.

- Ap 0 to 8 inches. Dark brown (7.5YR 3/2) channery silt loam with weak fine granular structure, friable when moist; pH 6.6 (limed); abrupt smooth lower boundary; thickness ranges from 7 to 9 inches.
561507
- B21t 8 to 15 inches. Dark brown (7.5YR 4/4) silt loam with weak fine to medium subangular blocky structure, partial clay coatings on peds, a few black coatings, many earthworm burrows with organic staining, friable when moist, gradual wavy lower boundary; thickness varies from 6 to 10 inches.
561508
- B22t 15 to 21 inches. Strong brown (7.5YR 4/6) silt loam with weak medium subangular blocky structure, partial clay coats on peds, friable when moist; pH 6.6; gradual wavy lower boundary; thickness varies from 4 to 8 inches.
561509
- B3 21 to 26 inches. Strong brown (7.5YR 5/6) silt loam with weak medium subangular blocky structure; a few clay coats and many small black spots on peds contains some gray micaceous fragments of weathered schist, friable; pH 6.4; clear irregular lower boundary; thickness ranges from 2 to 10 inches.
561510
- C1 26 to 32 inches. Strong brown (7.5YR 5/6) loam, structureless, friable, containing streaks of saprolyte; pH 6.2; clear wavy lower boundary; thickness ranges from 4 to 10 inches.
561511
- C2 32 to 42 inches plus. Streaked reddish brown and gray loam consisting of saprolyte with horizontal schistose banding; friable; pH 6.2.
561512

Notes: Colors are for moist soil.

^{1/} This pedon is a taxadjunct because it is in the coarse-loamy family particle size class, whereas the Hollinger series is in the fine-loamy.

FEDON CLASSIFICATION: Typic Hapludalf; fine-loamy, mixed, mesic
SOIL Neshaminy taxadiunct SOIL Nos. S56Pa-15-10

LOCATION Chester County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 561541 - 561547

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1												3B2 Cm	Coarse fragments 3B1		
		1B1b Total			Sand					Silt					2A2 ≥ 2 < 76	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															
0-8	Ap	24.4	53.2	22.4	2.9	6.3	4.6	6.4	4.2	17.0	36.2	24.5	20.2	0.87	23		
8-13	B1	23.8	52.8	23.4	2.9	5.3	4.5	6.6	4.5	17.6	35.2	25.6	19.3	0.88	21		
13-18	B21t	23.1	50.1	26.8	2.7	5.5	4.3	6.2	4.4	13.5	36.6	24.4	18.7	0.84	26		
18-22	B22t	22.4	49.6	28.0	3.9	5.0	3.7	5.6	4.2	16.7	32.9	23.9	18.2	0.83	26		
22-28	B23t	21.8	51.9	26.3	3.1	5.2	3.9	5.6	4.0	17.0	34.9	24.0	17.8	0.78	34		
28-37	B3t	16.0	57.0	27.0	2.0	3.9	2.9	4.2	3.0	20.4	36.6	25.6	13.0	0.91	15		
37-48	C1	15.9	60.8	23.3	2.4	4.2	2.8	3.8	2.7	19.6	41.2	24.2	13.2	0.89	16		

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	Carbonate as CaCO ₃ Pct.	6C1a 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.	8C1c (1:1) KCl	8C1a (1:1) H ₂ O			
														pH	
0-8	2.00	0.157	13		2.8					28.9	12.6	0.19			6.5
8-13	0.30				3.2					26.2	12.3	0.17			6.7
13-18	0.18				3.4					28.0	14.3	0.17			6.8
18-22	0.13				3.5					27.0	14.8	0.16			6.6
22-28	0.14				3.1					27.1	14.4	0.14			6.8
28-37	0.06				2.9					29.7	14.6	0.21			6.7
37-48	0.08				2.6					29.3	13.0	0.25			6.6

Depth (in.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay 8D1			8D3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	CEC Sum		Ext. iron	15-bar water	Sum cations Pct.		5C1 NH ₄ OAc Pct.	
															meq/100 g
0-8	9.0	1.8	0.1	0.3	11.2	5.3	16.5			0.74	0.13	0.56	5.0	68	
8-13	4.5	1.5	0.1	0.1	6.2	3.6	9.8			0.42	0.14	0.53	3.0	63	
13-18	4.6	2.0	0.1	0.1	6.8	3.4	10.2			0.38	0.13	0.53	2.3	67	
18-22	4.8	2.6	0.1	0.2	7.7	3.6	11.3			0.40	0.13	0.53	1.8	68	
22-28	4.9	3.0	0.1	0.2	8.2	3.6	11.8			0.45	0.12	0.55	1.6	69	
28-37	5.2	3.1	0.1	0.2	8.6	3.8	12.4			0.46	0.11	0.54	1.7	69	
37-48	4.7	2.8	0.1	0.2	7.8	3.8	11.6			0.50	0.11	0.56	1.7	67	

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt	Chl.	Vm	Mi	Int	Qtz	Kl	Gibbsite
	7A2 X-ray				7A3			
0-8			x	x			xxx	
8-13							xxx	
13-18			x	x			xxx	
18-22							xx	
22-28			x	x			xx	
28-37							xxx	
37-48			x	x			xxx	

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.

Pedon Classification: Typic Hapludalf; fine-loamy, mixed, mesic

Soil: Neshaminy taxadjunct

Soil No.: S56Pa-15-10

Location: Chester County, Pennsylvania. Grant Steele farm, 5 miles SE of Honeybrook, in West Caln Twp. Sample 300 feet south of route T435 measuring from Philadelphic Electric Co., pole 519044. Aerial photo ARK 100-10.

Vegetation and land use: Alfalfa.

Slope and land form: 6 percent.

Erosion: Class 3; moderately severe sheet erosion.

Drainage: Well drained.

Permeability: Moderate.

Sampled by and date: Merrill Kunkle; F.G. Loughry; E. J. Pedersen, J. J. Noll, John Carey, G. M. Phibbs and Robert Zimmerman. November 1, 1956.

Horizon and
Beltsville
Lab. No.

Ap 561541	0 to 8 inches. Dark brown (10YR 4/4) fine silt loam, with fine and medium subangular blocky structure; friable when moist; pH 6.8; abrupt smooth boundary; thickness ranges from 6 to 8 inches.
B1 561542	8 to 13 inches. Yellowish red (5YR 4/6) silty clay loam with moderate medium blocky structure; firm when moist, somewhat plastic when wet; pH 7.2; gradual wavy lower boundary; thickness ranges from 3 to 5 inches.
B21t 561543	13 to 18 inches. Reddish brown (5YR 4/4) silty clay loam with moderate medium blocky structure; occasional dark coating or manganese stains; firm when moist, plastic and sticky when wet; pH 7.2; gradual wavy lower boundary; thickness varies from 3 to 7 inches.
B22t 561544	18 to 22 inches. Reddish brown (5YR 4/4) silty clay loam with moderate medium blocky structure, occasional dark coatings; firm when moist, plastic when wet; pH 7.2; gradual irregular lower boundary; thickness ranges from 4 to 10 inches.
B23t 561545	22 to 28 inches. Reddish brown (5YR 4/4) silty clay loam with strong medium blocky structure; occasional dark coating; firm when moist, plastic when wet; pH 7.2; gradual wavy lower boundary; thickness ranges from 4 to 10 inches.
B3t 561546	28 to 37 inches. Brown (7.5YR 5/4) silty clay loam with moderate to medium platy structure breaking to blocky; occasional dark coatings; firm when moist, sticky when wet; pH 6.8; gradual broken lower boundary; thickness ranges from 4 to 12 inches.
C1 561547	37 to 48 inches. Brown (7.5YR 4/4) silty clay loam with moderate medium platy structure breaking to blocky; firm when moist; sticky when wet; pH 6.8; similar material continues to varying depths over hard bedrock.

Notes: Colors are for moist soil.

¹/This pedon is a taxadjunct because it has higher base saturation than the Neshaminy series which is in the Ultic subgroup.

PEDON CLASSIFICATION: Typic Hapludalf; fine-loamy, mixed, mesic
SOIL Penn taxad,unct SOIL Nos. S56Pa-15-6

LOCATION Chester County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 561519 - 561522

Depth (In.)	Horizon	Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1		
		181b Total					Sand				Silt			2A2 2-76 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)	(2-0.1)				
0-8	Ap	38.6	47.1	14.3	2.5	7.0	9.7	13.5	5.9	19.3	27.8	31.4	32.7	15		
8-14	B21t	29.4	50.7	19.9	2.8	6.3	7.3	9.0	4.0	23.2	27.5	31.1	25.4	4		
14-23	B22t	19.6	57.2	23.2	0.9	3.3	4.5	6.5	4.4	21.3	35.9	28.9	15.2	3		
23-27	C	46.2	36.2	17.6	3.8	11.2	12.3	14.0	4.9	12.5	23.7	23.4	41.3	8		

Depth (In.)	6A1a Organic carbon Pct	6B1a Nitrogen Pct	C/N	Carbonate as CaCO ₃ Pct	6C1a 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	4B1c 1/2 bar Pct.		4B2 15 bar Pct.	8C1c (1-1) KCl	8C1a (1.1) H ₂ O			
														g/cc	g/cc
0-8	0.88	0.069	13		1.5					19.7	6.0			7.1	
8-14	0.23				2.2					21.3	8.3			6.7	
14-23	0.08				2.8					24.5	9.7			6.6	
23-27	0.06				2.1					18.9	6.5			6.6	

Depth (In.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay 8D1			8D3 Ca/Mg	Base saturation			
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	Ext. iron		15-bar water	CEC Sum	Ext. iron		15-bar water	Ca/Mg	5C3 Sum cations Pct.	5C1 NH ₄ OAc Pct.
0-8	8.7	1.0	0.1	0.2	10.0	1.0	10.9			0.77	0.10	0.42	8.7	91			
8-14	4.1	1.4	0.1	0.2	5.8	2.2	8.0			0.40	0.11	0.42	2.9	72			
14-23	4.4	1.4	0.1	0.2	6.1	2.0	8.1			0.35	0.12	0.42	3.1	75			
23-27	3.5	1.2	0.1	0.2	5.0	1.4	6.4			0.36	0.12	0.37	2.9	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.

Pedon Classification: Typic Hapludalf; fine-loamy, mixed, mesic

Soil: Penn taxadjunct ^{1/}

Soil No.: S56Pa-15-6

Location: Chester County, Pennsylvania. Jonathan Thorne farm, East Coventry Twp., 110 feet southwest of

Route 15125 opposite braced power and telephone pole west of farm buildings. Aerial photo AHK-44-56.

Vegetation and land use: Cropland. Alfalfa and bromegrass sod strip in strip cropped field.

Slope and land form: 10 percent.

Erosion: Moderately severe sheet erosion.

Drainage: Well drained.

Permeability: Moderate.

Sampled by and date: M. W. Kunkle, E. J. Pedersen, F. G. Loughry, J. J. Noll, J. B. Carey and party.

October 31, 1956.

Horizon and

Beltsville

Lab. No.

- Ap 0 to 8 inches. Dark reddish brown (2.5YR 3/4) silt loam with weak fine granular to weak sub-angular blocky structure, friable when moist; pH 7.2+ (limed); contains up to 22 percent sandstone fragments over 2mm; lower boundary is abrupt and smooth; thickness ranges from 7 to 9 inches.
- B21t 8 to 14 inches. Red (2.5YR 4/6) silt loam with weak medium subangular blocky structure, peds have moderate clay coatings; friable when moist, nonplastic when wet; pH 7.2; contains about 30 percent sandstone fragments concentrated near the bottom of the horizon which appears to be the residue of a sandstone stratum; abrupt irregular lower boundary; thickness ranges from 4 to 7 inches.
- B22t 14 to 23 inches. Weak red (10R 4/4) silty clay loam, with moderate medium to coarse blocky structures, ped faces have distinct clay coatings; firm when moist, slightly plastic when wet; pH 7.2; contains about 30 percent coarse fragments; clear irregular lower boundary; thickness ranges from 6 to 11 inches.
- C 23 to 27 inches. Dusky red to weak red (10R 3/4 to 4/4) channery loam, containing 70 to 80 percent coarse fragments, with moderate coarse blocky to coarse platy structure, clay coats on plate faces and on stones; hard when dry, firm when moist, nonplastic when wet; pH 6.8.
- R 27 inches plus. Stratified sandstone, siltstone and shale. Alfalfa roots are abundant to 27 Not sampled inches. There are numerous large earthworms.

Notes: Colors are for moist soil.

^{1/}This pedon is a taxajunct because the base saturation is high enough for placement in the Typic subgroup, whereas the Penn series is in the Ultic subgroup.

FEDON CLASSIFICATION: Typic Hapludalf, fine-silty, mixed, mesic
SOIL *Conestoga taxadjunct* SOIL Nos. 855Pa-36-11

LOCATION Lancaster County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 551600 - 551607

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1		
		181b Total			Sand					Silt				2A2 ≥ 2 < 76 Pct.	2-19 Pct.	19-76 Pct.
		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)				
0-3	A1	17.3	63.9	18.8	1.4	1.9	1.3	4.6	8.1	21.2	42.7	32.3	9.2			
3-11	A2	15.3	64.6	20.1	0.9	1.6	1.3	4.2	7.3	20.6	44.0	30.6	8.0	tr.		
11-15	B1	13.7	61.1	25.2	1.4	1.4	1.1	3.4	6.4	19.9	41.2	28.6	7.3	tr.		
15-20	B21t	11.6	56.9	31.5	0.9	1.2	1.0	3.2	5.3	18.4	38.5	25.8	6.3	tr.		
20-30	B22t	14.0	56.1	29.9	1.7	1.9	1.2	3.6	5.6	20.4	35.7	28.4	8.4	tr.		
30-37	B23t	13.2	59.7	27.1	1.5	1.6	1.2	3.5	5.4	21.1	38.6	28.8	7.8	tr.		
37-43	B3t	15.5	48.0	36.5	0.9	1.5	1.3	4.5	7.3	15.4	32.6	25.7	8.2	tr.		
43-56	C	20.5	37.1	42.4	1.9	2.1	1.6	5.5	9.4	13.2	23.9	26.2	11.1	8		

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		
						g/cc	4A1e 1/2 bar g/cc	4A1h Oven dry g/cc		Pct.	4B1c 1/2 bar Pct.	4B2 15 bar Pct.		8C1c (1:1) KCl	8C1a (1:1) H ₂ O	
0-3	5.2															5.9
3-11	0.79															4.9
11-15	0.30															4.7
15-20	0.23															4.9
20-30	0.19															5.0
30-37	0.12															5.0
37-43	0.11															5.0
43-56	0.12															5.1

Depth (in.)	Extractable bases 6B1a					6H1a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay 8D1			8O3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	CEC Sum		Ext. iron	15-bar water	Sum cations Pct.		5C1 NH ₄ OAc Pct.	
0-3	9.7	2.6	tr.	0.6	12.9	11.7	24.6			1.31		3.7		52	
3-11	1.0	0.6	tr.	0.2	1.8	7.1	8.9			0.44				20	
11-15	0.8	0.6	tr.	0.2	1.6	8.6	10.2			0.40				16	
15-20	1.4	1.9	tr.	0.3	3.6	8.9	12.5			0.40		0.7		29	
20-30	1.0	3.5	tr.	0.3	4.8	6.1	10.9			0.36		0.3		44	
30-37	0.7	2.8	tr.	0.2	3.7	6.5	10.2			0.38				36	
37-43	0.6	1.9	tr.	0.2	2.7	8.9	10.6			0.32				25	
43-56	0.8	3.6	0.1	0.2	4.7	9.2	13.9			0.33				34	

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt.	Chl.	Vm.	Mi.	Int.	Qtz.	Kl.	Gibbsite
0-3								
3-11		xx	xx	x			xx	
11-15								
15-20		x	xx	xx			xx	
20-30								
30-37								
37-43			xxxx	x			xxxx	
43-56								

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.

Pedon Classification: Typic Hapludalf, fine-silty, mixed, mesic

Soil: Conestoga taxadjunct~~us~~

Soil No.: 855Pa-36-11

Location: Lancaster County, Pennsylvania. 1/2 mile east of New Danville, in woods on Elem H. Myers farm, 100 feet north and 100 feet west of southeast corner of woods. Aerial photo No. R-7-43.

Vegetation and land use: Forest - white oak, red oak, tulip poplar, scarlet oak, red maple, sassafras, dogwood, and hickory.

Slope and land form: 3 percent.

Drainage: Well drained.

Permeability: Moderate.

Described by: F. G. Loughry.

Horizon and

Beltsville

Lab. No.

O1	1-1/2 to 1/2 inch.	Mixed hard wood leaves; abrupt wavy boundary.
Not sampled		
O2	1/2 inch to 0.	Dark reddish brown (5YR 2/2) leaf mold; neutral; abrupt wavy boundary.
Not sampled		
A1	0 to 3 inches.	Very dark grayish brown (10YR 3/2) silt loam with medium fine to medium granular structure; very friable; slightly acid; clear wavy boundary.
551600		
A2	3 to 11 inches.	Dark yellowish brown to yellowish brown (10YR 4/4 - 5/4) silt loam with weak medium platy breaking to weak fine granular structure; strongly acid; clear wavy boundary.
551601		
B1	11 to 15 inches.	Yellowish brown (10YR 5/4 - 5/6) heavy silt loam with moderate medium to fine subangular blocky structure; friable; strongly acid; clear wavy boundary.
551602		
B21t	15 to 20 inches.	Yellowish brown to strong brown (Crushed color 10YR 5/6, ped faces 7.5YR 5/6) heavy silt loam with moderate, medium blocky structure; firm; strongly acid; gradual wavy boundary; ped faces slightly coated.
551603		
B22t	20 to 30 inches.	Yellowish brown to strong brown (crushed color 10YR 5/6, ped faces 7.5YR 5/6) heavy silt loam with moderate medium blocky structure; firm; strongly acid; gradual wavy boundary.
551604		
B23t	30 to 37 inches.	Yellowish brown to strong brown (crushed color 10YR 5/6, ped faces 7.5YR 5/6) heavy silt loam with moderate medium blocky structure; firm; strongly acid; gradual wavy boundary; ped faces moderately coated with clay.
551605		
B3t	37 to 43 inches.	Yellowish brown (10YR 5/6) heavy silt loam with moderate medium blocky structure; friable; strongly acid; gradual boundary; ped faces coated with clay.
551606		
C	43 to 56 inches plus.	Strong brown streaked with yellowish brown (7.5YR 5/6 - 10YR 5/6) silt loam with platy structure; strongly acid.
551607		

Notes: Colors are for moist soil.

^{1/}This pedon was sampled as a representative of the Conestoga series but differs in family particle size class. Conestoga is in the fine-loamy class.

FEDON CLASSIFICATION: Ultic Hapludalf; loamy-skeletal, mixed, mesic

SOIL Weshaminy taxadjunct

SOIL Nos. S56Pa-15-9

LOCATION Chester County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 561534 - 561540

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1		
		Total				Sand					Silt			2A2 > 2 < 76 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)				
0-7	Ap	27.0	53.0	20.0	2.5	6.3	5.7	7.7	4.8	20.8	32.2	29.6	22.2	23		
7-12	A3	31.5	47.9	20.6	4.3	7.5	6.1	8.2	5.4	18.3	29.6	27.9	26.1	12		
12-19	B2lt	31.4	41.5	27.1	4.1	7.5	6.1	8.2	5.5	16.7	24.8	26.5	25.9	23		
19-28	B22t	32.3	36.9	30.8	5.0	7.6	6.0	8.1	5.6	13.5	23.4	23.3	26.7	14		
28-35	B23t	34.4	36.7	28.9	4.3	8.0	6.6	9.1	6.4	14.9	21.8	26.1	28.0	9		
35-41	B3t	33.0	37.8	29.2	4.1	8.1	6.4	8.4	6.0	13.3	24.5	23.8	27.0	5		
41-58	C1	40.6	24.0	35.4	5.8	12.5	7.8	9.0	5.5	7.4	16.6	17.4	35.1	7		

Depth (in.)	6A1a Organic carbon Pct.	Nitrogen Pct.	C/N	Carbonate as CaCO ₃ Pct.	6C1a Ext. iron as Fe Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH	
						g/cc	4A1e 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	
0-7	1.93	0.158	12		2.2					26.5	9.5				
7-12	0.36	0.045	8		2.7					23.3	9.1				6.4
12-19	0.20				3.5					23.3	11.7				6.2
19-28	0.10				3.6					23.6	13.2				6.0
28-35	0.08				3.5					24.8	13.8				5.9
35-41	0.04				3.7					24.9	14.2				5.2
41-58	0.06				3.3					23.7	15.6				4.9

Depth (in.)	Extractable bases 5B1s					6H1a Ext. acidity	CEC		6G1d Ext Al	Ratios to clay 8D1			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.
0-7	7.5	1.6	0.1	0.3	9.5	6.5	16.0			0.80	0.11	0.48	4.7		59
7-12	4.0	1.0	0.1	0.2	5.3	4.3	9.6			0.47	0.13	0.44	4.0		55
12-19	4.1	1.3	0.1	0.2	5.7	4.7	10.4			0.38	0.13	0.43	3.2		55
19-28	4.1	1.5	0.1	0.2	5.9	5.8	11.7			0.38	0.12	0.43	2.7		50
28-35	3.3	2.0	0.1	0.2	5.6	6.0	11.6			0.56	0.12	0.48	1.7		48
35-41	2.4	2.3	0.1	0.2	5.0	6.6	11.6			0.40	0.13	0.49	1.0		43
41-58	1.6	1.8	0.1	0.2	3.7	6.6	10.3			0.29	0.09	0.44	0.9		36

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt	Chl.	Vm.	Mi.	Int.	Qtz.	Kl.	Gibbsite
	7A2 X-ray				7A3			
0-7			x	xxxx				
7-12				xx	x		xx	
12-19				xx	x		xx	
19-28					x		x	
28-35					x			
35-41							xx	
41-58							xx	

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.

Pedon Classification: Ultic Hapludalf; loamy-skeletal, mixed, mesic

Soil: Neshaminy taxadjunct ^{1/}

Soil No.: S56Pa-15-9

Location: Chester County, Pennsylvania. L. L. Smith farm, West Cain Twp., 1 mile east of Martin's Corner, 140 feet south of route Th37 and 40 feet east of woods. Aerial photo AHK-100-10.

Vegetation and land use: Cropland, timothy hay.

Slope and land form: 7 percent.

Erosion: Moderate sheet erosion where sampled.

Drainage: Well drained.

Permeability: Moderate.

Sampled by and date: Merrill Kunkle, F. G. Loughry, E. J. Pedersen, J. J. Noll, G. M. Phibbs, J. B. Carey and Robert Zimmerman. November 1, 1956.

Horizon and

Beltsville

Lab. No.

- Ap
561534 0 to 7 inches. Dark brown (10YR 4/3) gravelly silt loam, with weak subangular blocky structure breaking to weak fine granular; contains about 25 percent rock fragments, 1 to 4 inches in diameter; friable when moist, pH 6.8; abrupt smooth lower boundary; thickness ranges from 6 to 8 inches.
- A3
561535 7 to 12 inches. Strong brown (7.5YR 5/6) gravelly fine silt loam with moderate medium subangular blocky structure with some platiness at top; contains about 25 percent rock fragments 1 to 4 inches in diameter; friable consistence when moist, pH 7.2; clear irregular lower boundary; thickness ranges from 2 to 15 inches.
- B21t
561536 12 to 19 inches. Yellowish brown (10YR 5/6) gravelly clay loam, with moderate medium blocky structure, clay coats on peds; contains about 35 percent rock fragments 2 to 8 inches in diameter, firm when moist and slightly sticky when wet; pH 6.4; gradual wavy lower boundary; thickness ranges from 0 to 9 inches.
- B22t
561537 19 to 28 inches. Yellowish brown (10YR 5/6) gravelly clay loam with weak medium blocky structure; continuous clay coats on peds, contains 35 percent stones 2 to 8 inches in diameter, firm when moist, slightly sticky and slightly plastic when wet; pH 6.2; gradual wavy lower boundary; thickness ranges from 7 to 11 inches.
- B23t
561538 28 to 35 inches. Yellowish brown (10YR 5/6) gravelly clay loam with weak medium platy structure; prominent clay coatings and some black coatings on peds; contains about 35 percent of rock fragments 2 to 8 inches in diameter; firm when moist, slightly sticky and slightly plastic when wet; pH 6.2; clear irregular lower boundary; thickness ranges from 5 to 9 inches.
- B3t
561539 35 to 41 inches. Yellowish brown (10YR 5/6) stony clay loam, with weak medium platy structure; partial clay coats on peds; contains about 45 percent stones 4 to 10 inches in diameter, firm when moist, nonplastic when wet; pH 6.0; clear broken boundary; thickness ranges from 4 to 8 inches.
- C1
561540 41 to 58 inches. Red (2.5YR 4/8) stony coarse sandy clay loam with weak medium platy structure; peds near top of horizon have a few clay coats; contains about 30 percent rock fragments 4 to 10 inches in diameter; friable when moist; pH 5.4; similar material continues to varying depths over hard bed rock.

Notes: Colors are for moist soil.

^{1/}This pedon is a taxadjunct because it just exceeds the coarse fragment maximum of the fine-loamy family particle size class and because hues are yellower than in the Neshaminy series. Neshaminy is in the fine-loamy class.

PEDON CLASSIFICATION: Ultic Hapludalf; coarse-loamy, mixed, mesic

SOIL Brecknock taxadjunct SOIL Nos. 856Pa-15-12 LOCATION Chester County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 561556 - 561561

Depth (In.)	Horizon	1B1b Size class and particle diameter (mm) SAI											3B2 Cm	3B1 Coarse fragments		
		Total			Sand					Silt				2A2 ≥ 2 < 76 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)	Int. III (0.05-0.02) (0.02-0.002)	Int. II (0.2-0.02) (2-0.1)					
0-2	A1	26.5	60.1	13.4	2.9	3.0	3.0	7.4	10.2	26.6	33.5	41.6	16.3			
2-10	A2	23.7	61.6	14.7	1.3	2.4	2.9	7.0	10.1	23.2	38.4	38.1	13.6			
10-15	B1	29.3	55.1	15.6	1.8	2.7	2.9	8.7	13.2	21.9	33.2	40.9	16.1			
15-20	B2t	32.9	46.4	20.7	2.6	3.4	3.3	9.5	14.1	18.6	27.8	39.2	18.8			
20-30	B3	36.0	49.4	14.6	3.4	5.8	5.5	10.2	11.1	11.1	38.3	28.5	24.9			
30-36	C1	59.6	18.6	21.8	4.0	10.1	12.1	21.5	11.9	8.0	10.6	31.6	47.7			
Depth (In.)	6A1a Organic carbon Pct.	Nitrogen Pct.	C/N	Carbonate as CaCO ₃ Pct.	6C1a 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 g/cc		4B1c ½ bar Pct.	4B2 15 bar Pct.	4C1 KCl (1:1)		4C1a H ₂ O (1:1)		
0-2	3.15	0.138	23		1.0						30.8	6.7			4.3	
2-10	0.77	0.054	14		1.0						26.2	5.8			4.3	
10-15	0.39	0.038	10		1.2						24.5	7.1			4.4	
15-20	0.27				1.5						22.1	9.3			4.7	
20-30	0.16				2.4						24.8	16.0			4.5	
30-36	0.08				1.5						16.3	9.8			4.6	
Depth (In.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6G1d Ext Al	Ratios to clay 5D1			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.	
0-2	1.0	0.4	0.1	0.2	1.7	14.5	16.2				1.21	0.07	0.50		10	
2-10	0.4	0.1	tr.	0.2	.7	8.8	9.5				0.65	0.07	0.39		8	
10-15	0.6	0.3	tr.	0.1	1.0	7.3	8.3				0.53	0.08	0.46		12	
15-20	2.5	0.9	tr.	0.2	3.6	6.9	10.5				0.51	0.07	0.45		34	
20-30	2.9	1.1	tr.	0.2	4.2	11.9	16.1				1.10	0.16	1.10	2.6	26	
30-36	3.2	1.1	tr.	0.1	4.4	7.1	11.5				0.53	0.07	0.45	2.9	38	
Depth (In.)	Clay Fraction Analysis 7A1b-d															
	Mt.	Chl.	Vm	Mi.	Int.	Qtz.	Kl.	Gibbsite								
0-2																
2-10																
10-15			xxx	x			xxx									
15-20			xxx	x			xxx									
20-30			xxx	x			xxx									
30-36			xx	x			xxx									

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.

Pedon Classification: Ultic Hapludalf; coarse-loamy, mixed, mesic

Soil: Brecknock taxadjunct ^{1/}

Soil No.: S56Pa-15-12

Location: Chester County, Pennsylvania. Hill School property, North Coventry Twp., One mile north of Harmonyville, 300 feet west of sharp bend in route 15130, in woods 100 feet south of southwest corner of field on line toward shagbark hickory, 25 feet north of hickory. Aerial photo ANK-43-44.

Vegetation and land use: Second growth forest. Tulip poplar, red oak, birch, white oak, hickory, wild cherry, red cedar; red maple, dogwood, beech. Ground cover of viburnum, greenbrier, blackberry, sassafras, birch seedlings, moss, and ground pine (lycopodium).

Slope and land form: 10 percent.

Erosion: No apparent erosion at this site.

Drainage: Well drained.

Permeability: Moderate.

Sampled by and date: Merrill Kunkle, F. Glade Loughry, E. J. Pedersen, J. J. Noll, J. B. Carey, G. M. Phibbs, and Robert Zimmerman. November 1, 1956.

Horizon and
Beltsville
Lab. No.

O1	2 to 1 inch.	Hardwood leaf litter.
Not sampled		
O2	1 inch to 0.	Black leaf mold, pH 5.2.
Not sampled		
A1	0 to 2 inches.	Very dark grayish brown (2.5Y 3/2) stony silt loam with weak fine granular structure, very friable when moist; pH 5.2; contains about 25 percent coarse quartzite fragments, clear wavy lower boundary; thickness ranges from 1 to 2-1/2 inches.
561556		
A2	2 to 10 inches.	Grayish brown to dark grayish brown (2.5Y 5/2 to 4/2) stony silt loam, with weak fine platy to weak medium subangular blocky structure; friable when moist; pH 5.4; contains about 25 percent coarse fragments; clear wavy lower boundary; thickness ranges from 7 to 9 inches.
561557		
B1	10 to 15 inches.	Dark grayish brown (2.5Y 4/2) stony fine silt loam with weak medium subangular blocky structure with partial clay coats on peds; friable when moist; pH 5.4, contains about 25 percent coarse fragments; clear wavy lower boundary; thickness ranges from 4 to 8 inches.
561558		
B2t	15 to 20 inches.	Dark grayish brown to dark brown (10YR 4/2 to 4/3) stony fine silt loam, with moderate medium blocky structure; firm in place when moist, slightly plastic when wet; pH 5.6; contains about 25 percent coarse fragments; abrupt irregular lower boundary; thickness ranges from 4 to 6 inches.
561559		
B3	20 to 30 inches.	Brown (7.5YR 4/4) with slightly reddish hue stony silty clay loam; with moderate medium blocky structure; firm when moist, moderately plastic when wet; pH 5.2; contains about 25 percent coarse fragments; clear wavy lower boundary; thickness ranges from 7 to 12 inches.
561560		
C1	30 to 36 inches plus.	Strong brown (7.5YR 5/6) with reddish hue stony sandy loam, structureless; friable consistence; pH 5.2.
561561		

Notes: Colors are for moist soil.

^{1/}This pedon is a taxadjunct because it is in the coarse-loamy family particle size class, whereas the Brecknock series is in the fine-loamy class. The divergence is less than 1 percent clay.

PEDON CLASSIFICATION: Ultic Hapludalf; fine-loamy, mixed, mesic
SOIL Penn silt loam SOIL Nos. S56Pa-15-8

LOCATION Chester County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 561529 - 561533

Depth (in.)	Horizon	1B1b Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1			
		Total			Sand					Silt				2A2 > 2 < 76 Pct.	2-19 Pct. of < 76mm	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)	Int. III (0.2-0.02)	Int II (2-0.1)					
0-9	Ap	43.0	41.3	15.7	1.9	2.5	4.0	18.0	16.0	18.1	23.2	46.8	26.4	0.94	10		
9-13	B21t	34.3	45.5	20.2	0.7	2.0	1.9	11.0	18.7	22.7	22.8	49.4	15.6	0.78	32		
13-21	B22t	41.4	39.9	18.7	0.6	1.7	1.6	13.9	23.6	19.7	20.2	54.3	17.8	0.99	2		
21-24	B3t	27.3	50.3	22.4	0.2	1.2	1.8	7.6	16.5	23.9	26.4	45.9	10.8	0.91	15		
24-33	C	58.2	24.7	17.1	0.7	9.7	11.0	23.2	13.6	8.3	16.4	35.5	44.6	0.97	6		

Depth (in.)	6A1a Organic carbon Pct	6B1a Nitrogen Pct.	C/N	Carbonate as CaCO ₃ Pct	6C1a Ext. iron as Fe Pct	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH	
						4A1e $\frac{1}{2}$ bar g/cc	4A1h Oven dry g/cc	4B1c $\frac{1}{2}$ bar Pct.		4B2 15 bar Pct.	8C1c (1:1) KCl	8C1a (1:1) H ₂ O			
														g/cc	g/cc
0-9	1.11	0.102	11		1.6					21.8	7.0	0.20		6.5	
9-13	0.14				2.2					20.9	9.1	0.15		5.6	
13-21	0.04				2.2					20.6	8.4	0.20		5.5	
21-24	0.06				2.2					23.9	9.4	0.20		4.4	
24-33	0.02				2.0					22.0	8.7	0.16		4.6	

Depth (in.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay 8D1			8D3 Ca/Mg	Base saturation			
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	Ext. Iron		15-bar water	CEC Sum	Ext Iron		15-bar water	Cs/Mg	5C3 Sum cations Pct.	5C1 NH ₄ OAc Pct.
0-9	7.2	1.9	0.1	0.3	9.5	3.0	12.4			0.80	0.10	0.45	3.8	76			
9-13	4.9	2.2	0.1	0.2	7.4	3.4	10.8			0.53	0.11	0.45	2.2	68			
13-21	4.6	2.7	0.1	0.2	7.6	3.0	10.6			0.57	0.12	0.45	1.7	72			
21-24	3.7	3.1	0.1	0.3	7.2	9.6	16.8			0.75	0.10	0.42	1.2	43			
24-33	1.7	2.2	0.1	0.2	4.2	10.4	14.6			0.85	0.12	0.51	0.8	29			

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

Pedon Classification: Ultic Hapludalf; fine-loamy, mixed, mesic
 Soil: Penn silt loam^{1/}
 Soil No.: S56Pa-15-8
 Location: Chester County, Pennsylvania. Sunny Slope Dairy Farm No. 2. East Vincent Twp., 1/2 mile north of Hiestand, 300 feet west of barn. Aerial photo ANK-68-26.
 Vegetation and land use: Cropland. Red clover and timothy sod.
 Slope and land form: 10 percent.
 Erosion: Moderately severe sheet erosion.
 Drainage: Well drained.
 Permeability: Moderate.
 Sampled by and date: Merrill Kunkle, E. J. Pedersen, F. G. Loughry, J. J. Noll, J. B. Carey, G. M. Phibbs. October 31, 1956.

Horizon and
 Beltsville
 Lab. No.

Ap 561529	0 to 9 inches. Dark reddish brown (2.5YR 3/4) silt loam with weak fine to medium subangular blocky structure; friable consistence when moist, pH 7.2+ (limed) gradual irregular lower boundary apparently due to subsoiling; thickness ranges from 8 to 13 inches.
B21t 561530	9 to 13 inches. Reddish brown (2.5YR 4/4) silt loam, with weak medium subangular blocky structure, prominent clay coats on peds, friable when moist, pH 6.8; gradual wavy lower boundary; thickness ranges from 1 to 6 inches.
B22t 561531	13 to 21 inches. Dark reddish brown (2.5YR 3/4) silt loam with moderate medium subangular blocky structure, prominent clay coats on peds; hard consistence when dry, firm when moist, pH 6.3; clear wavy lower boundary; thickness ranges from 5 to 7 inches.
B3t 561532	21 to 24 inches. Dark reddish brown (5YR 3/3) loam with moderate medium platy structure, firm in place, pH 5.8; abrupt wavy lower boundary; thickness ranges from 1 to 5 inches.
C1 561533	24 to 33 inches. Strong brown (7.5YR 5/6) fine sandy loam weathered sandstone, with moderate medium and coarse platy structure, friable, pH 5.2. Parent material is triassic shale and arkosic sandstone containing considerable weathered sandstone.

Notes: Colors are for moist soil.

^{1/}Classification based on paralithic contact at 24 inches.

PEDON CLASSIFICATION: Ultic Hapludalf; fine-silty, mixed, mesic
SOIL Duffield taxadjunct

SOIL Nos. 855Pa-36-6

LOCATION Lancaster County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 551565 - 551571

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1		
		Total			Sand					Silt				2A2 ≥ 2 < 76 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 (0.02- 0.002)	Int. II (0.2-0.02)	(2-0.1)				
0-5	A1	4.5	75.8	19.7	0.3	0.4	0.2	0.8	2.8	20.0	55.8	23.2	1.7	-		
5-14	A2	8.5	73.0	18.5	0.7	0.9	0.6	1.5	4.8	23.5	49.5	29.2	3.7	5		
14-19	B1	8.2	72.1	19.7	1.1	0.8	0.6	1.4	4.3	24.3	47.8	29.4	3.9	tr.		
19-28	B21t	10.2	62.3	27.5	1.0	1.1	0.8	1.8	5.5	21.7	40.6	26.3	4.7	tr.		
28-34	B22t	13.7	50.3	36.0	1.5	1.5	0.9	2.3	7.5	16.9	33.4	25.9	6.2	tr.		
34-43	B3t	16.7	47.4	35.9	2.3	1.9	1.1	2.6	8.8	17.3	30.1	27.7	7.9	tr.		
43-56	C	16.5	46.8	36.7	1.7	1.7	0.9	2.6	9.6	16.4	30.4	27.7	6.9	tr.		
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		
						g/cc	4A1e 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		
0-5	3.39				1.7										5.0	
5-14	1.15				1.6										4.5	
14-19	0.29				1.8										4.4	
19-28	0.18				2.7										4.8	
28-34	0.12				3.6										5.2	
34-43	0.07				3.7										5.2	
43-56	0.10				3.9										5.1	
Depth (in.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay 8D1			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															
0-5	5.5	1.2	tr.	0.6	7.3	17.0	24.3		1.23	0.09		4.6		30		
5-14	0.5	1.5	tr.	0.3	2.3	12.6	14.9		0.81	0.09				15		
14-19	0.4	0.5	tr.	0.2	1.1	8.0	9.1		0.46	0.09				12		
19-28	1.5	2.0	tr.	0.2	3.7	8.4	12.1		0.44	0.10	8.4	0.8		30		
28-34	2.2	3.8	0.1	0.3	6.4	7.4	13.8		0.38	0.10		0.6		46		
34-43	2.1	3.4	tr.	0.3	5.8	7.6	13.4		0.37	0.10		0.6		43		
43-56	1.8	3.1	tr.	0.2	5.1	7.4	12.5		0.34	0.11		0.6		41		
Depth (in.)	Clay Fraction Analysis 7A1b-d															
	Mt.	Chl.	Vm.	Mi.	Int.	Qtz.	Kl.	Gibbsite								
	7A2 X-ray				7A3											
0-5																
5-14	xx	xx	x				xx									
14-19																
19-28																
28-34	x	x	x				x									
34-43																
43-56	x	x	x				xx									

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.

Pedon Classification: Ultic Hapludalf; fine-silty, mixed, mesic

Soil: Duffield taxadjunct^{1/}

Soil No.: S55Pa-36-6

Location: Lancaster County, Pennsylvania. 3/4 mile southeast of Bareville, in woodlot on Titus Hess farm.

North edge of woodlot 20 feet from field. Aerial photo No. R-5-13.

Vegetation and land use: Woodlot (grazed) - white oak, red oak, wild cherry, and hickory.

Slope and land form: 4 percent.

Drainage: Well drained.

Permeability: Moderate.

Described by: F. G. Loughry.

Horizon and

Beltsville

Lab. No.

O2	1/2 inch to 0. Dark reddish brown (5YR2/2) leaf mold.
Not sampled	
A1 551565	0 to 5 inches. Dark brown (7.5YR 3/2) silt loam with weak fine granular structure; very friable; medium acid; clear wavy boundary.
A2 551566	5 to 14 inches. Dark brown (7.5YR 4/4) silt loam with weak medium platy structure; friable; very strongly acid; clear wavy boundary.
B1 551567	14 to 19 inches. Yellowish brown (10YR 5/4) heavy silt loam with weak medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.
B21t 551568	19 to 28 inches. Yellowish brown to dark yellowish brown (10YR 5/4 - 4/4) heavy silt loam with moderate medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.
B22t 551569	28 to 34 inches. Yellowish red (5YR 4/6) silty clay loam with moderate medium blocky structure; firm; strongly acid; gradual wavy boundary; dark coatings on peds.
B3t 551570	34 to 43 inches. Yellowish red (5YR 4/8) silty clay loam with moderate medium blocky structure; very firm; strongly acid; clear irregular boundary; some manganese coatings on peds.
C 551571	43 to 56 inches plus. Yellowish red (5YR 5/6) weathered limestone with weak coarse platy structure; firm; strongly acid; abrupt irregular boundary, some manganese coatings.

Notes: Colors are for moist soil.

^{1/}This pedon is a taxadjunct because the control section is siltier than in the Duffield series which is in the fine-loamy family particle size class.

FEDON CLASSIFICATION: Ultic Hapludalf; fine, mixed, mesic

SOIL Montalto silt loam SOIL Nos. S55Pa-36-7 LOCATION Lancaster County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 551572 - 551579

Depth (In.)	Horizon	1B1b Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1		
		Total				Sand				Silt				2A2 4.75 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 (0.25-0.1)	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)				
0-2	A1	15.3	64.8	19.9	2.9	2.8	1.5	3.2	4.9	24.5	40.3	31.2	10.4			
2-11	A2	12.3	65.6	22.1	1.8	2.2	1.4	2.5	4.4	24.9	40.7	30.8	7.9			
11-15	B1	11.1	59.3	29.6	1.7	1.8	1.2	2.3	4.1	21.0	38.3	26.5	7.0			
15-19	B21t	11.5	50.9	37.6	1.8	2.1	1.3	2.5	3.8	17.6	33.3	22.8	7.7			
19-26	B22t	11.8	37.2	51.0	1.4	1.5	1.2	2.9	4.8	10.5	26.7	17.0	7.0			
26-35	B23t	11.7	35.8	52.5	0.9	1.5	1.2	3.1	5.0	9.2	26.6	16.2	6.7			
35-51	B3	12.2	34.0	53.8	0.3	1.2	1.1	3.6	6.0	8.5	25.5	16.9	6.2			
51-60	C	14.6	31.6	53.8	0.8	1.9	1.4	4.1	6.4	8.1	23.5	17.1	8.2			

Depth (In.)	6A1a Organic carbon Pct.	Nitrogen Pct.	C/N	Carbonate as CaCO ₃ Pct.	6C1a 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	4B1c 1/2 bar Pct.		4B2 15 bar Pct.	8C1c (1:1) KCl	8C1a (1:1) H ₂ O			
														g/cc	g/cc
0-2	5.0				3.4										4.7
2-11	0.64				3.6										4.7
11-15	0.28				4.6										5.1
15-19	0.20				5.9										5.3
19-26	0.19				7.8										5.3
26-35	0.13				8.0										5.2
35-51	0.13				8.8										5.1
51-60	0.14				9.5										5.2

Depth (In.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay 8D1			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
0-2	2.4	1.6	tr.	0.5	4.5	18.8	23.3		1.17	0.17	1.5	19			
2-11	0.3	0.5	0.1	0.2	1.1	9.8	10.9		0.49	0.16		10			
11-15	1.0	1.2	tr.	0.2	2.4	8.2	10.6		0.36	0.16	0.8	23			
15-19	2.0	3.9	0.1	0.2	6.2	8.9	15.1		0.40	0.16	0.5	41			
19-26	3.2	6.1	0.1	0.2	9.6	10.2	19.8		0.39	0.15	0.5	48			
26-35	2.9	3.5	0.1	0.2	6.7	10.7	17.4		0.33	0.15	0.8	39			
35-51	1.9	4.8	0.1	0.2	7.0	12.9	19.9		0.37	0.16	0.4	35			
51-60	2.4	4.0	0.2	0.2	6.8	12.7	19.5		0.36	0.18	0.6	35			

Depth (In.)	Clay Fraction Analysis 7A1b-d							
	Mt.	Chl.	Vm	Mi.	Int.	Qtz.	Kl.	Gibbsite
	7A2 X-ray				7A3			
0-2								
2-11		xx					xxx	
11-15								
15-19		x					xxx	
19-26								
26-35								
35-51		xx					xxx	
51-60								

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.

Pedon Classification: Ultic Hapludalf; fine, mixed, mesic

Soil: Montalto silt loam

Soil No.: S55Pa-36-7

Location: Lancaster County, Pennsylvania. 1-1/2 miles northwest of Newville, 200 feet north of sawmill, 75 feet west of road. Aerial photo No. AHG-10-38

Vegetation and land use: Forest - scarlet oak, white oak, virginia pine, hickory, tulip poplar, red oak, dogwood, red maple, and birch.

Slope and land form: 2 percent.

Drainage: Well drained.

Permeability: Moderate.

Described by: F. G. Loughry.

Horizon and
Beltsville
Lab. No.

O1	2 to 1 inch.	Mixed hardwood leaves; clear wavy boundary.
Not sampled		
O2	1 inch to 0.	Well rotted leaf litter; abrupt wavy boundary.
Not sampled		
A1	0 to 2 inches.	Dark brown (7.5YR 3/2) silt loam with weak fine granular structure very friable; very strongly acid; clear wavy boundary.
551572		
A2	2 to 11 inches.	Reddish brown (5YR 4/3 - 4/4) silt loam with acid; abrupt wavy boundary.
551573		
B1	11 to 15 inches.	Yellowish red (5YR 5/6) light silty clay loam with weak fine subangular blocky structure; friable when moist, slightly sticky when wet; medium acid; gradual wavy boundary.
551574		
B21t	15 to 19 inches.	Yellowish red (5YR 4/8) silty clay loam with weak fine blocky structure; firm when moist and sticky somewhat plastic when wet; medium acid; gradual wavy boundary; few manganese coatings.
551575		
B22t	19 to 26 inches.	Red (2.5YR 4/6 - 4/8) silty clay loam with strong medium blocky structure; firm when moist, sticky and plastic when wet; medium acid; gradual wavy boundary; manganese coatings.
551576		
B23t	26 to 35 inches.	Red (2.5YR 4/6 - 4/8) silty clay loam with strong medium blocky structure; firm when moist, sticky and plastic when wet; slightly acid; gradual wavy boundary; distinct clay coatings.
551577		
B3	35 to 51 inches.	Red (2.5YR 5/6 - 4/6) light silty clay loam with weak medium platy structure; firm when moist, slightly sticky when wet; slight acid; gradual wavy boundary; few manganese coatings.
551578		
C	51 to 60 inches plus.	Yellowish red (5YR 5/8 - 5/6) light silty clay loam with weakly platy structure; friable; medium acid.
551579		

Notes: Colors are for moist soil.

FEDON CLASSIFICATION: Ultic Hapludalf; fine, mixed, mesic

SOIL Montalto silt loam SOIL Nos. 855Pa-36-10 LOCATION Lancaster County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 551580 - 551587

Depth (in.)	Horizon	181b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments			
		Total		Sand							Silt			3B2	2A2	3B1	
		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)	0.05-0.02	Int. III (0.02-0.002)	Int. II (0.2-0.02)			(2-0.1)	> 2 < 76	2-19
Pct. of < 2 mm																	
0-4	A1	19.7	64.0	16.3	2.6	3.4	2.1	4.9	6.7	17.2	46.8	26.8	13.0	-	-	-	
4-8	A2	14.9	59.0	26.1	1.4	2.5	1.7	3.7	5.6	15.8	43.2	23.8	9.3	-	-	-	
8-12	B1t	12.7	56.5	30.8	1.3	2.0	1.3	3.1	5.0	14.8	41.7	21.8	7.7	32	-	-	
12-18	B21t	9.2	50.0	40.8	0.7	1.3	0.9	2.4	3.9	11.8	38.2	17.2	5.3	-	-	-	
18-32	B22t	9.8	44.7	45.5	0.5	1.3	1.0	2.6	4.4	9.7	35.0	15.8	5.4	-	-	-	
32-40	B23t	25.1	36.1	38.8	2.7	6.0	3.8	6.0	6.6	8.4	27.7	18.5	18.5	-	-	-	
40-48	B3t	16.7	44.7	38.6	0.4	1.8	2.0	5.3	7.2	9.9	34.8	20.5	9.5	-	-	-	
48-60	C	20.4	45.0	34.6	0.1	1.6	2.2	7.0	9.5	12.1	32.9	25.9	10.9	-	-	-	
Depth (in.)	6A1a Organic carbon	Nitrogen	C/N	Carbonate as CaCO ₃	6C1a Ext. iron as Fe	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH			
						4A1e ½ bar	4A1h Oven dry	4D1		4B1c ½ bar	4B2 15 bar	8C1c (1:1) KCl		8C1a (1:1) H ₂ O			
						Pct.	Pct.	Pct.		Pct.	Pct.	Pct.		Pct.			
0-4	4.13				3.6												
4-8	0.91				4.6											6.6	
8-12	0.59				4.8											4.8	
12-18	0.35				6.0											4.9	
18-32	0.18				7.3											5.0	
32-40	0.16				8.6											5.1	
40-48	0.15				7.8											5.0	
48-60	0.14				8.0											5.0	
Depth (in.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay 8D1			8D3 Ca/Mg	Base saturation			
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum	Sum		CEC	Ext iron	15-bar water		Sum cations	5C3 Pct.	5C1 NH ₄ OAc Pct.	
	meq/100 g																
0-4	2.4	3.5	0.1	0.8	6.8	9.5	16.3				1.00	0.22	0.7		42		
4-8	1.0	0.9	tr.	0.3	2.2	11.8	14.0				0.54	0.18			16		
8-12	1.0	1.5	tr.	0.2	2.7	12.7	15.4				0.50	0.16	0.7		18		
12-18	2.1	4.1	tr.	0.2	6.4	11.7	18.1				0.44	0.15	0.5		35		
18-32	2.1	4.4	tr.	0.2	6.7	11.4	18.1				0.40	0.16	0.5		37		
32-40	1.8	4.8	0.2	0.2	7.0	12.7	19.7				0.53	0.22	0.4		36		
40-48	2.1	4.6	0.3	0.1	7.1	12.5	19.6				0.53	0.20	0.5		36		
48-60	1.9	4.0	0.3	0.1	6.3	12.4	18.7				0.54	0.23	0.5		34		
Depth (in.)	Clay Fraction Analysis 7A1b-d																
	Mt.	Chl.	Vm.	Mi.	Int.	Qtz.	Kl.	Gibbsite									
	7A2 X-ray				7A3												
0-4																	
4-8		x		x			xxxx										
8-12																	
12-18																	
18-32		x					xxxx										
32-40																	
40-48																	
48-60		x		x			xxxx										

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.

Pedon Classification: Ultic Hapludalf; fine, mixed, mesic
 Soil: Montalto silt loam
 Soil No.: S55Pa-36-10
 Location: Lancaster County, Pennsylvania. 5/8 mile east southeast of Belair, near twin white oak and several tulip poplars, 380 feet west southwest of telephone pole C-tel. co.-8.
 Vegetation and land use: Forest - tulip poplar, white oak, sassafras, beech, black cherry.
 Slope and land form: 2 percent.
 Drainage: Well drained.
 Permeability: Moderate.
 Described by: F. G. Loughry.

Horizon and
 Beltsville
 Lab. No.

O1	2 to 1/2 inch.	Partly rotted hardwood leaves.
Not sampled		
O2	1/2 inch to 0.	Dark reddish brown (5YR 2/2) leaf mold, abrupt wavy boundary.
Not sampled		
A1	0 to 4 inches.	Dark brown (7.5YR 3/2) silt loam with weak, medium granular structure; very friable; reaction is neutral; clear wavy boundary.
551580		
A2	4 to 8 inches.	Reddish brown (5YR 4/4) silt loam with very weak medium platy breaking to weak fine granular structure; friable; medium acid; clear wavy boundary.
551581		
B1t	8 to 12 inches.	Yellowish red (5YR 5/6 - 4/6) heavy silt loam with weak medium subangular blocky structure; friable; medium acid; clear wavy boundary; clay coatings on root channels and ped faces.
551582		
B21t	12 to 18 inches.	Red (2.5YR 4/6 - 4/8) heavy silty clay loam with moderate fine to medium blocky structure; firm when moist, plastic and somewhat sticky when wet; medium acid; gradual wavy boundary; a few manganese coatings on peds.
551583		
B22t	18 to 32 inches.	Red (2.5YR 4/8) heavy silty clay loam with strong fine to medium blocky structure; firm; plastic and somewhat sticky; medium acid; gradual wavy boundary; some manganese coatings, distinct clay coatings on all peds.
551584		
B23t	32 to 40 inches.	Red (2.5YR 4/6) heavy silty clay loam with moderate medium blocky structure; firm; strongly acid; gradual wavy boundary; many manganese coatings.
551585		
B3t	40 to 48 inches.	Red (2.5YR 4/6) silty clay loam with weak, medium blocky structure; firm; very strongly acid; gradual wavy boundary.
551586		
C	48 to 60 inches plus.	Red (2.5YR 4/6) weathered rock with very weak platy structure; friable; very strongly acid.
551587		

Notes: Colors are for moist soil.

PEDON CLASSIFICATION: Aeric Fragiaquept; fine-loamy, mixed, mesic
SOIL Volusia silt loam

SOIL Nos. 856Pa-25-4

LOCATION Erie County, Pennsylvania

SOIL SURVEY LABORATORY Lincoln, Nebraska

LAB. Nos. 7621 - 7628

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1					
		Total				Sand					Silt			3B2	2A2	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 < 19	Pct. of < 76mm		
Pct. of < 2 mm																			
0-1 1/2	A1	22.0	62.8	15.2	4.1 ^a	3.0 ^a	1.9 ^a	5.0 ^a	8.0 ^a	25.9	36.9	36.7	14.0				5.0		
1 1/2-6 1/2	A2	18.8	62.7	18.5	3.8 ^a	2.3 ^a	1.6 ^a	4.0 ^a	7.1 ^a	26.7	36.0	36.2	11.7	0.95			11.7		
6 1/2-13	B1g	16.4	63.5	20.1	1.7 ^a	1.9 ^a	1.4 ^a	4.1 ^a	7.3 ^a	27.2	36.3	37.0	9.1	0.97			7.0		
13-22	A'2g	26.5	56.0	17.5	3.6 ^a	3.8 ^a	2.8 ^a	6.9 ^a	9.4 ^a	27.6	28.4	41.0	17.1	0.93			11.8		
22-31	B'x1	43.0	38.7	19.2	4.2 ^a	7.4 ^a	6.8 ^a	13.3 ^a	10.4 ^a	19.4	18.4	37.5	32.6	0.93			11.9		
31-43	B'x2	27.9	47.7	24.4	5.8 ^a	4.5 ^a	3.4 ^a	6.9 ^a	7.3 ^a	18.8	28.9	29.8	20.6	0.84			24.9		
43-58	C1g	20.3	55.3	25.2	3.2 ^a	3.4 ^a	1.9 ^a	4.3 ^a	6.7 ^a	20.9	34.4	30.1	13.6	0.82			22.5		
58-64	C2	25.6	53.0	21.4	5.0 ^b	4.4 ^b	2.6 ^b	5.6 ^b	8.0 ^b	21.6	31.4	33.0	17.6	0.87			16.5		

Depth (in.)	6A1a Organic carbon Pct	6B1a Nitrogen Pct	C/N	6E1a Carbonate as CaCO ₃ Pct.	6C1a Ext. iron as Fe Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH		
						4A3a c	4A1a 1/2 bar	4A1h Oven dry		4B1c 1/2 bar	4B2 15 bar	8C1c (1-1) KCl		8C1a (1.1) H ₂ O		
						g/cc	g/cc	g/cc		Pct.	Pct.	Pct.				
0-1 1/2	8.08	0.479	16.9		1.3											4.0
1 1/2-6 1/2	1.59	0.114	13.9		1.3	1.14										4.2
6 1/2-13	0.76	0.076	10.0		1.4	1.19										4.3
13-22	0.34	0.042	8.0		1.4	1.41										4.5
22-31	0.12	0.028	4.0		1.2	1.48										4.7
31-43	0.10				1.5	1.50										5.7
43-58	0.12			tr.	1.5	2.02										7.1
58-64	0.20			3	1.3	1.96										7.5

Depth (in.)	Extractable bases 5B1a				6H1a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay 8D1			8D3 Ca/Mg	Base saturation				
	6N2b Ca	6O2b Mg	6P2a Na	6Q2a K		Sum	5A3a Sum cations		5A1a NH ₄ QAc	CEC Sum	Ext. iron		15-bar water	5C3 Sum cations Pct	5C1 NH ₄ OAc Pct.		
	mg/100 g																
0-1 1/2	1.3	0.4	tr.	0.3	2.0	32.7	34.7	20.6					2.28	0.09		6	10
1 1/2-6 1/2	0.1	0.1	tr.	0.2	0.4	19.3	19.7	10.5					1.06	0.07		2	4
6 1/2-13	tr.	tr.	tr.	0.2	0.2	15.6	15.8	8.5					0.79	0.07		1	2
13-22	0.5	0.1	tr.	0.2	0.8	11.8	12.6	7.0					0.72	0.08		6	11
22-31	2.2	0.9	tr.	0.2	3.3	9.4	12.7	7.5					0.66	0.06		26	44
31-43	6.9	1.6	tr.	0.1	8.6	5.3	13.9	9.6					0.57	0.06	4.3	62	90
43-58			tr.	0.1		4.5		8.8						0.06			
58-64			tr.	0.1		2.8		7.3						0.06			

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

^aFew smooth light brown and black concretions (Fe-Mn?).
^bFew, smooth light brown and black concretions (Fe-Mn?). Also common CaCO₃ concretions?
^cBulk density by Beltsville Laboratory.
 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

Pedon Classification: Aeric Fragiaquept; fine-loamy, mixed, mesic

Soil: Volusia silt loam

Soil Nos.: S56Pa-25-4

Location: LeBoeuf Township, Erie County, Pennsylvania on Helen Henry farm, 1 mile east of Mill Village, just south of Route U. S. 6, in grazed woodlot, 250 feet east of west boundary of woodlot, 130 feet north of south boundary, 8 feet east of blazed tree.

Vegetation: Partially cleared and grazed woodlot, beech, birch, red maple, basswood. Ground cover is ferns, pokeweed, and trillium.

Parent material: Calcareous glacial till, probably Tazewell substage of Wisconsin glaciation, site is between two moraines both of which seem to join with the Cleveland Moraine further west.

Physiography: Broad upland ridgetop of the Glaciated Allegheny Plateau.

Relief: Smooth general relief, hummocky microrelief with many cradle knolls.

Elevation: 1,450 feet.

Slope and aspect: 3 percent toward southwest.

Erosion: None apparent except for some movement down sides of cradle knolls.

Permeability: Moderately slow.

Drainage: Somewhat poor.

Ground water: Water table at 22 inches when sampled.

Moisture: Wet when sampled.

Stoniness: None.

Root distribution: Many tree roots to 13 inches, a few to 20 inches.

Sampled and described by: E. J. Pedersen, F. G. Loughry, L. T. Kardos, D. C. Taylor and party, September 11, 1956.

Horizon and

Lincoln

Lab. No.

- Aoo 1 to $\frac{1}{2}$ inch. Hardwood leaf litter.
- Ao 1/2 inch to 0. Dark reddish brown (5YR2/2) leaf mold; pH 5.2.
- A1 0 to $1\frac{1}{2}$ inches. Dark reddish brown (5YR 2/2) silt loam; weak fine granular structure; very friable; pH 5.2; 7621 abrupt wavy lower boundary; thickness ranges from 1 to 3 inches.
- A2 $1\frac{1}{2}$ to $6\frac{1}{2}$ inches. Brown to yellowish brown (10YR 5/3 to 5/4) silt loam; weak medium granular to weak fine platy structure; friable; pH 5.2; clear wavy lower boundary; thickness ranges from 4 to 7 inches. 7622
- B1g $6\frac{1}{2}$ to 13 inches. Brown (10YR 5/3) heavy silt loam with common medium distinct light brownish gray (10YR 6/2) and yellowish red (5YR 5/6) mottles; weak medium subangular blocky structure; friable when moist, moderately plastic when wet; pH 5.0; clear wavy lower boundary; thickness ranges from 4 to 8 inches. 7623
- A'2g 13 to 22 inches. Light brownish gray (10YR 6/2) silty clay loam with common coarse prominent strong brown (7.5YR 5/8) and gray (10YR 6/1) mottles; weak medium blocky structure; hard when dry, firm when moist, and moderately plastic when wet; pH 5.0; 5 to 10 percent gravel; clear wavy lower boundary; thickness ranges from 8 to 11 inches. 7624
- B'x1 22 to 31 inches. Yellowish brown (10YR 5/4) loam with many medium distinct gray (10YR 6/1) and strong brown (7.5YR 5/8) mottles large polygons breaking into moderate medium blocks with partial clay coats; hard when dry, firm when moist, nonplastic when wet; pH 5.6; 5 to 10 percent gravel; clear wavy lower boundary; thickness ranges from 7 to 11 inches. 7625
- B'x2 31 to 43 inches. Light brownish gray (10YR 6/2) clay loam with common medium distinct yellowish brown (10YR 5/4) mottles; large polygons break into weak medium blocky with some platiness; ped faces are partially coated with clay; hard when dry, firm when moist, slightly plastic when wet; pH 6.3; 5 to 10 percent gravel and an occasional small boulder; gradual wavy lower boundary; thickness ranges from 9 to 15 inches. 7626
- Clg 43 to 58 inches. Grayish brown (2.5Y 5/2) silty clay loam with few coarse distinct gray (2.5Y 6/0) and yellowish brown (10YR 5/6) mottles; weak medium blocky structure; partial clay coats on peds; very firm in places; slightly plastic when wet; pH 6.8; about 15 percent gravel and shale; occasional small boulders; abrupt wavy lower boundary; thickness varies from 10 to 17 inches. 7627
- C2 58 to 64 inches plus. Dark grayish brown to olive brown (2.5Y 4/2 to 4/4) silty clay loam; weak medium platy structure; firm in place, slightly plastic when wet; effervesces with dilute HCl; 15 percent gravel and shale and occasional small boulders. 7628

Remarks: This site was sampled as typical of the Erie silt loam in Erie County, Pennsylvania on a gentle slope with only slightly disturbed profile in 1956 as the somewhat poorly drained member of the Valois-Ingford-Erie-Elkery-Alden Catena. Colors are for moist soil.

^{1/} Although sampled in 1956 as a representative of the Erie series, this pedon lacks sufficient morphological evidences of illuviation to retain classification as Erie which is now in Fragiaqualfs.

PEDON CLASSIFICATION: Aeric Fragiaquept; fine-silty, mixed, mesic
SOIL Dalton taxadjunct

SOIL Nos. S56Pa-25-1

LOCATION Erie County, Pennsylvania

SOIL SURVEY LABORATORY Lincoln, Nebraska

LAB. Nos. 7692 - 7697

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1												3B2 Cm	Coarse fragments 3B1			
		181b Total					Sand					Silt			3B2 (2-0.1)	2A2 > 2 < 76 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)						
0-4	A1	9.8	66.8	23.4	1.0 ^a	0.7	0.6	2.8	4.7	21.9	44.9	28.5	5.1		1			
4-6	A2	10.4	68.6	21.0	0.5 ^d	0.8 ^b	0.6 ^c	3.0 ^c	5.5 ^c	23.7	44.9	31.2	4.9		tr.			
6-10	A2g	9.8	69.5	20.7	0.4 ^b	0.7 ^b	0.6 ^c	2.9 ^c	5.2 ^c	23.6	45.9	30.7	4.6		tr.			
10-17	Bx1	22.7	58.5	18.8	3.0 ^d	3.2 ^d	2.5 ^d	6.5 ^d	7.5 ^d	21.7	36.8	33.0	15.2		12			
17-35	Bx2	20.5	61.1	18.4	3.6 ^e	3.9 ^e	2.1 ^e	5.0 ^e	5.9 ^e	18.1	43.0	27.0	14.6		20			
35-42	C	23.6	58.4	18.0	4.9 ^e	3.8 ^e	2.6 ^e	5.7 ^e	6.6 ^e	19.6	38.8	29.5	17.0		25			

Depth (in.)	6A1a Organic carbon Pct.	Nitrogen Pct.	C/N	6E1a Carbonate as CaCO ₃ Pct.	Ext. iron as Fe Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH	
						4A3a	4A1e	4A1h		4B1c	4B2	8C1c (1:1) KCl		8C1e (1:1) H ₂ O	
						g/cc	½ bar g/cc	Oven dry g/cc		Pct.	½ bar Pct.	15 bar Pct.			
0-4	6.44														4.7
4-6	2.50														4.4
6-10	1.10														4.5
10-17	0.22														5.6
17-35	0.16			1											7.7
35-42	0.15			4											7.9

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.	
	meq/100 g														
0-4															
4-6															
6-10															
10-17															
17-35															
35-42															

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

^aSome organic matter.
^bCommon smooth and irregular light brown to dark brown concretions (Fe-Mn?).
^cFew smooth and irregular light brown to dark brown concretions (Fe-Mn?).
^dFew smooth and irregular light brown to dark brown concretions (Fe-Mn?). Also few sandstone fragments.
^eFew smooth and irregular light brown to dark brown concretions (Fe-Mn?). Also few sandstone fragments. Also few, CaCO₃ concretions.

Pedon Classification; Aeric Fragiaquept; fine-silty, mixed, mesic
 Soil: Dalton taxadjunct
 Soil Nos.: S56Pa-25-1
 Location: Cranesville Township, Erie County, Pennsylvania, 3 miles east of Cranesville and 1/2 mile south of Trinity Lutheran Church.
 Vegetation: Second growth forest of red maple, ash, and basswood.
 Parent material: Calcareous glacial till, probably Tazewell substage of Wisconsin glaciation.
 Physiography: Upland of the Glaciated Allegheny Plateau.
 Relief: Smooth.
 Slope: 1 percent slope.
 Erosion: None.
 Permeability: Very slow.
 Drainage: Poor.
 Moisture: Moist when sampled.
 Stoniness: None.
 Root distribution: Abundant in surface 4 inches with some following prism faces to 35 inches depth.
 Sampled and described by: F. G. Loughry, D. C. Taylor, and party, June 20, 1956.

Horizon and
 Lincoln
 Lab. No.

A00 1/2 inch to 0. Hardwood leaf litter.

A1 0 to 4 inches. Very dark brown (10YR 2/2) silt loam; moderate fine granular structure; friable when moist; pH 5.6; abrupt smooth lower boundary.
 7692

A2 4 to 6 inches. Dark gray brown (10YR 4/2) silt loam; moderate medium granular structure; friable when moist; pH 5.2; clear and smooth lower boundary.
 7693

A2g 6 to 10 inches. Light yellowish brown (10YR 6/4) silt loam with few, fine distinct mottles of strong brown (7.5YR 5/6); weak medium platy structure; friable when moist; pH 5.4; clear and smooth lower boundary.
 7694

Bx1 10 to 17 inches. Gray brown (2.5Y 5/2) loam with numerous medium distinct mottles of yellowish red (5YR 5/6); strong coarse angular blocky structure; very firm when moist; pH 5.8; abrupt smooth lower boundary.
 7695

Bx2 17 to 35 inches. Gray brown (2.5Y 5/2) silty clay loam with numerous coarse distinct mottles of yellowish brown (10YR 5/4); gray silt on ped faces; strong coarse prismatic structure; firm when moist; pH 6.6; clear smooth lower boundary.
 7696

C 35 to 42 inches. Olive (5Y 4/3) loam with few streaks of gray (2.5Y 5/0); 5 percent round and angular gravel 2 to 15 mm in size; calcareous at 35 inches depth.
 7697

Notes: Colors are for moist soil.

1/ This pedon is a taxadjunct because the clay content in the control section is too high. The Dalton series is in the coarse-silty particle size class.

PEDON CLASSIFICATION: Typic Fragiochrept; coarse-loamy, mixed, mesic

SOIL Series not designated SOIL Nos. S56Pa-25-3 LOCATION Erie County, Pennsylvania

SOIL SURVEY LABORATORY Lincoln, Nebraska

LAB. Nos. 7611 - 7620

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1		
		181b Total			Sand					Silt				2A2 > 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)	Int. III (0.05-0.02)	Int. II (0.02-0.002)	Int. I (2-0.1)				
0-2 1/2	A1	46.1	41.7	12.2	1.4 ^a	1.8 ^a	2.0 ^a	16.8 ^a	24.1 ^a	19.8	21.9	55.5	22.0	1.00	tr.	
2 1/2-9	A2	47.3	42.9	9.8	1.0 ^a	1.3 ^a	1.7 ^a	17.0 ^a	26.3 ^a	21.3	21.6	59.3	21.0	1.00	tr.	
9-18	B1	48.4	42.2	9.4	0.6 ^a	1.3 ^a	2.0 ^a	18.7 ^a	25.8 ^a	20.8	21.4	59.6	22.6	1.00	tr.	
18-24	B2	49.9	39.3	10.8	1.2 ^a	1.2 ^a	1.8 ^a	20.0 ^a	25.7 ^a	19.7	19.6	59.0	24.2	0.98	3.7	
24-30	A'21g	57.5	34.5	8.0	0.6 ^b	0.8 ^b	1.4 ^b	21.2 ^b	33.5 ^b	19.7	14.8	68.6	24.0	1.00	tr.	
30-34	A'22g	72.2	21.2	6.6	1.0 ^b	1.3 ^b	2.0 ^b	47.8 ^b	20.1 ^b	12.6	8.6	64.3	52.1	0.99	1.1	
34-44	B'x1	60.7	25.7	13.6	1.9 ^b	2.3 ^b	2.3 ^b	37.8 ^b	17.3 ^b	14.0	11.7	55.7	43.4	0.98	2.9	
44-54	C1g	22.1	51.9	26.0	4.2 ^b	3.5 ^b	2.1 ^b	5.0 ^b	7.3 ^b	19.3	32.6	29.5	14.8	0.96	16.4	
54-70	C2	14.4	62.2	23.4	4.7 ^c	2.9 ^c	0.6 ^c	1.2 ^c	5.0 ^c	25.4	36.8	31.1	9.4	0.90	13.5	
70-75	C3	29.2	52.7	18.1	9.5 ^c	5.5 ^c	1.5 ^c	4.3 ^c	8.4 ^c	22.4	30.3	33.5	20.8	0.77	27.6	

Depth (in.)	6A1a Organic carbon Pct.	6B1a		Carbonate as CaCO ₃ Pct.	6C1a Ext. iron as Fe Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH	
		Nitrogen Pct.	C/N			4A3a d g/cc	4A1e 1/2 bar g/cc	4A1h Oven dry g/cc		4B1c 1/2 bar Pct.	4B2 15 bar Pct.	8C1 H ₂ O (1:5)		8C1a H ₂ O (1:1)	
		0-2 1/2	8.53			0.490	17.4			1.1	1.08				
2 1/2-9	2.07	0.134	15.4		1.3	0.94									4.5
9-18	1.37	0.095	14.4		1.1	0.95									4.6
18-24	0.38	0.044	10.0		0.8	1.39									4.6
24-30	0.14				0.6	1.65									5.0
30-34	0.08				0.8	1.58									5.3
34-44	0.08				1.1	1.68									5.8
44-54	0.11				1.5	1.80									6.5
54-70	0.13				1.5	1.98									6.5
70-75	0.23				1.5	2.02									6.0

Depth (in.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay 8D1			8D3 Ca/Mg	Base saturation		
	6N2b Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	5A1a NH ₄ OC		CEC Sum	Ext. iron	15-bar water		5C3 Sum cations Pct.	5C1 NH ₄ OC Pct.	
	0-2 1/2	1.8	0.5	tr.	0.5		2.8	30.2		33.0	21.5					2.70
2 1/2-9	0.1	0.1	tr.	0.2	0.4	18.0	18.4	9.2				1.88	0.13		2	4
9-18	tr.	tr.	tr.	0.2	0.2	13.5	13.7	6.6				1.46	0.12		1	3
18-24	0.1	tr.	tr.	0.1	0.2	8.1	8.3	4.2				0.77	0.07		2	5
24-30	0.5	tr.	tr.	0.1	0.6	5.3	5.9	2.9				0.74	0.08		10	21
30-34	1.0	0.3	tr.	0.1	1.4	4.0	5.4	3.0				0.82	0.12		26	47
34-44	4.3	1.2	tr.	0.1	5.6	3.7	9.3	6.5				0.68	0.04	3.6	60	86
44-54	7.1	1.8	0.1	0.1	9.1	4.9	14.0	9.0				0.54	0.06	3.9	65	101
54-70	6.8	2.0	tr.	0.1	8.9	4.9	13.8	8.6				0.59	0.06	3.4	64	103
70-75	4.9	1.4	tr.	0.1	6.4	5.7	12.1	7.0				0.67	0.08	3.5	53	91

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

^a Common smooth light brown to black concretions (Fe-Mn?).

^b Common smooth light brown to black concretions (Fe-Mn?). Also, few, mica flakes.

^c Mostly sandstone fragments?

^d Bulk density by Beltsville laboratory.

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

Pedon Classification: Typic Fragiochrept; coarse-loamy, mixed, mesic
 Soil: Series not designated^{1/}
 Soil Nos.: S56Pa-25-3
 Location: LeBoeuf Township, Erie County, Pennsylvania on Helen Henry farm, 1 mile east of Mill Village, just south of Route U. S. 6, in grazed woodlot, 250 feet south of highway, 80 feet east of west boundary of woodlot, 10 feet north of blazed beech tree. Location shown on aerial photo APD-15-58.
 Vegetation: Partially cleared and grazed woodlot, beech, sugar maple, black cherry, yellow birch, ash, ground cover is ferns, daisy, trillium, and partridgeberry.
 Parent material: Calcareous glacial till, probably Tazewell substage of Wisconsin glaciation, site is between two moraines, both of which seem to join with the Cleveland moraine farther west.
 Physiography: Broad upland ridgetop of the Glaciated Allegheny Plateau.
 Relief: Slightly rolling with hummocky microrelief composed of many cradle knolls.
 Elevation: 1,450 feet.
 Slope and aspect: 2 percent toward southwest.
 Erosion: Slight. Some local movement of soil from cradle knolls to depressions.
 Permeability: Moderate to 30 inches, moderately slow below.
 Drainage: Moderately good.
 Ground water: Ground water seeping into pit at depths of 54 to 70 inches when samples were taken.
 Stoniness: Nonstony.
 Root distribution: Many tree roots to 25 inches. Few tree roots down polygon faces to 50 inches.
 Sampled and described by: E. J. Pedersen, F. G. Loughry, L. T. Kardos, D. C. Taylor and party, September 11, 1956.

Horizon and
 Lincoln
 Lab. No.

Aoo 2 to 1 inch. Hardwood leaf litter.
 Ao 1 inch to 0. Dark reddish brown (5YR 2/2) leaf mold; pH 5.1.
 A1 0 to 2½ inches. Dark reddish brown (5YR 2/2) silt loam; moderate fine granular structure; very friable when moist, nonplastic when wet; pH 5.1; abrupt wavy lower boundary; thickness ranges from 2 to 3 inches.
 A2 2½ to 9 inches. Dark yellowish brown (10YR 4/4 to 5/4) silt loam to loam; weak fine granular mixed with some platy structure; friable when moist, nonplastic when wet; pH 5.1; clear wavy lower boundary; thickness ranges from 6 to 8 inches.
 B1 9 to 18 inches. Dark yellowish brown (10YR 4/4) silt loam; weak fine and medium subangular blocky mixed with some platy structure; friable when moist, nonplastic when wet; pH 5.2; clear wavy lower boundary; thickness ranges from 7 to 11 inches.
 B2 18 to 24 inches. Brown to yellowish brown (10YR 5/3 to 5/8) loam with few faint gray mottles; weak medium subangular blocky structure; friable when moist, nonplastic when wet; pH 5.2; clear wavy lower boundary; thickness ranges from 4 to 9 inches.
 A'21g 24 to 30 inches. Grayish brown (10YR 5/2) loam to very fine sandy loam with abundant coarse distinct pale brown (10YR 6/3) and yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure arranged on caps of polygons; slightly firm when moist, nonplastic when wet; pH 5.2; clear wavy lower boundary; thickness ranges from 4 to 8 inches.
 A'22g 30 to 34 inches. Yellowish brown (10YR 5/6) fine sandy loam with abundant coarse distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/8) mottles; breaks in 6 and 8 inch polygons with interiors weak medium platy to massive; firm in place, not plastic when wet; pH 5.6; clear irregular lower boundary; thickness ranges from 2 to 5 inches.
 7617 34 to 44 inches. Dark brown (7.5YR 4/2) loam with few coarse distinct gray (10YR 5/1) and strong brown (7.5YR 5/8) mottles; polygons breaking to moderate coarse platy; very firm, fragipan horizon, slightly plastic when wet; pH 5.8; contains 5 to 10 percent gravel; gradual wavy lower boundary; thickness ranges from 7 to 13 inches.
 C1g 44 to 54 inches. Grayish brown to light olive brown (2.5Y 5/2 to 5/4) gravelly silty clay loam with coarse faint gray (2.5Y 6/0) and yellowish brown (10YR 5/6) mottles; weak medium platy to moderate medium blocky structure; very firm in place, plastic when wet; pH 7.0; about 30 percent gravel; gradual wavy lower boundary; thickness ranges from 7 to 13 inches.
 C2 54 to 70 inches. Light olive brown (2.5Y 5/4) gravelly silty clay loam with few large distinct gray (2.5Y 5/0) mottles; strong medium blocky structure; very firm in place, plastic when wet; pH 6.8; about 25 percent gravel; gradual wavy lower boundary; thickness ranges from 12 to 18 inches.
 C3 70 to 75 inches plus. Grayish brown to light olive brown (2.5Y 5/2 to 5/4) shaly silty clay loam; massive structure; very firm in place, slightly plastic when wet; pH 6.8; contains about 40 percent shale fragments.

Remarks: This site was sampled as typical of the Langford silt loam in Erie County, Pennsylvania on a nearly level slope with only slightly disturbed profile in 1956 as the moderately well-drained member of the Valois-Langford-Erie-Ellery-Alden Catena. Colors are for moist soil.

^{1/}Although sampled as a representative of the Langford series, this pedon lacks an argillic horizon. Langford is in the coarse-loamy, mixed, mesic family of Aqueptic Fragiudalfs.

PEDON CLASSIFICATION: Typic Fragiochrept; coarse-loamy, mixed, mesic

SOIL Mardin silt loam

SOIL Nos. 856Pa-25-2

LOCATION Erie County, Pennsylvania

SOIL SURVEY LABORATORY Lincoln, Nebraska

LAB. Nos. 7602 - 7610

Depth (In.)	Horizon	Size class and particle diameter (mm) 3A1													3B2 Cm	Coarse fragments 3B1			
		Total											Int. III (0.02-0.002)	Int. II (0.2-0.02)		(2-0.1)	2A2 ≥ 2 < 19 Pct.	2-19 Pct. of < 76mm	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	0.002-0.001							
0-2	A1	34.2	51.0	14.8	5.8 ^a	4.4 ^a	3.3 ^a	9.4 ^a	11.3 ^a	22.6	28.4	39.6	22.9	0.96	13.8				
2-8	A2	33.4	52.4	14.2	5.9 ^a	4.5 ^a	3.3 ^a	9.0 ^a	10.7 ^a	23.8	28.6	39.8	22.7	0.93	17.9				
8-15	B21	29.3	57.6	13.1	5.4 ^a	4.1 ^a	2.9 ^a	7.9 ^a	9.0 ^a	24.0	33.6	37.6	20.3	0.92	18.0				
15-21	B22	42.2	47.4	10.4	7.9 ^a	6.1 ^a	4.4 ^a	11.6 ^b	12.2 ^b	21.7	25.7	40.6	30.0	0.89	23.2				
21-28	Bx	44.9	46.1	9.0	8.1 ^a	6.2 ^a	4.4 ^a	11.8 ^b	14.4 ^b	23.8	22.3	45.2	30.5	0.84	24.3				
28-36	C1g	63.7	25.4	10.9	17.9 ^a	12.8 ^a	8.3 ^a	15.1 ^b	9.6 ^b	11.1	14.3	28.5	54.1	0.71	39.5				
36-48	C2g	53.0	31.8	15.2	11.1 ^a	8.3 ^a	5.6 ^a	14.3 ^b	13.7 ^b	16.1	15.7	38.4	39.3	0.84	23.4				
48-60	C3g	40.7	47.2	12.1	10.8 ^d	5.1 ^d	3.6 ^d	9.4 ^c	11.8 ^c	24.1	23.1	41.4	28.9		19.1				
60-72	C4	39.9	55.3	4.8	7.0 ^d	5.7 ^d	4.1 ^d	10.6 ^c	12.5 ^c	27.5	27.8	46.0	27.4		20.2				

Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	6E1a Carbonate as CaCO ₃ Pct.	6C1a Ext iron as Fe Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD In/in	pH		
						4A3a e g/cc	4A1a 1/2 bar g/cc	4A1h Oven dry g/cc		4B1c 1/2 bar Pct.	4B2 15 bar Pct.	8C1 (1:5) H ₂ O		8C1a (1:1) H ₂ O		
0-2	9.44	0.579	16.3		1.3	0.63										
2-8	2.74	0.225	12.2		1.5	0.93										4.6
8-15	1.74	0.136	12.8		1.4	1.12										4.7
15-21	1.07	0.091	11.8		1.1	1.06										4.9
21-28	0.20	0.024	8.0		1.0	1.60										5.2
28-36	0.20				1.2	1.68										6.1
36-48	0.12			tr.	1.3	1.67										7.1
48-60	0.10				1.0											7.9
60-72	0.08				0.8											8.0

Depth (In.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6E1d Ext. Al	Ratios to clay 8D1			8D3 Ca/Mg	Base saturation	
	6N2b Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	5A1a NH ₄ OAc		CEC Sum	Ext. iron	15-bar water		5C3 Sum cations Pct.	5C1 NH ₄ OAc Pct.
	meq/100 g														
0-2	4.4	0.3	0.1	0.5	5.3	33.2	38.5	27.6						14	19
2-8	1.1	0.1	tr.	0.3	1.5	22.7	24.2	15.7						6	10
8-15	0.6	0.2	tr.	0.2	1.0	18.9	19.9	11.4						5	9
15-21	0.5	0.1	tr.	0.2	0.8	14.3	15.1	8.4						5	10
21-28	0.8	0.2	tr.	0.1	1.1	5.7	6.8	4.0						16	28
28-36	3.4	0.7	tr.	0.1	4.2	4.5	8.7	5.8						48	72
36-48	6.5	1.2	tr.	0.1	7.8	4.1	11.9	7.7						66	101
48-60						0.8		4.7							
60-72						tr.		2.4							

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

^aCommon smooth light brown to black concretions (Fe-Mn?).
^bCommon smooth light brown to black concretions (Fe-Mn?) Also few mica flakes.
^cCommon, smooth light brown to black concretions (Fe-Mn?) Also few mica flakes. Also common CaCO₃ concretions?
^dCommon smooth light brown to black concretions (Fe-Mn?) Also common CaCO₃ concretions.
^eBulk density by Beltville laboratory.

Pedon Classification: Typic Fragiochrept; coarse-loamy, mixed, mesic
Soil: Mardin silt loam^{1/2}

Soil Nos.: S56Pa-25-2

Location: Greene Township, Erie County, Pennsylvania on S. S. Firewich farm $\frac{1}{2}$ mile southeast of West Greene School in woods 40 feet south of line fence at point 120 feet east of southeast corner of cleared field on neighboring farm, opposite three beech trees, largest with initials I.J.T., location shown on aerial photo APD-42-53.

Vegetation: Birch-beech-maple forest. Birch, beech, maple, ash, and black cherry trees. Ground cover mayapple, ferns, trillium, partridgeberry, and some tree seedlings.

Parent material: Calcareous glacial till, probably Tazewell substage of Wisconsin glaciation, site is north of Cleveland Moraine.

Physiography: Upland of the Glaciated Allegheny Plateau.

Relief: Slightly rolling with profuse wavy microrelief due to cradle knolls.

Elevation: 1,480 feet.

Slope and aspect: 4 percent toward west.

Erosion: Slight or none.

Permeability: Moderate to 20 inches, moderately slow below.

Drainage: Moderately good.

Ground water: Water table at 40 inches when sampled.

Stoniness: Quite a few boulders in the vicinity.

Root distribution: Many tree roots to 21 inches, a few to 24 inches.

Sampled and described by: E. J. Pedersen, F. G. Loughry, L. T. Kardos, D. C. Taylor and party, September 11, 1956.

Horizon and

Lincoln

Lab. No.

- Aoo 2 to 1 inch. Partly rotted hardwood leaves with clear wavy lower boundary and thickness ranging from $\frac{1}{2}$ to $1\frac{1}{2}$ inches.
- Ao 1 inch to 0. Dark reddish brown (5YR 2/2) leaf mold with much fungus mycelium and fine tree roots; pH 5.0; clear wavy lower boundary; thickness ranges from $\frac{1}{2}$ to $1\frac{1}{2}$ inches.
- A1 0 to 2 inches. Black (5YR 2/1) silt loam; moderate fine granular structure; very friable when moist, non-sticky when wet; pH 5.2; about 5 percent gravel; clear wavy lower boundary; thickness ranges from $1\frac{1}{2}$ to 4 inches.
- A2 2 to 8 inches. Dark yellowish brown (10YR 4/3 to 4/4) silt loam; very weak fine platy to weak medium granular structure; very friable when moist, nonsticky when wet; pH 5.2; contains 5 percent gravel; gradual wavy lower boundary; thickness ranges from 5 to 8 inches.
- B21 8 to 15 inches. Dark yellowish brown (10YR 4/4 to 4/6) heavy silt loam; weak fine and medium subangular blocky to weak fine granular structure; friable when moist, nonplastic and nonsticky when wet; pH 5.3; contains about 5 percent gravel; clear wavy lower boundary; thickness ranges from 5 to 9 inches.
- B22 15 to 21 inches. Dark yellowish brown (10YR 4/4) loam with a few faint mottles at bottom of horizon; weak medium subangular blocky structure with partial clay coats on peds; friable when moist, nonplastic and non-sticky when wet; pH 5.4; about 10 percent gravel; clear wavy lower boundary; thickness ranges from 5 to 7 inches.
- Bx 21 to 28 inches. Yellowish brown (10YR 5/4) loam with many medium distinct mottles of light brownish gray (10YR 6/2) and strong brown (7.5YR 5/8) moderate coarse platy structure and firm consistence indicate that this is a fragipan; contains about 15 percent gravel; clay coatings on ped faces and gravel; nonplastic and nonsticky when wet; pH 5.6; clear wavy lower boundary; thickness ranges from 6 to 8 inches.
- C1g 28 to 36 inches. Dark brown (10YR 4/3) gravelly clay loam with a few small faint gray mottles, structure determined by shape of space between gravels which makes up about 50 percent of soil volume; slightly firm in place, sticky when wet; pH 6.9; clear wavy lower boundary; thickness ranges from 7 to 9 inches.
- C2g 36 to 48 inches. Dark brown (7.5YR 4/2 to 10YR 4/3) gravelly clay loam with few fine faint gray mottles; mixed moderate medium platy and blocky structure; clay coats on ped faces; firm in place, slightly plastic when wet; pH 6.9; about 20 percent gravel; gradual wavy lower boundary; thickness ranges from 10 to 14 inches.
- C3g 48 to 60 inches. Dark yellowish brown (10YR 4/4) gravelly silt loam with a few gray and strong brown mottles; moderate medium platy structure; about 20 percent gravel; firm in place, slightly plastic when wet; pH 7.0; abrupt wavy lower boundary; thickness ranges from 10 to 14 inches.
- C4 60 to 72 inches plus. Olive brown (2.5Y 4/4) gravelly loam; weak medium platy structure; firm in place; non-plastic when wet; effervesces freely with HCl; contains about 20 percent gravel.

Remarks: This site was sampled as typical of the Langford series in Erie County, Pennsylvania on a gentle slope with undisturbed profile in 1956 as the moderately well drained member of the Valois-Langford-Erie-Ellyer-Alden Catena. Colors are for moist soil.

^{1/2} Although sampled as a representative of the Langford series in 1956, this pedon lacks an argillic horizon. Langford is in the Aquaptic Fragiudalfs.

PEDON CLASSIFICATION: Typic Fragiochrept; fine-loamy, mixed, mesic

SOIL - Lackawanna taxadjunct

SOIL Nos. 533Pa-53-1

LOCATION Potter County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 531363 - 531366

Depth (in.)	Horizon	1B1b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments			
		Total			Sand					Silt				2A2 ≥ 2 < 76 Pct.	2-19 Pct.	19-76 Pct.	
		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)	Int. III (0.05-0.02)	Int. II (0.02-0.002)	(2-0.1)					
Pct. of \leq 2 mm																	
0-7	Ap	21.3	51.4	27.3	3.2	2.6	1.9	6.9	6.7	16.5	34.9	28.2	14.6				
7-14	B21	22.7	50.5	26.8	1.5	2.2	2.1	8.5	8.4	16.7	33.8	31.1	14.3				
14-22	B22	27.4	52.4	20.2	1.6	2.6	2.4	10.4	10.4	20.5	31.9	38.3	17.0				
22-30	Cx	35.9	43.0	21.1	2.4	2.7	2.4	14.8	13.6	15.9	27.1	40.6	22.3				
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 $\frac{1}{2}$ bar g/cc	4A1h Oven dry g/cc	4B1c $\frac{1}{2}$ bar Pct.		4B2 15 bar Pct.	8C1c (1.1) KCl	8C1a (1.1) H ₂ O					
0-7	2.07															5.6	
7-14	0.64																4.8
14-22	0.10																4.9
22-30	0.11																5.1
Depth (in.)	Extractable bases 5B1e					6H1a Ext acidity	CEC		6G1d Ext. Al	Ratios to clay 8D1			8D3 Ca/Mg	Base saturation			
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3e Sum cations	Ext. Al		CEC Sum	Ext. Iron	15-bar water		Sum cations Pct.	5C1 NH ₄ OAc Pct.		
	meq/100 g																
0-7	4.7	0.3	0.1	0.1	5.2	11.7	16.7						0.62		30		
7-14	1.0	0.1	0.1	0.1	1.3	17.2	18.3						0.69		6		
14-22	0.6	0.2	0.1	0.1	1.0	8.7	9.5						0.48		8		
22-30	0.6	0.3	0.1	0.1	1.1	7.3	8.2						0.40		11		
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.

Pedon Classification: Typic Fragiochrept; fine-loamy, mixed, mesic
 Soil: Lackawanna taxadjunct^{1/}
 Soil No.: S53FA-53-1
 Location: Pottery County, Pennsylvania. One mile SW Andrews Settlement - photo 71-77.
 Sampled by and date: K. V. Goodman. 1953.

Horizon and
 Beltsville
 Lab. No.

Ap 531363	0 to 7 inches. Dusky red (10R 3/3), silt loam; strong medium crumb structure; very friable; slightly acid.
B21 531364	7 to 14 inches. Dark red to red (10R 3/6 - 4/6), channery silt loam; weak fine subangular blocky; friable, strongly acid.
B22 531365	14 to 22 inches. Red (10R 4/6), channery silt loam; moderately strong medium subangular blocky, firm, strongly acid.
Cx 531366	22 to 30 inches. Weak red (10R 5/4), channery clay loam; strong medium subangular blocky; very firm and compact; strongly acid; glacial till.

Notes: Colors are for moist soil.

^{1/}This pedon is a taxadjunct because of the fine-loamy family particle size placement. The Lackawanna series is in the coarse-loamy class.

FEDON CLASSIFICATION: Typic Dystrachrept; loamy-skeletal, mixed, mesic

SOIL Hazleton fine sandy loam SOIL Nos. 855Pa-36-13 LOCATION Lancaster County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 551616 - 551622

Depth (in.)	Horizon	181b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments		
		Total		Sand						Silt				2A2 > 2 < 76 Pct.	2-19 Pct of 76mm	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																
0-0.1	O2	72.4	20.5	7.1	3.6	7.7	8.9	36.6	15.6	7.7	12.8	43.1	56.8			
0-1	A2	69.0	21.6	9.4	6.2	5.6	7.4	33.7	16.1	7.7	13.9	43.5	52.9			6
1-2	B1	66.6	23.3	10.1	6.4	6.0	6.9	30.3	17.0	7.8	15.5	43.3	49.6			7
2-12	A'21	67.3	22.7	10.0	7.4	6.6	6.5	29.5	17.3	7.9	14.8	43.1	50.0			15
12-18	A'22	65.2	21.3	13.5	5.9	6.0	5.5	28.2	19.6	8.8	12.5	46.2	45.6			14
18-25	B'2	78.1	14.8	7.1	13.3	9.2	6.6	29.1	19.9	7.3	7.5	45.4	58.2			34
25-32	B3															27

Depth (in.)	6A1a Organic carbon Pct	Nitrogen Pct	C/N	Carbonate as CaCO ₃ Pct.	6C1a 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.
0-0.1																D/3.6
0-1	5.6				0.2											3.6
1-2	2.39				0.4											3.9
2-12	0.92				0.6											4.6
12-18	0.29				0.5											4.6
18-25	0.12				0.8											4.4
25-32	0.11				0.4											4.5

Depth (in.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay 8D1			8D3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2e K	Sum		5A3a Sum cations	Ext.		CEC Sum	Ext. iron	15-bar water		Sum cations Pct	5C1 NH ₄ OAc Pct.
0-0.1	1.7	0.5	0.2	0.5	2.9	69.1	72.0			10.14					4
0-1	0.2	0.4	0.1	0.2	0.9	14.9	15.8			1.68	0.03				6
1-2	0.1	0.3	0.1	0.1	0.6	13.5	14.1			1.40	0.04				4
2-12	0.1	tr.	0.2	0.1	0.4	6.6	7.0			0.70	0.06				6
12-18	0.1	0.1	0.2	0.1	0.5	4.0	4.5			0.33	0.05				11
18-25	tr.	tr.	tr.	0.2	0.2	5.7	5.9			0.83	0.06				3
25-32	tr.	0.2	tr.	0.1	0.3	2.5	2.8			0.39	0.06				11

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

3/Aggregates in coarse sands.
1/1:5 dilution.

Mt. = Montmorillonite, Chl. = chlorite, Vm. = Vermiculite, m = 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.

Pedon Classification: Typic Dystrochrept; loamy-skeletal, mixed, mesic

Soil: Hazleton fine sandy loam

Soil No.: S55Pa-36-13

Location: Lancaster County, Pennsylvania. 3 miles southeast of Strasburg on Route 360-11, sampled in woods west of road 60 feet from road opposite cinder pile. Aerial photo No. R-8-29.

Vegetation and land use: Chestnut, white oak, red oak, scarlet oak, tulip poplar, maple, beech, and mountain laurel.

Slope and land form: 7 percent.

Drainage: Well drained.

Permeability: Moderately rapid.

Described by: F. G. Loughry.

Horizon and

Beltsville

Lab. No.

- O1 2 to 1/2 inches. Mixed hardwood leaves; abrupt wavy boundary.
Not sampled
- O2 1/2 inch to 0. Dark reddish brown (5YR 2/2) well rotted leafmold; strongly acid; abrupt wavy boundary.
551616
- A2 0 to 1 inch. Dark gray (10YR 4/1) fine sandy loam with single grain structure; friable; very strongly acid; abrupt discontinuous boundary.
551617
- B1 1 to 2 inches. Strong brown (7.5YR 5/6) fine sandy loam with single grain structure; friable; very strongly acid; abrupt discontinuous boundary.
551618
- A'21 2 to 12 inches. Light yellowish brown to very pale brown (10YR 6/4 - 7/4) fine sandy loam with very weak medium subangular blocky structure; friable; strongly acid; clear wavy boundary.
551619
- A'22 12 to 18 inches. Light yellowish brown to very pale brown (10YR 6/4 - 7/4) fine sandy loam with weak medium subangular blocky structure; friable; strongly acid; clear wavy boundary.
551620
- B'2 18 to 25 inches. Yellowish brown (10YR 5/6) channery sandy loam with weak medium subangular blocky structure; friable; strongly acid; clear wavy boundary; about 40 percent coarse fragments.
551621
- B3 25 to 32 inches. Light yellowish brown (10YR 6/4) channery sandy loam with strong brown (7.5YR 5/6) coatings on rock fragments; strongly acid; about 60 percent coarse fragments.
551622
- C 32 to 42 inches plus. Light yellowish brown (10YR 6/4 with 10YR 5/6 coatings) channery sandy loam; strongly acid; some clay in cracks in rock; about 90 percent coarse fragments.
Not sampled

Notes: Colors are for moist soil.

PEDON CLASSIFICATION: Typic Dystrachrept; coarse-loamy, mixed, mesic

SOIL Hazleton taxadjunct

SOIL Nos. 555Pa-36-14

LOCATION Lancaster County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 551623 - 551629

Depth (In.)	Horizon	181b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments		
		Total		Sand					Silt					2A2 ≥ 2 < 76 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)				
1-0	U2	Pct of < 2 mm														
0-1	A2	71.8	20.0	8.2	6.7	8.6	7.7	31.0	17.8	8.0	12.0	43.1	54.0			
1-2	B2	75.7	13.9	10.4	6.3	9.1	7.9	31.9	20.5		16.6	36.4	55.2	5		
2-12	A'21	67.4	24.6	8.0	11.1	8.3	5.7	23.6	18.7	9.0	15.6	42.9	48.7	31		
12-16	A'22	71.1	21.2	7.7	16.2	9.1	5.2	21.6	19.0	7.9	13.3	41.1	52.1	39		
16-24	B'2	72.8	20.0	7.2	18.7	9.9	4.6	19.5	20.1	9.0	11.0	42.4	52.7	42		
24-32	C	78.2	17.0	4.8	7.5	15.0	6.6	26.7	22.4	8.7	8.3	48.5	55.8	35		

Depth (In.)	6A1a Organic carbon Pct	Nitrogen Pct	C/N	Carbonate as CaCO ₃ Pct	6C1a 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	8C1c (1.1) KCl	8C1a (1.1) H ₂ O			
1-0															
0-1	5.0				0.2										b/3.6
1-2	2.93				0.4										3.6
2-12	0.30				0.3										4.0
12-16	0.21				0.4										4.4
16-24	0.15				0.4										4.4
24-32	0.17				0.3										4.4

Depth (In.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6G1d Ext Al	Ratios to clay 8D1			8D3 Ca/Mg	Base saturation		
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	Ext iron		15-bar water	CEC Sum	Ext iron		15-bar water	5C3 Sum cations Pct	5C1 NH ₄ OAc Pct
1-0	0.3	0.7	0.2	0.3	1.5	67.1	68.6								2	
0-1	0.1	0.4	0.2	0.1	0.8	25.0	25.8				0.02				3	
1-2	0.1	1.2	tr.	0.1	1.4	20.6	22.0				0.04				6	
2-12	tr.	tr.	0.1	0.1	0.2	4.2	4.5				0.55	0.04			7	
12-16	tr.	0.1	0.1	0.1	0.3	3.2	3.5				0.45	0.05			9	
16-24	tr.	1.1	tr.	0.1	1.2	3.8	5.0				0.69	0.06			24	
24-32	tr.	0.1	tr.	0.1	0.2	2.3	2.5				0.52	0.06			8	

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

a/ Aggregates and undecomposed organic matter in sands.
b/ 1:5 dilution.

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.

Pedon Classification: Typic Dystrachrept; coarse-loamy, mixed, mesic

Soil: Hazleton taxadjunct 1/

Soil No.: S55Pa-36-14

Location: Lancaster County, Pennsylvania. 4 miles southeast of Strasburg on Crest of Mine Ridge 40 feet east of pole BT Co. of Pa. 66, 50 feet north into woods, 1/2 mile west of Mt. Pleasant Church. Aerial photo No. R-7-147.

Vegetation and land use: Forest - chestnut oak, red oak, scarlet oak, white oak, tulip poplar.

Slope and land form: 5 percent.

Drainage: Well drained.

Described by: F. G. Loughry.

Horizon and

Beltsville

Lab. No.

O1	2 to 1 inch.	Mixed hardwood leaves; abrupt wavy boundary.
Not sampled		
O2	1 inch to 0.	Black (5YR 2/1) rotted leaf litter; abrupt wavy boundary.
551623		
A2	0 to 1 inch.	Dark gray to gray (10YR 4/1 to 5/1) fine sandy loam with single grain structure; friable; very strongly acid; abrupt wavy boundary.
551624		
E2	1 to 2 inches.	Dark brown (10YR 4/3) fine sandy loam with single grain or very weak massive structure; friable; very strongly acid; abrupt discontinuous boundary.
551625		
A'21	2 to 12 inches.	Pale yellow (2.5Y 7/4) fine sandy loam; with very weak medium subangular blocky structure; friable; very strongly acid; clear wavy boundary.
551626		
A'22	12 to 16 inches.	Pale yellow (2.5Y 7/4) channery sandy loam with very weak medium subangular blocky structure; friable; very strongly acid; clear wavy boundary.
551627		
B'2	16 to 24 inches.	Pale yellow to yellow (2.5Y 7/4 - 7/6) channery sandy loam; very strongly acid; clear broken boundary.
551628		
C	24 to 32 inches plus.	Channery sandy loam; very strongly acid; clay coatings on weathered rock and in cracks to depths below sampling.
551629		

Notes: Colors are for moist soil.

1/ This pedon is a taxadjunct because it is in a coarse-loamy family particle size class, whereas the Hazleton series is in a loamy-skeletal class.

PEDON CLASSIFICATION: Aquic Dystric Eutrochrept; sandy, mixed, mesic

SOIL Minoa taxadjunct

SOIL Nos. S56Pa-25-11

LOCATION Eric County, Pennsylvania

SOIL SURVEY LABORATORY Lincoln, Nebraska

LAB. Nos. 7681 - 7691

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1		
		1B1b Total		Sand					Silt					2A2 > 2 < 19 Pct	2-19 Pct of < 75mm	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)				
0-4	A1	61.8	31.4	6.8	5.8 ^a	3.7 ^a	5.8 ^a	39.5 ^a	7.0 ^a	15.4	16.0	46.9	54.8	1.00	tr.	
4-7	A21	57.7	31.1	11.2	0.5 ^a	2.1 ^a	5.6 ^a	42.4 ^a	7.1 ^a	14.8	16.3	50.2	50.6	1.00	1.0	
7-11	A22	58.2	30.6	11.2	0.4 ^a	1.8 ^a	5.4 ^a	43.5 ^a	7.1 ^a	14.2	16.4	50.3	51.1	1.00	tr.	
11-15	B1	61.5	28.9	9.6	0.8 ^a	1.8 ^a	5.5 ^a	46.4 ^a	7.0 ^a	13.1	15.8	50.8	54.5	1.00	tr.	
15-22	B21	74.0	19.2	6.8	2.6 ^a	8.8 ^a	16.0 ^a	40.6 ^a	6.0 ^a	9.7	9.5	37.9	68.0	0.98	4.1	
22-26	B22	85.5	10.7	3.8	0.1 ^b	0.3 ^b	0.5 ^b	78.3 ^b	6.3 ^b	4.5	6.2	73.9	79.2	1.00	tr.	
26-35	C1	82.6	12.1	5.3	0.1 ^b	0.2 ^b	0.3 ^b	76.0 ^b	6.0 ^b	4.0	8.1	76.1	76.6	1.00	tr.	
35-46	C21	84.4	8.6	7.0	0.2 ^b	1.1 ^b	0.3 ^b	78.2 ^b	5.5 ^b	2.9	5.7	75.6	78.9	0.99	1.6	
46-55	C22	92.8	3.9	3.3	1.2 ^b	0.7 ^b	0.6 ^b	85.9 ^b	4.4 ^b	1.0	2.9	71.7	88.4	0.99	1.8	
55-58	C3	84.9	11.4	3.7	4.1 ^c	7.0 ^c	0.8 ^c	30.0 ^b	5.4 ^b	4.6	6.8	36.9	79.5		53.6	
58-76	IIC4	40.6	48.8	10.6	2.2 ^c	1.7 ^c	1.2 ^c	10.3 ^c	25.2 ^c	22.3	26.5	55.7	15.4		4.6	

Depth (in.)	6A1a Organic carbon Pct	6B1a		6E1a Carbonate as CaCO ₃ Pct.	6C1a Ext iron as Fe ⁺⁺ Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD In/In	pH	
		Nitrogen Pct.	C/N			4A3a d g/cc	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	
		0-4	5.32			0.528	10.1			1.1	0.68				
4-7	3.00	0.127	23.6		1.6	1.00									4.2
7-11	1.89	0.095	19.9		1.7	1.04									4.3
11-15	0.82	0.051	16.0		1.0	0.20									4.4
15-22	0.55	0.034	16.0		1.1	1.36									4.4
22-26	0.39	0.033	12.0		0.8	1.38									4.6
26-35	0.18				0.6	1.43									5.4
35-46	0.23				0.8	1.48									6.3
46-55	0.20			tr.	0.4	1.47									6.9
55-58	0.20				3	0.5									7.5
58-76	0.73				7	0.2									7.4

Depth (in.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC			6G1d Ext Al	Ratios to clay 8D1			8D3 Ca/Mg	Base saturation		
	6N2b Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	5A1a NH ₄ OAc	Sum		Ext. iron	15-bar water	5C3 Sum cations Pct.		5C1 NH ₄ OAc Pct.		
	meq/100 g																
0-4	5.0	1.0	tr.	0.3	6.3	36.8	43.1	33.3				6.34	0.16		5.0	15	19
4-7	0.3	tr.	tr.	0.1	0.4	22.5	22.9	13.0				2.04	0.14			2	3
7-11	0.2	0.2	tr.	0.1	0.5	15.9	16.4	9.6				1.46	0.15			3	5
11-15	0.1	tr.	tr.	0.1	0.2	9.8	10.0	5.8				1.04	0.10			2	3
15-22	0.1	1.3	tr.	0.1	1.5	7.7	9.2	4.0				1.35	0.16			16	38
22-26	tr.	0.2	tr.	0.1	0.3	5.7	6.0	2.6				1.58	0.21			5	12
26-35	1.9	tr.	tr.	0.1	2.0	2.0	4.0	2.9				0.75	0.11			50	69
35-46	2.8	0.4	tr.	0.1	3.3	1.6	4.9	3.7				0.70	0.11			67	89
46-55	1.3	0.4	tr.	0.1	1.8	0.8	2.6	1.7				0.79	0.12			69	106
55-58								2.0					0.14				
58-76								2.1					0.02				

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

^aFew smooth and irregular light brown to dark brown concretions.

^bFew smooth and irregular black concretions or minerals?

^cFew smooth and irregular black concretions or minerals? Also few CaCO₃ concretions.

^dBulk density by Beltrville laboratory.

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

Pedon Classification: Aquic Dystric Eutrochrept; sandy, mixed, mesic

Soil: Minoa taxadjunct ^{1/}

Soil Nos.: S56Pa-25-11

Location: Fairview Township, Erie County, Pennsylvania on White Swan Farm, in woods 200 feet west of drainage ditch back of houses west of Pasadena Drive, 75 feet north of south edge of woods, 15 feet south of dead hemlock stub. Location shown on aerial photo AFD-41-28.

Vegetation: Yellow birch, hard maple, hemlock, black gum, hickory, beech, black cherry, tulip poplar, elm, ash, spicebush, sassafras, basswood. Ground cover of tree seedlings, ferns, wild asters, greenbrier, virginia creeper, elderberry, trillium, and moss.

Parent material: Lacustrine sand over calcareous clay and very fine sand.

Physiography: Lake Erie Lake Plain, Bed of Glacial Lake Warren.

Relief: smooth, level.

Elevation: 650 feet.

Erosion: None.

Permeability: Rapid to 55 inches, very slow below.

Drainage: Poor.

Ground water: Water table at 48 inches when sampled.

Moisture: Moist when sampled.

Stoniness: None.

Root distribution: Many tree roots to 11 inches, a few to 49 inches, the soil contains many earthworms.

Sampled and described by: E. J. Pedersen, F. G. Loughry, L. T. Kardos, David C. Taylor and party, September 14, 1956.

Horizon and

Lincoln

Lab. No.

- Aoo 1 1/2 to 1/2 inch. Hardwood leaf litter.
- Ao 1/2 inch to 0. Dark reddish brown (5YR 2/2) leaf mold.
- A1 0 to 4 inches. Very dark brown (7.5YR 2/2) silt loam; weak fine granular structure; very friable when moist; pH 4.8; clear wavy lower boundary; thickness ranges from 3 to 4-1/2 inches.
- A21 4 to 7 inches. Dark brown (7.5YR 4/4) loam; weak fine granular structure; friable when moist; pH 4.6; clear wavy boundary; thickness ranges from 2 to 4 inches.
- A22 7 to 11 inches. Dark yellowish brown (10YR 4/4) fine sandy loam with few large faint to distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/8) mottles; weak fine platy structure grading to structureless; friable when moist; clear wavy lower boundary; thickness ranges from 2 to 5 inches.
- B1 11 to 15 inches. Yellowish brown (10YR 5/4) fine sandy loam with few medium distinct yellowish red (5YR 4/6) and strong brown (7.5YR 5/6) mottles; structureless; friable with firm streaks when moist; few hard yellowish red concretions 1/4 inch in diameter; pH 4.8; clear irregular lower boundary; thickness ranges from 3 to 7 inches.
- B21 15 to 22 inches. Light olive brown (2.5Y 5/4) sandy loam with few medium distinct strong brown (7.5YR 5/6) mottles; massive structure; moderately firm when moist, numerous reddish brown concretions 1/8 to 3/8 inch in diameter; pH 4.8; gradual wavy lower boundary; thickness ranges from 6 to 8 inches.
- B22 22 to 26 inches. Light olive brown (2.5Y 5/4) sandy loam with common large prominent yellowish red (5YR 5/6) and grayish brown (2.5Y 5/2) mottles; massive structure; hard when dry, very firm when moist; pH 4.8; clear wavy lower boundary; thickness ranges from 2 to 5 inches.
- C1 26 to 35 inches. Grayish brown to dark grayish brown (2.5Y 5/2 to 4/2) loamy sand with few yellowish red mottles near the top; structureless; very friable when moist; pH 5.5; gradual wavy lower boundary; thickness ranges from 7 to 11 inches.
- C21 35 to 46 inches. Dark grayish brown (2.5Y 4/2) loamy sand; structureless; very friable when moist; pH 6.5; gradual wavy lower boundary; thickness ranges from 7 to 12 inches.
- C22 46 to 55 inches. Gray (N 5/1) loamy sand; structureless; loose even when moist; pH 6.8; abrupt smooth lower boundary; thickness ranges from 7 to 11 inches.
- C3 55 to 58 inches. Gray (N 5/1) gravelly sand with white, red, black and olive gravel; structureless; loose; pH 7.2; abrupt smooth lower boundary; thickness ranges from 2 to 4 inches.
- IC^h 58 to 76 inches plus. Dark gray (N 4/1) stratified clay and very fine sand; firm when moist; effervesces with dilute HCl.

Remarks: This site was sampled as representative of an extensive area of this soil on the Erie Lake Plain. Colors are for moist soil.

^{1/}This pedon is a taxadjunct because it is barely in the sandy family particle size class, whereas the Minoa series is in a coarse-loamy class.

PEDON CLASSIFICATION: Dystric Eutrochrept; coarse-loamy, micaceous, mesic
SOIL Manor taxadjunct SOIL Nos. S56Pa-15-3 LOCATION Chester County, Pennsylvania

Chester County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 561503 - 561506

Depth (In.)	Horizon	181b Size class and particle diameter (mm) 3A1											382 Cm	381 Coarse fragments			
		Total			Sand					Silt				2A2 > 2 < 76 Pct	2-19 Pct	19-76 Pct of 76mm	
		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)	Int. III (0.05-0.02)	Int. II (0.02-0.002)	Int. I (2-0.1)					
0-7	Ap	44.2	41.7	14.1	6.1	9.4	5.8	11.7	11.2	16.0	25.7	34.0	33.0	0.89	19		
7-13	B2	44.6	40.7	14.7	6.2	9.3	5.9	11.5	11.7	15.2	25.5	33.6	32.9	0.88	20		
13-20	B3	52.3	35.6	12.1	8.9	11.3	6.1	12.6	13.4	15.4	20.2	36.3	38.9	0.82	27		
20-28	C	68.8	25.1	6.1	15.0	18.1	9.2	14.6	11.9	11.9	13.2	32.0	56.9	0.56	56		
Pct. of \leq 2 mm																	
Depth (In.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	Carbonate as CaCO ₃ Pct.	6C1a Ext. iron as Fe Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH			
						4A1e $\frac{1}{2}$ bar g/cc	4A1h Oven dry g/cc	4B1c $\frac{1}{2}$ bar Pct.		4B2 15 bar Pct.	8C1c (1-1) KCl	8C1a (1-1) H ₂ O					
														g/cc	g/cc	Pct.	Pct.
0-7	1.25	0.123	10		1.8		1.40			22.4	7.3	0.19			5.7		
7-13	0.19				2.2		1.50			21.4	7.6	0.18			5.3		
13-20	0.12				2.1		1.57			19.2	6.8	0.16			5.5		
20-28	0.06				1.6		1.66			13.4	4.5	0.08			5.4		
Depth (In.)	Extractable bases 5B1a					6H1a Ext. acidity meq/100 g	CEC		6G1d Ext. Al	Ratios to clay 8D1			8D3 Ca/Mg	Base saturation			
	6N2d 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.		
0-7	5.0	1.2	0.1	0.3	6.6	8.3	14.9			1.06	0.13	0.52	4.2	44			
7-13	4.0	0.9	tr.	0.3	5.2	5.7	10.9			0.74	0.15	0.52	4.2	48			
13-20	4.2	1.0	0.1	0.2	5.5	4.7	10.2			0.84	0.17	0.56	4.2	54			
20-28	3.4	1.5	0.2	0.3	5.4	3.6	9.0			1.48	0.26	0.74	2.3	60			
Depth (In.)	Clay Fraction Analysis 7A1b-d																
	Mt	Chl.	Vm.	Mi.	Int	Qtz.	Kl.	Gibbsite									
	7A2 X-ray				7A3												
0-7																	
7-13																	
13-20																	
20-28																	

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

Pedon Classification: Dystric Eutrochrepts; coarse-loamy, micaceous, mesic

Soil: Manor taxadjunct ^{1/}

Soil No.: S56Pa-15-3

Location: Chester County, Pennsylvania. H. B. Spackman farm, Thornbury Twp., 1/2 mile west of Darlington Corners on Street Road. In field south of woods. 150 feet south of maple tree in south edge of woods, about 225 feet west of southeastern corner of woods. Aerial photo AHK-44-89.

Vegetation and land use: Cropland. Sampled in alfalfa strip of contour strip cropped field.

Slope and land form: 12 percent C slope toward north.

Erosion: Moderately severe sheet erosion.

Drainage: Well drained.

Permeability: Moderate.

Sampled by: Merrill Kunkle, F. G. Loughry, E. J. Pedersen, J. J. Noll, J. B. Carey, and G. M. Fhibbs.

Horizon and

Beltsville

Lab. No.

Ap 561503	0 to 7 inches. Very dark grayish brown (10YR 3/2) silt loam, with weak fine granular structure, friable when moist; pH 6.6 (limed); abrupt smooth lower boundary; thickness ranges from 6 to 8 inches.
B2 561504	7 to 13 inches. Dark brown (7.5YR 4/4) micaceous silt loam with moderate medium subangular blocky structure, firm when moist; pH 6.0 (limed); discontinuous clay coatings on peds, clay flow between peds, numerous mica flakes; clear wavy lower boundary; thickness ranges from 4 to 8 inches.
B3 561505	13 to 20 inches. Dark brown (7.5YR 4/4) gritty silt loam, with moderate fine and medium subangular blocky structure, friable when moist; pH 5.8; discontinuous clay coatings on peds, numerous large mica flakes; clear irregular lower boundary; thickness ranges from 5 to 10 inches.
C 561506	20 to 28 inches plus. Mixed dark brown (10YR 4/3) and reddish brown (2.5YR 4/4) rotted gneiss and schist; pH 5.6.

Notes: Colors are for moist soil.

^{1/}This pedon is a taxadjunct because the base saturation is higher than in the Manor series which is in the Typic Dystrichrept suborder.

PEDON CLASSIFICATION: Fluvaquentic Eutrochrept; coarse-loamy, mixed, mesic
Series not designated

Erie County, Pennsylvania

SOIL No. S56Pa-25-10 LOCATION

SOIL SURVEY LABORATORY Lincoln, Nebraska

LAB. Nos. 7673 - 7680

Depth (in.)	Horizon	1B1b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments 3B1			
		Total		Sand					Silt					2A2 ≥ 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	Ap1	68.7	21.6	9.7	0.9 ^a	1.8 ^a	3.2 ^a	57.1 ^a	5.7 ^a	9.4	12.2	48.3	63.0	1.00	tr.		
3-9	Ap2	66.6	23.2	10.2	2.2 ^a	1.9 ^a	2.9 ^a	54.3 ^a	5.3 ^a	10.2	13.0	46.7	61.3	0.99	2.6		
9-15	A3g	78.4	16.4	5.2	0.7 ^a	1.4 ^a	3.2 ^a	68.3 ^a	4.8 ^a	7.8	8.6	51.6	73.6	0.99	0.9		
15-19	B21g	77.8	14.4	7.8	0.7 ^a	1.9 ^a	2.3 ^a	67.4 ^a	5.5 ^a	6.9	7.5	56.5	72.3	0.99	0.9		
19-22	B22g	79.9	11.9	8.2	3.7 ^b	4.4 ^b	2.9 ^b	64.4 ^a	4.5 ^a	4.9	7.0	48.8	75.4	0.98	3.0		
22-32	B23g	74.1	16.5	9.4	8.7 ^b	16.9 ^b	8.0 ^b	37.5 ^a	3.0 ^a	7.3	9.2	27.3	71.1	0.96	5.8		
32-38	C1	68.6	23.2	8.2	15.0 ^c	5.4 ^c	3.3 ^c	40.5 ^d	4.4 ^d	11.1	12.1	35.6	64.2		31.4		
38-66	IIC2	13.8	66.7	19.5	1.8 ^d	1.9 ^d	1.3 ^d	4.1 ^d	4.7 ^d	21.2	45.5	28.5	9.1	0.96	5.9		

Depth (in.)	6A1a Organic carbon Pct	6B1a Nitrogen Pct	C/N	6E1a Carbonate as CaCO ₃ Pct	6C1a Ext iron as Fe ²⁺ Pct	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH	
						4A3a e g/cc	4A1e 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	
0-3	3.45	0.242	14.2		1.3	0.88									4.9
3-9	2.00	0.157	12.7		1.5	1.26									5.1
9-15	0.23	0.026	9.0		1.1	1.61									5.6
15-19	0.12	0.026	5.0		1.8	1.62									6.1
19-22	0.11	0.019	6.0		1.7	1.64									6.4
22-32	0.16	0.023	7.0		2.0	1.64									6.8
32-38	0.26			tr.	1.8										7.4
38-66	1.08			5	0.2	1.96									7.2

Depth (in.)	Extractable bases 5B1a					6H1a Ext acidity	CEC		6G1d Ext. Al	Ratios to clay 8D1			8D3 Ca/Mg	Base saturation	
	6N2b Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	5A1a NH ₄ OAc		CEC Sum	Ext. iron	15-bar water		Sum cations Pct.	5C1 NH ₄ OAc Pct.
	meq/100 g														
0-3	3.3	1.2	tr.	0.4	4.9	14.0	18.9	13.5		1.95	0.13	2.8	26	36	
3-9	2.0	0.5	tr.	0.2	2.7	10.2	12.9	9.1		1.26	0.15		21	30	
9-15	1.1	0.5	tr.	0.1	1.7	2.8	4.5	2.4		0.87	0.21		38	71	
15-19	1.9	0.6	tr.	tr.	2.5	2.4	4.9	3.0		0.63	0.23		51	83	
19-22	2.5	0.8	tr.	tr.	3.3	2.4	5.7	3.5		0.70	0.21		58	94	
22-32	3.7	1.1	tr.	0.1	4.9	2.0	6.9	4.5		0.73	0.21	3.4	71	109	
32-38						1.2		3.6			0.22				
38-66						0.4		3.0			0.01				

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

^aFew smooth light brown to dark brown concretions (Fe-Mn?).
^bFew smooth light brown to dark brown concretions (Fe-Mn?). Also many sandstone fragments.
^cFew smooth light brown to dark brown concretions (Fe-Mn?). Also many sandstone fragments. Also few CaCO₃ concretions.
^dFew smooth black concretions (Mn-Fe?). Also few CaCO₃ concretions.
^eBulk density by Beltsville laboratory.

Pedon Classification: Fluvaquentic Eutrochrept; coarse-loamy, mixed, mesic

Soil: Series not designated ^{1/}

Soil Nos.: S56Pa-25-10

Location: Springfield Township, Erie County, Pennsylvania, on Paul Duris Farm, west of Township Route 310, 1/4 mile south of New York Central Railroad, 70 feet west of center of road at a point 90 feet north of black cherry tree with one large branch cut off. Location shown on aerial photo APD-1-4.

Vegetation: Aspen, red maple, tulip poplar, red osier dogwood, white ash, black gum, poison ivy. Ground cover of horsetail, wild aster, dewberry, ferns, moss, lycopodium.

Parent material: Lacustrine sand over calcareous clay.

Physiography: Lake Erie Lake Plain, Bed of Glacial Lake Warren.

Relief: Smooth, nearly level.

Elevation: 665 feet.

Erosion: None.

Permeability: Slow.

Drainage: Poor.

Ground water: Water table at 11 inches when sampled.

Moisture: Moist surface, wet below when sampled.

Stoniness: None.

Root distribution: Many roots to 9 inches, a few to 32 inches. This site has many large earthworm burrows penetrating to the calcareous horizon below 38 inches.

Sampled and described by: E. J. Petersen, F. G. Loughry, L. T. Kardos, D. C. Taylor and party, September 13, 1956.

Horizon and

Lincoln

Lab. No.

- Ao 1 inch to 0. Black leaf mold; pH 5.4 with abrupt smooth lower boundary; thickness ranges from 1/2 to 1-1/2 inches.
- Ap1 0 to 3 inches. Very dark brown (10YR 2/2) fine sandy loam with very weak fine granular structure; very friable when moist, nonplastic when wet; pH 5.4; clear wavy lower boundary; thickness ranges from 2 to 4 inches.
7673
- Ap2 3 to 9 inches. Dark brown (10YR 3/3) fine sandy loam with weak medium faint to distinct gray (10YR 5/1) mottling and very dark brown (10YR 2/2) streaks; very weak medium blocky structure with slight platiness; friable when moist, nonplastic when wet; pH 5.8; abrupt smooth lower boundary; thickness ranges from 5 to 7 inches.
7674
- A3g 9 to 15 inches. Grayish brown (10YR 5/2) fine sandy loam with common medium distinct yellowish brown (10YR 5/6) and strong brown (7.5YR 5/8) mottling; weak medium subangular blocky to platy structure with a few black and dark reddish brown concretions and centers; friable when moist, nonplastic when wet; pH 6.0; abrupt irregular lower boundary; thickness ranges from 2 to 9 inches.
7675
- B21g 15 to 19 inches. Yellowish brown (10YR 5/4) fine sandy loam with common large distinct yellowish red (5YR 4/6) and dark reddish brown (5YR 3/3) mottling; weak coarse blocky structure with discontinuous streaks and centers of yellowish red and dark reddish brown iron accumulation; very hard when dry, very firm when moist, nonplastic when wet; pH 6.2; clear irregular lower boundary; thickness ranges from 2 to 8 inches.
7676
- B22g 19 to 22 inches. Yellowish brown (10YR 5/4) loamy fine sand with common medium distinct dark brown (10YR 4/3) mottles and yellowish red (5YR 4/6) streaks; structureless with a few iron streaks and a few gravels; firm when moist, nonplastic when wet; pH 6.6; clear irregular lower boundary; thickness ranges from 2 to 4 inches.
7677
- B23g 22 to 32 inches. Dark yellowish brown (10YR 4/4) loamy sand with hardened reddish brown (5YR 4/4) streaks and some quicksand; structureless except for streaks and a few clay spots; from 5 to 10 percent gravel; friable when moist, nonplastic when wet; pH 6.8; clear irregular lower boundary; thickness ranges from 8 to 14 inches.
7678
- Cl 32 to 38 inches. Very dark grayish brown to dark brown (10YR 3/2 to 3/3) gravelly sand with some cobbles and a few boulders; structureless; friable when moist, nonplastic when wet; pH 7.2; abrupt smooth lower boundary; thickness ranges from 2 to 8 inches.
7679
- LIC2 38 to 66 inches plus. Gray (N 5/1 to 4/1) clay with 2 to 3 percent gravel and calcareous shale chips; very firm when moist, plastic when wet; effervesces with dilute HCl.
7680

Remarks: This site was sampled as representative of an extensive area of this soil on the Erie Lake Plain. Rimer is the somewhat poorly to poorly drained soil associated with the well drained Ottawa, moderately well drained Berrien, and the very poorly drained Wauseon. Colors are for moist soil.

^{1/}This pedon was sampled as a representative of the Rimer series but lacks an argillic horizon. The Rimer series is in the loamy, mixed, mesic family of Aquic Aeric Hapludalfs.

FEDON CLASSIFICATION: Typic Fragiudult; loamy-skeletal, mixed, mesic

SOIL Series not designated

SOIL No. S54Pa-41-1

LOCATION Lycoming County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 55220 - 55228

Depth (in.)	Horizon	181b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments			
		Total			Sand					Silt				2A2 > 2 < 76 Pct	2-19 Pct	19-76 Pct	
		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)	0.05-0.02	Int. III (0.02-0.002)	Int. II (0.2-0.02)					(2-0.1)
Pct. of \leq 2 mm																	
1-1	A2-B21	20.9	62.8	15.3	11.2	3.5	1.2	2.4	3.6	17.2	45.6	22.2	17.3		64		
1-3	B22	24.5	57.9	17.6	17.7	3.3	0.6	0.9	2.0	15.1	42.8	17.6	22.5		68		
3-12	A'2	29.4	56.5	14.1	20.2	5.8	1.0	0.8	1.6	14.8	41.7	16.9	27.8		70		
12-24	B'1	39.8	45.6	14.6	25.0	9.7	1.9	1.4	1.8	12.6	33.0	15.0	38.0		74		
24-36	B'2	44.9	37.9	17.2	27.4	11.1	2.3	1.8	2.3	11.7	26.2	14.8	42.6		70		
36-54	B'x1	42.8	45.8	11.4	12.2	11.9	6.1	7.4	5.2	15.2	30.6	24.2	37.6		58		
54-56	B'x2	18.6	65.2	16.2	4.2	3.7	1.6	3.3	5.8	23.6	41.6	31.4	12.8		25		
56-66	B'x3	26.5	55.3	18.2	7.6	8.5	2.8	3.7	3.9	14.8	40.5	20.7	22.6		-		
66-78	C	40.7	45.2	14.1	10.5	18.7	4.0	4.0	3.5	12.7	32.5	18.3	37.2		-		

Depth (in.)	6A1e Organic carbon Pct.	Nitrogen Pct.	C/N	Carbonate as CaCO ₃ Pct.	6C1a 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	4B1 Pct		4B1c 1/2 bar Pct.	4B2 15 bar Pct	8C1c (1.1) KCl		8C1a (1.1) H ₂ O	
															g/cc
1-1	7.90				1.5										4.0
1-3	3.62				1.5										4.6
3-12	1.26				1.3										4.6
12-24	0.39				1.5										4.7
24-36	0.21				1.8										5.0
36-54	0.16				1.9										4.9
54-56	0.15				2.3										4.6
56-66	0.16				3.0										4.8
66-78	0.15				2.7										5.0

Depth (in.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6G1d Ext Al	Ratios to clay 8D1			8O3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	Ext		CEC Sum	Ext. iron	15-bar water		Sum cations Pct.	5C1 NH ₄ OAc Pct.
1-1	0.5	0.9	0.2	0.1		26.2	27.9			1.83	0.10			6	
1-3	0.2	0.6	0.5	0.1		18.8	20.2			1.15	0.09			7	
3-12	0.3	0.2	0.1	tr.		10.2	10.8			0.77	0.09			6	
12-24	0.2	0.2	0.1	0.1		7.3	7.9			0.54	0.10			8	
24-36	0.8	1.7	0.3	0.1		6.0	8.9			0.52	0.10			32	
36-54	0.5	1.1	0.2	0.1		4.7	6.6			0.58	0.17			29	
54-56	0.1	1.2	0.2	0.1		5.8	7.4			0.46	0.14			22	
56-66	0.1	1.5	0.2	0.1		5.6	7.5			0.41	0.05			25	
66-78	0.2	2.1	0.3	0.1		4.9	7.5			0.53	0.19			35	

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.

Pedon Classification: Typic Fragiudult; loamy-skeletal, mixed, mesic

Soil : Series not designated^{1/}

Soil No.: S54Pa-41-1

Location: Lycoming County, Pennsylvania. Near Hughesville.

Vegetation and land use: An oak forest of predominantly black birch, red maple, sugar maple, hemlock, red oak, chestnut oak, and flowering dogwood.

Horizon and
Beltsville
Lab. No.

- O1
55217 1/2 to 1/4 inch. Surface litter of whole red oak, chestnut oak, black birch, and red maple leaves tied together weakly with fungal hyphae.
- O2
55218 1/4 inch to 0. Matted, partially decomposed leaves and needles firmly fastened to each other and to the A1 below by fungal hyphae; many animals including beetle larvae, ants, thrips, and millipedes.
- A1
55219 0 to 1/4 inch. Very dark brown (10YR 2/2) silt loam; weak, fine, granular structure; very friable; many rootlets; very high organic matter content; possibly should be considered an O2 rather than an A1 horizon.
- A2-B21
55220 1/4 to 1 inch. Dark gray (5YR 4/1) very channery silt loam, a very thin bleicherde, A2, underlain by a dark reddish brown (5YR 3/3) orterde, B'21; fibrous, spongy, and tied together with fungal hyphae; contains 50 percent or more fine channers, with a few larger ones; pH 5.2; abrupt, smooth boundary. In many places these horizons are absent and in their place is a very dark grayish brown (10YR 3/2) very channery silt loam.
- B22
55221 1 to 3 inches. Yellowish brown (10YR 5/4) very channery silt loam; weak, very fine, granular structure; very friable; pH 5.1; abrupt, smooth boundary.
- A'2
52222 3 to 12 inches. Light olive brown (2.5Y 5/4) very channery silt loam; very weak, medium, subangular blocky clods with no visible ped faces; very friable; many roots; many pores; no clay skins, channers have silt caps and do not separate cleanly from surrounding material; pH 4.8; abrupt, wavy boundary. This horizon is distinctly paler in color than the B1 horizon.
- B'1
55223 12 to 24 inches. Light olive brown (2.5Y 5/4 toward 10YR) very channery loam, very weak, medium, subangular blocky structure; friable; many fine pores; no clay skins; contains 50 to 70 percent by volume fine and coarse channers with very fine sand packed in around them; clear, wavy boundary.
- B'2
55224 24 to 36 inches. Dark yellowish brown (10YR 4/4) very channery loam which feels finer textured than B1 horizon; shiny clay skins are common, some have yellowish red color (5YR 4/6); 50 to 60 percent coarse skeleton, chiefly fine channers; pH less than 5.0; abrupt, wavy boundary.
- B'x1
55225 36 to 54 inches. Dark yellowish brown (10YR 4/4) very channery loam; massive; very firm in place; to 90 percent coarse skeleton consists mostly of coarse channers, includes as much as 5 percent of sub-rounded pebbles, the latter conspicuous because of their absence in horizons above; channers have silt caps, lie horizontal to the surface, and are firmly wedged one against another; abrupt, smooth boundary.
- B'x2
55226 54 to 56 inches. Yellowish brown (10YR 5/4) and brown (7.5YR 4/4) coarse distinctly mottled channery silt loam; massive; very firm, nonsticky; 20 to 30 percent coarse skeleton mostly weathered hard angular siltstone; abrupt smooth boundary. This material caps the prisms of the B24m horizon.
- B'x3
55227 56 to 66 inches. Yellowish red (5YR 4/6) and brown (7.5YR 4/4) silt loam which feels finer textured than B23m horizon; moderate, very coarse, prismatic structure, prisms 4 to 6 inches across, bordered with 1/8 inch thick pale brown (10YR 6/3) very fine sand, and breaks readily to very weak, medium, angular blocky structure; very firm, dense; few clay coated pores; 5 to 10 percent coarse skeleton consisting of strongly weathered but hard angular fragments of siltstone; no erratics on rounded pebbles observed.
- C
55228 66 to 78 inches plus. Yellowish brown (10YR 5/6) very channery loam; massive; firm in place; 90 percent coarse skeleton, consists of angular blocks of siltstone capped with fine material. These coarse fragments appear to be strongly weathered and lie on weakly weathered channers and flags that appear to be part of the underlying bedrock. Clay skins and silty material occur on these less weathered fragments.

Notes: Colors refer to moist soil.

^{1/}This pedon was sampled as a representative of the Weikert series, but by present classification it is too deep to rock and has a fragipan. The Weikert series is in the loamy-skeletal, mixed, mesic family of Lithic Dystrachrepts.

PEDON CLASSIFICATION: Aquic Fragluudult; fine-loamy, mixed, mesic

SOIL Glenville silt loam SOIL Nos. S56Pa-15-13 LOCATION Chester County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 57270 - 57275

Depth (In.)	Horizon	Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1			
		18B1b Total			Sand					Silt				2A2 ≥ 2 < 76 Pct	2-19 Pct	19-76 Pct of < 76mm	
		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)	0.05-0.02	Int. III (0.02-0.002)	Int II (0.2-0.02)					(2-0.1)
0-9	Ap	10.3	69.0	20.7	0.7	1.3	1.1	3.2	4.0	25.8	43.2	31.8	6.3	0.95	9		
9-18	B21t	10.5	64.2	25.3	1.0	1.3	1.0	3.1	4.1	22.7	41.5	28.8	6.4	0.96	6		
18-26	B22tg	13.2	65.2	21.6	1.3	1.7	1.2	3.9	5.1	25.2	40.0	32.8	8.1	0.89	16		
26-34	B31g	28.3	55.8	15.9	3.0	3.9	2.8	8.4	10.2	23.4	32.4	39.0	18.1	0.94	9		
34-40	B32g	24.0	61.7	14.3	2.9	4.2	2.5	6.8	7.6	27.7	34.0	39.5	16.4	0.93	11		
40-48	C	56.3	33.8	9.9	6.4	9.0	6.1	17.4	17.4	12.2	21.6	40.3	38.9	0.83	24		

Depth (In.)	6A1a Organic carbon Pct	6B1a Nitrogen Pct	C/N	Carbonate as CaCO ₃ Pct.	6C1a 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			4B1c 1/2 bar Pct.	4B2 15 bar Pct.			8A/ Field pH	8C1c (1:1) KCl	8C1a (1:1) H ₂ O
0-9	1.79	0.145	12		1.3			1.35						7.2		6.4
9-18	0.27				1.5			1.57						6.0		5.3
18-26	0.15				1.3			1.70						5.7		4.5
26-34	0.06				1.3			1.63						5.4		4.8
34-40	0.06				2.3			1.63						5.4		4.9
40-48	0.04				2.9			1.73						5.0		4.5

Depth (In.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6G1d Ext Al	Ratios to clay 5D1			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.
0-9	4.0	2.0	0.1	0.2	6.3	7.1	13.4			0.65	0.06	2.0	47		
9-18	5.2	2.3	tr.	0.1	7.6	6.3	13.9			0.55	0.06	2.3	55		
18-26	2.3	2.0	0.1	0.2	4.6	7.1	11.7			0.54	0.06	1.2	39		
26-34	2.2	1.3	tr.	0.1	3.6	6.3	9.9			0.67	0.08	1.7	35		
34-40	1.9	1.5	0.1	0.1	3.6	6.7	10.3			0.72	0.16	1.3	35		
40-48	0.9	1.0	tr.	0.1	2.0	4.4	6.4			0.65	0.29		31		

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

a/ Determined with pH indicator.

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.

Pedon Classification: Aquic Fragiudult; fine-loamy, mixed, mesic

Soil: Glenville silt loam

Soil No.: S56Pa-15-13

Location: Chester County, Pennsylvania. Ira Hicks farm, West Goshen Township, in alfalfa field 200 feet north of woods on West Chester Airport property, 150 feet west of township route 464.

Vegetation and land use: At sample site: a new seeding of alfalfa on plowed seedbed.

Slope and land form: One percent.

Erosion: Moderate sheet erosion 3 to 6 inches of soil lost at sample site. More lost up slope, some accumulated above edge of woods at lower corner of field.

Drainage: Moderately good drainage.

Permeability: Moderate to 18 inches, slow below.

Sampled by and date: W. M. Kunkle and R. Zimmerman. November 13, 1956.

Horizon and

Beltsville

Lab. No.

Ap 57270	0 to 9 inches. Dark grayish brown (10YR 4/2) silt loam with weak fine granular structure; friable; pH 7.2+ (limed); with abrupt smooth boundary; 8 to 11 inches thick.
B21t 57271	9 to 18 inches. Yellowish brown (10YR 5/4) silty clay loam with moderate medium subangular blocky structure; friable; pH 6.0 (limed); clear wavy boundary; slightly sticky clay coating on peds; numerous root and earthworm channels with organic staining; 7 to 11 inches thick.
B22t _E 57272	18 to 26 inches. Yellowish brown (10YR 5/6) silty clay loam with many fine faint grayish brown (10YR 5/2) mottles; moderate coarse subangular blocky structure; firm consistence; pH 5.7 (limed); gradual irregular boundary. Some root and earthworm channels; 6 to 10 inches thick.
B31g 57273	26 to 34 inches. Yellowish brown (10YR 5/4) silt loam with pale brown (10YR 6/3) mottling and coating on peds; moderate medium subangular blocky structure; friable; pH 5.4; clear wavy boundary; 6 to 12 inches thick.
B32g 57274	34 to 40 inches. Yellowish brown (10YR 5/6) light silt loam with light gray to light brownish gray (10YR 6/1 - 6/2) mottles and coatings on peds; weak fine to medium granular and weak medium platy structure; friable when moist, nonplastic and nonsticky when wet; pH 5.4; clear wavy boundary; a few quartz fragments 1/2 to 1 inch; 5 to 8 inches thick.
C 57275	40 to 48 inches plus. Yellowish brown (10YR 5/6) loam; weak fine platy structure; very friable; pH 5.0. This horizon is partially weathered mica schist.

Notes: Colors are for moist soil.

PELTON CLASSIFICATION: Typic Hapludult; fine-loamy, mixed, mesic

SOIL Allenwood stony silt loam

SOIL Nos. 554Pa-41-2

LOCATION Lycoming County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 55233 - 55245

Depth (in.)	Horizon	1B1b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments					
		Total			Sand					Silt				2A2 ≥ 2 ≤ 76 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																			
0-1	A2	27.5	58.5	14.0	2.3	3.9	3.8	8.7	8.8	19.8	38.7	33.9	18.7				53		
1-3	A22	24.7	61.6	13.7	1.6	3.2	3.6	8.0	8.3	22.4	39.2	35.4	16.4				30		
3-4	A3	24.1	59.6	16.3	2.6	3.0	3.4	7.3	7.8	21.1	38.5	33.4	16.3				35		
4-6	B11	24.9	57.1	18.0	3.6	3.4	3.4	6.8	7.7	20.0	37.1	31.8	17.2				21		
6-10	B12	24.6	53.6	21.8	3.4	3.7	3.5	6.8	7.2	18.4	35.2	29.6	17.4				16		
10-16	B21t	26.5	47.4	26.1	3.6	3.7	4.0	7.6	7.6	17.1	30.3	28.9	18.9				12		
16-22	B22t	24.6	38.1	37.3	2.7	3.8	3.7	7.2	7.2	12.5	25.6	24.1	17.4				20		
22-36	B23t	30.6	37.7	31.7	3.2	4.8	4.7	9.1	8.8	14.2	23.5	28.4	21.8				34		
36-46	B3	41.2	37.2	21.6	6.7	7.1	6.0	11.4	10.0	13.9	23.3	30.4	31.2				28		
46-60	B3	38.7	39.8	21.5	6.3	6.8	5.5	10.6	9.5	16.4	23.4	32.1	29.2				28		
60-70	C1	47.9	36.4	15.7	7.2	8.3	7.0	13.4	12.0	15.7	20.7	35.8	35.9				57		
70-88	C2	56.4	32.1	11.5	9.4	10.4	8.2	15.5	12.9	15.2	16.9	37.4	43.5				47		

Depth (in.)	6A1a Organic carbon Pct.	Nitrogen Pct.	C/N	Carbonate as CaCO ₃ Pct.	6C1a Ext. iron as Fe Pct.	6C1a Bulk density			4D1 COLE	4D1 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	
						0-1	11.20					1.6			
1-3	4.42				1.3										3.9
3-4	2.26				1.5										4.4
4-6	1.17				1.7										4.4
6-10	1.20				2.1										4.3
10-16	0.34				2.6										4.4
16-22	0.17				4.1										4.4
22-36	0.20				3.0										4.8
36-46	0.18				3.4										4.5
46-60	0.04				3.4										4.6
60-70	0.11				3.3										4.7
70-88	0.02				2.9										4.8

Depth (in.)	6N2d Extractable bases 5B1a					6H1a Ext. acidity	6G1a CEC		6G1d Ext Al	6D1 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 NH ₄ OAc Pct.
	meq/100 g														
0-1	0.5	0.8	0.1	0.3	1.7	24.6	26.3							6	
1-3	0.2	1.0	tr.	0.2	1.4	23.0	24.4				1.74	0.11		6	
3-4	0.1	0.5	0.1	0.2	0.9	10.8	11.7				0.91	0.09		8	
4-6	0.2	0.2	tr.	0.1	0.5	8.1	8.6				0.63	0.09		6	
6-10	0.1	0.3	tr.	0.1	0.5	7.9	8.4				0.47	0.09		6	
10-16	0.1	0.3	0.1	0.1	0.6	7.9	8.5				0.38	0.10		7	
16-22	0.1	tr.	tr.	0.1	0.2	9.7	9.9				0.38	0.06		2	
22-36	tr.	0.1	tr.	0.2	0.3	11.1	11.4				0.31	0.11		3	
36-46	tr.	tr.	0.1	0.1	2.4	10.2	10.4				0.39	0.12		2	
46-60	tr.	tr.	tr.	0.1	0.1	6.9	7.0				0.32	0.16		1	
60-70	tr.	tr.	0.1	0.1	0.2	6.9	7.1				0.33	0.15		3	
70-88	0.1	0.2	tr.	0.1	0.4	6.0	6.4				0.41	0.18		6	
	0.1	0.3	0.1	0.1	0.6	5.6	6.2				0.54	0.25		10	

Pedon Classification: Typic Hapludult; fine-loamy, mixed, mesic
 Soil: Allenwood stony silt loam
 Soil No.: S54Pa-41-2
 Location: Lycoming County, Pennsylvania, near Hughesville.
 Vegetation and land use: Oak forest consisting predominantly of chestnut oak.

Horizon and
 Beltsville
 Lab. No.

- O2 1-1/2 inches to 0. Forest floor, consisting of leaves and needles in various stages of decay.
 Not sampled O1, O21, O22, and O23 horizons can be distinguished. Casts and tunnel excavations of arthropod fauna occur as discontinuous A1 horizons.
- A21 (0-1/4") 0 to 1 inch. These are the very thin horizons of a micropodzol. The A'2 horizon is gray (10YR 6/1) gravelly silt loam or loam about 1/4 inch thick consisting of a mass of intertwined grayish fibrous fungal hyphae mixed with yellowish brown and gray sandy material. The B'21 horizon is dark yellowish brown (10YR 4/4) channery silt loam; weak very fine granular structure; matted with fungal hyphae.
 55233
 B (1/4-1")
 55234
- A2 1 to 3 inches. Reddish brown (2.5YR 4/4) gravelly silt loam; very weak granular structure; friable; horizontal roots numerous; many fine pores; matted with fungal hyphae.
 55235
- A3 3 to 4 inches. Yellowish brown (10YR 5/4) gravelly silt loam; otherwise like the A2 horizon.
 55236
- B11 4 to 6 inches. Strong brown (7.5YR 5/6) gravelly silt loam; weak coarse subangular blocky structure; very firm when dry; roots common; few fine pores.
 55237
- B12 6 to 10 inches. Yellowish red (5YR 5/6) silt loam; otherwise like the B11 horizon.
 55238
- B21t 10 to 16 inches. Yellowish red (5YR 4/8) loam or clay loam; strong medium subangular blocky structure; very firm; few discontinuous clay skins; exterior of peds duller colored than interior; abrupt boundary.
 55239
- B22t 16 to 22 inches. Intermediate between yellowish red (5YR 4/8) and dark red (2.5YR 3/6) clay loam; otherwise like B21 horizon. Material cut with a knife exhibits a few soft clayey strongly weathered fragments from sand size up to 1/4 inch in diameter.
 55240
- B23t 22 to 36 inches. Yellowish red (5YR 4/6) and dark red (2.5YR 3/6) gravelly clay loam; strong very coarse blocky and prismatic structure; extremely firm; roots common between peds; many fine pores; interior of peds is dark red, exterior is yellowish red; very coarse blocks are made up of moderate or weak medium angular blocks; discontinuous clay skins on ped surfaces; pores are glazed with clay; many soft clayey 1/8 to 1/2 inch pale yellow fragments inside of peds; coarse skeleton about 10-20 percent by volume; gradual boundary.
 55241
- B31 36 to 60 inches. Dark red (2.5YR 3/6) gravelly loam; massive; extremely firm and dense; a few very fine pores lined with clay; black finely pitted manganese dioxide skins are conspicuous, particularly bordering pebbles and stones; soft dark yellowish brown (10YR 4/4) strongly weathered fine channers and pebbles are also conspicuous when the material is cut or broken, much less so when crushed; sub-rounded hard pebbles larger than 1/2 inch diameter make up 20 percent of the soil volume.
 55242 (36-46)
 55243 (46-60)
- C1 60 to 70 inches. Dark red (2.5YR 3/6) gravelly loam; very firm; clay skins rare and discontinuous; black streaks of manganese dioxide are common, also some yellowish streaks; coarse skeleton 50 to 60 percent of volume consisting of angular, blocky fragments 3 to 4 inches in diameter, few, soft, weathered, clayey fragments.
 55244
- C2 70 to 88 inches. Same as C1 horizon except that texture is gravelly sandy loam.
 55245

Notes: Colors refer to moist soil.

PEDON CLASSIFICATION: Typic Hapludult; fine-loamy, mixed, mesic
Series not designated

SOIL No. S56Pa-15-11 LOCATION Chester County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 561548 - 561555

Depth (in)	Horizon	1B1b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments		
		Total			Sand					Silt				2AZ ≥ 2 < 76 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 (0.02- 0.002)	Int II (0.2-0.02)	(2-0.1)				
0-3	A1	39.0	45.8	15.2	1.8	6.2	8.0	13.6	9.4	17.5	28.3	34.1	29.6	9		
3-10	A2	38.1	45.9	16.0	2.4	6.1	7.8	12.8	9.0	17.5	28.4	33.2	29.1	15		
10-16	B1	35.7	47.4	16.9	2.1	6.6	7.2	11.4	8.4	18.6	28.8	33.0	27.3	19		
16-19	B21t	31.8	46.9	21.3	2.2	5.5	6.4	10.3	7.4	15.6	31.3	28.6	24.4	8		
19-27	B22t	27.9	47.9	24.2	2.4	5.2	5.5	8.9	5.9	17.4	30.5	28.0	22.0	14		
27-35	B3	25.5	52.0	22.5	1.7	4.8	5.3	8.2	5.5	16.8	35.2	26.6	20.0	5		
35-40	C1	25.1	52.1	22.8	2.4	4.7	5.2	7.8	5.0	17.7	34.4	26.7	17.3	13		
40	C2	29.6	45.7	24.7	2.5	5.7	5.8	8.6	7.0	15.0	30.7	26.7	22.6	10		

Depth (in)	6A1a Organic carbon Pct	Nitrogen Pct	C/N	Carbonate as CaCO ₃ Pct.	6C1a Ext iron as Fe Pct.	Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH		
						Ext iron as Fe g/cc	4A1a ½ bar g/cc	4A1b Oven dry g/cc		4B1c ½ bar Pct.	4B2 15 bar Pct.	8C1c (1-1) KCl		8C1a (1-1) H ₂ O		
															g/cc	g/cc
0-3	2.11	0.106	20		1.5					24.2	6.3				4.4	
3-10	0.84	0.054	16		1.3					26.7	7.0				4.7	
10-16	0.20				1.5					21.5	6.0				4.5	
16-19	0.12				1.8					22.7	8.1				4.3	
19-27	0.06				1.9					23.9	9.8				4.4	
27-35	0.02				1.9					24.8	9.3				4.8	
35-40	0.04				1.9					25.1	7.7				4.6	
40	0.02				2.2					21.7	9.3				4.4	

Depth (in.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6G1d Ext Al	Ratios to clay 8D1			8D3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	CEC Sum		Ext. iron	15-bar water	8C3 Sum cations Pct.		5C1 NH ₄ OAc Pct	
	meg/100 g														
0-3	0.1	0.4	tr.	0.2	0.7	11.6	12.3			0.81	0.10	0.41		6	
3-10	0.1	0.5	tr.	0.2	0.8	7.3	8.1			0.51	0.08	0.44		10	
10-16	0.1	0.1	tr.	0.2	0.4	5.4	5.8			0.34	0.09	0.36		7	
16-19	0.3	0.5	tr.	0.2	1.0	6.7	7.7			0.36	0.08	0.38		13	
19-27	0.6	0.7	0.1	0.3	1.7	7.3	9.0			0.37	0.08	0.40		19	
27-35	0.4	1.0	tr.	0.3	1.7	7.5	9.2			0.41	0.08	0.41		18	
35-40	0.3	0.4	0.1	0.3	1.1	7.8	8.9			0.39	0.08	0.34		12	
40	0.1	1.5	tr.	0.3	1.9	5.9	7.8			0.34	0.09	0.38		24	

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt.	Chl	Vm	Mi.	Int.	Qtz	Kl.	Gibbsite
	7A2 X-ray				7A3			
0-3								
3-10			xx	x			xx	
10-16								
16-19			x	xxx			xxx	
19-27								
27-35								
35-40				xxx			xxx	
40								

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.

Pedon Classification: Typic hapludult; fine-loamy, mixed, mesic

Soil: Series not designated^{1/}

Soil No.: S56Pa-15-11

Location: Chester County, Pennsylvania. Webster property; South Coventry Twp., 3/4 mile north of Coventryville, East of Route T470. 220 feet east of road starting at building lot stake 100 feet south of house on west side of road. 40 feet east of birch tree with bent top. Photo ANK-48-48.

Vegetation and land use: Second growth forest. White oak, red oak, black oak, red maple, tulip poplar; dogwood, black birch. Ground cover of tree seedlings; blueberries, a few ferns, moss, mountain laurel.

Slope and land form: 10 percent

Erosion: No apparent erosion at this site.

Drainage: Well drained.

Permeability: Moderate.

Sampled by and date: Merrill Kunkle, F. G. Loughry, E. J. Pedersen, J. J. Noll, G. M. Phibbs, John Carey, and Robert Zimmerman. November 1, 1956.

Horizon and
Beltsville
Lab. No.

O1 Not sampled	2 to 1 inch. Hardwood leaf litter.
O2 Not sampled	1 inch to 0. Leaf mold matted with roots and fungus mycelium, pH 4.2.
A1 561548	0 to 3 inches. Black to very dark brown (10YR 2/1 to 2/2) stony silt loam or fine loam with weak fine granular structure, very friable consistence, when moist, pH 4.6 contains about 25 percent of coarse fragments; gradual wavy lower boundary; thickness ranges from 2 to 3-1/2 inches.
A2 561549	3 to 10 inches. Very dark gray (N 3/) stony silt loam or fine loam, with weak fine platy structure, friable when moist contains about 25 percent coarse fragments; pH 5.2; clear wavy lower boundary; thickness ranges from 5 to 11 inches.
B1 561550	10 to 16 inches. Very dark gray to dark gray (N 3/ to 4/) stony silt loam with weak fine to medium subangular blocky structure, with distinct clay coats on peds; friable when moist, pH 5.4; contains about 20 percent coarse fragments; gradual wavy lower boundary; thickness ranges from 4 to 8 inches.
B21t 561551	16 to 19 inches. Dark grayish brown (2.5Y 4/2) stony silty clay loam, with weak to moderate subangular blocky to blocky structure with distinct clay coats on peds; friable to firm when moist; pH 5.2; contains about 20 percent coarse fragments; abrupt wavy lower boundary; thickness ranges from 2 to 4 inches.
B22t 561552	19 to 27 inches. Dark brown (10YR 3/3) stony silty clay loam with weak medium blocky structure with distinct clay coats on peds; firm in place when moist, pH 5.4; contains about 20 percent coarse fragments; clear wavy lower boundary; thickness ranges from 6 to 12 inches.
B3 561553	27 to 35 inches. Dark brown (10YR 3/3) stony silt loam, with weak medium blocky structure breaking to weak medium platy; with partial clay coats and a few manganese coats on peds; firm when moist; pH 5.2; contains about 20 percent coarse fragments; abrupt broken lower boundary; thickness ranges from 6 to 10 inches.
C1 561554	35 to 40 inches. Very dark gray (N 3/) streaked with dark brown stony silt loam with weak to moderate medium platy structure, firm when moist, pH 5.2, contains many partially weathered slate fragments.
C2 561555	40 inches plus. Dark bluish gray (5B 4/1) weathered slate.

Notes: Colors are for moist soil.

^{1/} This pedon was sampled as a representative of the Brecknock series. It fits the series criteria in most respects, but the base saturation is too low. Brecknock is in the fine-loamy, mixed, mesic family of Ultic Hapludalfs.

PEDON CLASSIFICATION: Typic Hapludult; fine-loamy, mixed, mesic

SOIL Chester silt loam SOIL Nos. S55Pa-36-15 LOCATION Lancaster County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 551630 - 551638

Depth (in.)	Horizon	1B1b Size class and particle diameter (mm) 3A1												3B2 Cm	3B1 Coarse fragments			
		Total			Sand					Silt					2A2 2-76 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)	(2-0.1)						
Pct. of $<$ 2 mm																		
1/2-0	O2																	
0-4	A1	19.2	56.8	24.0	1.6	2.8	2.9	6.8	5.1	16.8	40.0	25.7	14.1	18				
4-11	A2	19.3	55.2	25.5	2.1	2.8	2.7	6.4	5.3	18.5	36.7	27.4	14.0	9				
11-18	B21t	20.6	49.3	30.1	2.5	3.0	2.8	6.6	5.7	15.1	34.2	24.6	14.9	10				
18-27	B22t	24.2	41.1	34.7	2.9	3.5	3.1	7.6	7.1	14.0	27.1	25.5	17.1	30				
27-32	B23t	36.0	31.0	33.0	4.3	5.3	4.3	11.0	11.1	10.8	20.2	28.6	24.9	17				
32-38	B31t	42.0	27.0	31.0	4.8	6.4	5.2	12.8	12.8	9.2	17.8	29.7	29.2	24				
38-50	B32t	36.4	29.5	34.1	4.0	5.6	4.7	11.4	10.7	10.0	19.5	27.4	25.7	21				
50-70	C	42.3	25.1	32.6	7.2	7.4	4.9	11.5	11.3	9.2	15.9	27.3	31.0	18				

Depth (in.)	6A1a Organic carbon Pct	Nitrogen Pct	C/N	Carbonate as CaCO ₃ Pct	Ext iron as Fe Pct	6C1a Bulk density			4D1 COLE	Water content			4C1 WRD in/in	pH		
						4A1e 1/8 bar g/cc	4A1h Oven dry g/cc	4B1c 1/8 bar Pct		4B2 15 bar Pct	8C1c (1:1) KCl	8C1a (1:1) H ₂ O				
														8C1b (1:1) KCl		
1/2-0																
0-4	3.59				2.5											4.7
4-11	0.84				2.9											4.8
11-18	0.33				3.9											4.8
18-27	0.24				5.3											5.0
27-32	0.12				6.3											5.2
32-38	0.10				6.7											5.4
38-50	0.11				6.4											5.3
50-70	0.10				6.8											5.3

Depth (in.)	Extractable bases 5B1a					6H1a Ext acidity	6C2 Sum cations		6G1d Ext. Al	8D1 Ratios to clay			8D3 Ca/Mg	Base saturation			
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum	CEC		Ext. iron	15-bar water	CEC Sum		Ext. iron	15-bar water	5C3 Sum cations Pct	5C1 NH ₄ OAc Pct
	mg/100 g																
1/2-0	6.9	1.8	tr.	0.5	9.2	19.9	29.1										
0-4	0.6	0.6	tr.	0.4	1.6	17.2	18.8				0.78	0.10		3.8	32		
4-11	0.1	0.1	0.1	0.3	0.6	9.5	10.1				0.40	0.11			9		
11-18	0.2	0.3	0.3	0.2	1.0	8.8	9.8				0.33	0.13			6		
18-27	0.3	0.1	0.2	0.2	0.8	8.9	9.7				0.28	0.15			10		
27-32	0.1	0.5	0.2	0.2	1.0	6.0	7.0				0.21	0.19			8		
32-38	0.1	tr.	0.1	0.2	0.4	6.4	6.8				0.22	0.22			14		
38-50	0.1	0.1	0.1	0.2	0.5	6.6	7.1				0.21	0.19			6		
50-70	0.1	0.1	0.2	0.2	0.6	6.4	7.0				0.21	0.21			7		

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt	Chl.	Vm.	Mi.	Int.	Qtz	Kl	Gibbsite
	7A2 X-ray				7A3			
1/2-0								
0-4								
4-11		x	xx	xx			xx	
11-18								
18-27		x	xx	x			xx	
27-32								
32-38								
38-50								
50-70		x	xx	x			xx	

^a/1:5 dilution.

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.

Pedon Classification: Typic Hapludult; fine-loamy, mixed, mesic

Soil: Chester silt loam

Soil No.: S55Pa-36-15

Location: Lancaster County, Pennsylvania. 3/4 miles northeast of Bartville toward Ninepoints north of route 36009 in woods 60 feet from road and 1500 feet west of side road. Aerial photo #27.

Vegetation and land use: Forest - white oak, red oak, hickory, scarlet oak, chestnut oak, pin oak, dogwood, mountain laurel.

Slope and land form: 3 percent.

Drainage: Surface and internal drainage good.

Permeability: Moderately rapid.

Described by: F. G. Loughry.

Horizon and

Beltsville

Lab. No.

O1	1-1/2 to 1/2 inch.	Hardwood leaves.
Not sampled		
O2	1/2 inch to 0.	Dark reddish brown (5YR 2/2) leaf mold; very strongly acid; abrupt wavy boundary.
551630		
A1	0 to 4 inches.	Dark brown (10YR 4/3 to 3/3) silt loam with weak fine granular structure; very friable; strongly acid; clear wavy boundary.
551631		
A2	4 to 11 inches.	Strong brown to yellowish red (6.5YR 5/6) silt loam with weak fine granular, some very weak platy structure; very friable; strongly acid; clear wavy boundary.
551632		
B21t	11 to 18 inches.	Strong brown to yellowish red (6.5YR 5/6 to 5/8) heavy silt loam with weak fine to medium subangular blocky structure; friable; very strongly acid; clear wavy boundary.
551633		
B22t	18 to 27 inches.	Yellowish red (5YR 4/8) silty clay loam with moderate medium subangular blocky structure; friable; strongly acid; gradual wavy boundary.
551634		
B23t	27 to 32 inches.	Yellowish red to red (4YR 4/6 to 4/8) silty clay loam with moderate medium blocky structure; firm consistence when moist, slightly plastic when wet; strongly acid; gradual wavy boundary.
551635		
B31t	32 to 38 inches.	Red (2.5YR 4/6) silt loam with weak medium blocky structure; friable, strongly acid; clear irregular boundary; contains some clay-coated schist fragments.
551636		
B32t	38 to 50 inches.	Dark red (2.5YR 2/6) loam with weak coarse blocky and some medium platy structure; friable; strongly acid; clear irregular boundary; moderate amounts of clay-coated schist fragments.
551637		
C	50 to 70 inches plus.	Dark red to red loam with very weak blocky structure; friable; strongly acid.
551638		

Notes: Colors are for moist soil.

PEDON CLASSIFICATION: Typic Hapludult; fine-loamy, mixed, mesic

SOIL Chester silt loam SOIL Nos. S55Pa-36-16 LOCATION Lancaster County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 551639 - 551646

Depth (in)	Horizon	1B1b Size class and particle diameter (mm) 3A1												3B2 Cm	3B1 Coarse fragments		
		Total			Sand					Silt					2A2 > 2 < 76 Pct	2-19 Pct of < 76mm	19-76
		Sand (2-0.05)	Silt (0.05-0.002)	Clay (\leq 0.002)	Very coarse (2-1)	Coarse (1-0.5)	Medium (0.25-0.25)	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 \leq 2 mm																	
1-0	O2	25.4	54.6	20.0	3.7	4.6	2.8	7.9	^{a/} 6.4	15.1	39.5	26.2	19.0		21		
0-3	A1	21.5	54.9	23.6	3.6	3.3	2.4	6.6	5.6	16.1	38.8	25.6	15.9		37		
3-10	A2	24.3	50.9	24.8	5.7	4.0	2.6	6.5	5.5	14.6	36.3	24.0	18.8		20		
10-12	B1	23.4	49.0	27.6	5.1	3.9	2.5	6.3	5.6	14.5	34.5	23.9	17.8		16		
12-19	B21t	25.6	50.6	23.8	5.9	4.4	2.8	6.7	5.8	16.7	33.9	26.5	19.8		20		
19-27	B22t	41.3	39.7	19.0	10.9	8.8	4.2	9.4	8.0	11.1	28.6	24.6	33.3		55		
27-38	B3	58.8	28.0	13.2	15.9	13.2	6.0	12.6	11.1	9.5	18.5	27.9	47.7		37		
38-50	C																

Depth (in)	6A1a Organic carbon Pct.	Nitrogen Pct.	C/N	Carbonate as CaCO ₃ Pct.	6C1a Ext. iron as Fe Pct.	Bulk density			4D1 COLE Pct.	Water content			4C1 WRD in/in	pH		
						4A1e $\frac{1}{2}$ bar g/cc	4A1h Oven dry g/cc	4B1c $\frac{1}{2}$ bar Pct.		4B2 15 bar Pct.	8C1c (1-1) KCl	8C1a (1-1) H ₂ O				
														g/cc	g/cc	Pct.
1-0																
0-3	7.3				2.5											^{b/} 4.2
3-10	2.67				2.7											4.3
10-12	0.54				3.1											4.5
12-19	0.38				3.6											4.7
19-27	0.14				3.8											5.0
27-38	0.12				4.1											5.1
38-50	0.08				3.5											5.0

Depth (in)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay 8D1			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														
1-0	6.5	4.9	tr.	1.2	12.6	49.7	62.3					1.3		20	
0-3	0.6	1.1	tr.	0.5	2.2	24.4	26.6					1.33	0.13	8	
3-10	0.1	0.1	tr.	0.3	0.5	13.1	13.6					0.58	0.11	4	
10-12	tr.	0.1	0.3	0.2	1.5	8.6	9.2					0.59	0.13	7	
12-19	0.4	0.1	0.1	0.2	0.8	9.3	10.1					0.37	0.13	8	
19-27	0.1	1.6	0.2	0.2	2.1	7.3	9.3					0.39	0.16	22	
27-38	tr.	0.2	0.2	0.2	0.6	5.3	5.9					0.31	0.22	10	
38-50	tr.	tr.	0.3	0.1	0.4	6.5	6.9					0.52	0.27	6	

Depth (in)	Clay Fraction Analysis 7A1b-d							
	Mt.	Chl	Vm.	Mi	Int	Qtz	Kl.	Gibbsite
	7A2 X-ray				7A3			
1-0								
0-3								
3-10		xx	xx	x			xx	
10-12								
12-19		xx	xx	x			xx	
19-27								
27-38		xx	xx	x			xx	
38-50								

^{a/} Undecomposed organic matter in sand fraction.
^{b/} 1:5 dilution.

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.

Pedon Classification: Typic Hapludult; fine-loamy, mixed, mesic

Soil: Chester silt loam

Soil No.: S55Pa-36-16

Location: Lancaster County, Pennsylvania. Two miles east of Nine Points, 1 mile south of intersection of T970 and 36009. Mrs. H. H. Schoof farm, 25 feet west of dirt road 100 feet north of end of farm lane. Aerial photo No. AHM34-80.

Vegetation and land use: Forest - white oak, red oak, hickory, scarlet oak, chestnut oak, pin oak, dogwood, mountain laurel.

Slope and land form: 5 percent.

Drainage: Surface and internal drainage good.

Permeability: Moderately rapid.

Described by: F. G. Loughry

Horizon and

Beltsville

Lab. No.

O1	2 to 1 inch.	Mixed hardwood leaves.
Not sampled		
O2	1 inch to 0.	Rotted leaves.
551639		
A1	0 to 3 inches.	Black (10YR 2/1) silt loam with weak fine granular structures; very friable; strongly acid; abrupt wavy boundary.
551640		
A2	3 to 10 inches.	Dark brown (7.5YR 4/4) silt loam with weak medium granular, slightly platy structure; very friable; strongly acid; clear wavy boundary.
551641		
B1	10 to 12 inches.	Strong brown (7.5YR 5/6) heavy silt loam with moderate medium subangular blocky structure; friable; strongly acid; clear wavy boundary.
551642		
B21t	12 to 19 inches.	Strong brown (7.5YR 5/6) silty clay loam with moderate medium blocky structure; friable; strongly acid; gradual wavy boundary.
551643		
B22t	19 to 27 inches.	Strong brown (7.5YR 5/6) silty clay loam, moderate medium blocky structure; friable; medium acid; clear broken boundary.
551644		
B3	27 to 38 inches.	Yellowish red (5YR 5/6) channery silty clay loam; very weak blocky, some platy structure, friable; slightly acid; clear broken boundary; 30-40 percent coarse fragments of schist.
551645		
C	38 to 50 inches.	Red to very dark gray (2.5YR 4/6 - N/3) schistose weathered rock with yellowish red clay coatings on schist fragments; slightly acid.
551646		

Notes: Colors are for moist soil.

FEDON CLASSIFICATION: Typic Hapludult; fine-loamy, mixed, mesic

SOIL Glenn channery silt loam SOIL Nos. 856Pa-15-2 LOCATION Chester County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 561496 - 561502

Depth (in.)	Horizon	1B1b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments		
		Total			Sand					Silt				2A2 > 2 < 76 Pct	2-19 Pct of < 76mm	19-76
		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)				
Pct. of < 2 mm																
0-4	A1	32.5	48.4	19.1	3.5	7.4	5.0	9.2	7.4	14.9	33.5	27.6	25.1	0.90	26	
4-10	A2	36.2	47.9	15.9	5.9	7.9	5.2	9.5	7.7	14.5	33.4	27.6	28.5	0.82	32	
10-14	B1	36.2	45.7	18.1	6.6	8.1	4.9	9.3	7.3	17.4	28.3	30.1	28.9	0.85	24	
14-19	B21t	34.0	44.6	21.4	6.3	7.8	4.5	8.7	6.7	13.9	30.7	25.5	27.3	0.89	19	
19-24	B22t	34.8	43.8	21.4	9.1	7.5	4.1	8.1	6.0	14.5	29.3	25.0	28.8	0.83	27	
24-30	B3t	35.3	43.6	21.1	6.2	8.3	4.8	9.1	6.9	14.5	29.1	26.5	28.4	0.76	37	
30-40	C	51.5	33.0	15.5	10.9	11.5	6.5	12.5	9.7	11.3	21.7	28.1	41.8		53	

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	Carbonate as CaCO ₃ Pct.	6C1a 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.	8C1c (1.1) KCl	8C1e (1.1) H ₂ O			
														g/cc	g/cc
0-4	5.9	0.385	15		2.0		0.82			36.3	14.2	0.16		4.8	
4-10	0.87	0.070	12		2.2		1.27			24.4	8.0	0.17		4.4	
10-14	0.47	0.052	9		2.4		1.44			22.1	8.8	0.16		4.4	
14-19	0.36	0.047			2.4		1.36			21.4	9.9	0.14		4.3	
19-24	0.16				2.4		1.49			22.1	10.1	0.15		4.5	
24-30	0.14				2.4		1.45			21.9	9.8	0.13		4.5	
30-40	0.12				2.3					18.9	8.4			4.5	

Depth (in.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay 8D1			8D3 Ca/Mg	Base saturation	
	6N2d Ca	6O2b Mg	6P2e Na	6Q2a K	Sum		5A3a Sum cations	CEC Sum		Ext. iron	15-bar water	5C3 Sum cations Pct.		5C1 NH ₄ OAc Pct.	
															meg/100 g
0-4	3.7	1.8	0.1	0.8	6.4	27.1	33.5			1.75	0.10	0.74	2.1	19	
4-10	0.6	0.3	tr.	0.4	1.3	13.3	14.6			0.92	0.14	0.50		9	
10-14	0.6	0.3	0.1	0.4	1.1	12.5	13.9			0.75	0.13	0.49		10	
14-19	0.7	0.9	0.1	0.4	2.1	12.1	14.2			0.66	0.11	0.46		15	
19-24	0.7	0.9	0.1	0.4	2.1	10.4	12.5			0.58	0.11	0.47		17	
24-30	0.5	1.1	0.1	0.4	2.1	10.4	12.5			0.59	0.11	0.46		17	
30-40	0.3	1.4	0.1	0.6	2.4	10.0	12.4			0.80	0.15	0.54		19	

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.

Pedon Classification: Typic Hapludults; fine-loamy, mixed, mesic

Soil: Glenslg channery silt loam

Soil No.: 856Pa-15-2

Location: Chester County, Pennsylvania. H. B. Speckman farm, Thornbury Twp., 1/2 mile west of Darlington Corners on Street Road. In woods 260 feet from east edge of woods, 110 feet south of road. Aerial photo AEK-44-89.

Vegetation and land use: Forest. Old forest with large trees of beech, hickory, tulip poplar, and red oak. Understory of dogwood and viburnum. Largest trees were cut a few days before sample was collected.

Slope and land form: 13 percent.

Erosion: None evident.

Drainage: Well drained.

Permeability: Moderate.

Sampled by: W. M. Kunkle, F. G. Loughry, E. J. Pedersen, J. J. Noll, J. B. Carey, and G. M. Fhibus.

Horizon and
Beltsville
Lab. No.

- O1 1 to 1/2 inch. Hardwood leaf litter.
Not sampled
- O2 1/2 inch to 0. Black mull, pH 5.8.
Not sampled
- A1 0 to 4 inches. Very dark grayish brown (10YR 3/2) silt loam with weak very fine granular structure; very friable; pH 4.8; containing about 15 percent coarse schist fragments; clear wavy lower boundary; thickness ranges from 3 to 6 inches.
561496
- A2 4 to 10 inches. Dark brown (7.5YR 4/4) gritty silt loam with moderate fine to medium subangular blocky structure; friable; pH 4.8; contains about 10 percent coarse schist fragments; clear wavy lower boundary; thickness ranges from 4 to 8 inches.
561497
- B1 10 to 14 inches. Dark brown (7.5YR 4/4) gritty silt loam with moderate fine to medium subangular blocky structure showing some platiness; firm; pH 4.8; ped surfaces show some clay flows; contains about 15 percent coarse schist fragments; gradual wavy lower boundary; thickness ranges from 3 to 5 inches.
561498
- B21t 14 to 19 inches. Dark yellowish brown (10YR 4/4) heavy silt loam with moderate medium subangular blocky structure; firm consistence; pH 4.6; some clay coatings on peds and clay flow in pores; contains about 15 percent coarse schist fragments; gradual wavy lower boundary; thickness ranges from 3 to 7 inches.
561499
- B22t 19 to 24 inches. Dark yellowish brown (10YR 4/4) silt loam with strong medium subangular blocky structure; friable; pH 4.8; ped surfaces show faint clay coatings; contains about 15 percent coarse schist fragments; gradual wavy lower boundary; thickness ranges from 3 to 8 inches.
561500
- B3t 24 to 30 inches. Dark brown to brown (7.5YR 4/4 to 5/4) silt loam with moderate fine subangular blocky structure; friable; pH 5.2; distinct clay flows on some ped faces; contains about 25 percent coarse schist fragments; abrupt broken lower boundary.
561501
- C 30 to 40 inches plus. Yellowish brown (10YR 5/4) fragmented gneiss and schist containing 50 to 80 percent coarse fragments increasing downward and showing schistose rock structure; pH 5.4.
561502

Note: Colors are for moist soil.

PEDON CLASSIFICATION: Typic Hapludult; fine-loamy, mixed, mesic

SOIL Lansdale taxadjunct

SOIL Nos. 855Pa-36-8

LOCATION Lancaster County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 551588 - 551593

Depth (in.)	Horizon	1B1b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments		
		Total			Sand				Silt					2A2 ≥ 2 < 76 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 (0.02-0.002)	Int. II (0.2-0.02)	(2-0.1)				
0-5	A1	42.6	44.4	13.0	7.1	10.8	7.2	10.0	7.5	13.9	30.5	27.0	35.1	6		
5-13	A2	40.5	46.4	13.1	5.8	10.2	7.2	9.6	7.7	14.1	32.3	27.1	32.8	tr.		
13-17	B1t	37.1	45.4	17.5	6.3	9.4	6.1	8.5	6.8	13.9	31.5	25.4	30.3	tr.		
17-26	B2t	43.5	37.7	18.8	8.1	11.8	7.0	9.4	7.2	12.3	25.4	24.7	36.3	tr.		
26-32	B3	56.1	29.5	14.4	10.2	14.1	9.6	13.1	9.1	11.1	18.4	27.4	47.0	16		
32-37	C	67.6	22.5	9.9	8.4	17.2	12.9	18.4	10.7	8.5	14.0	28.8	56.9	16		

Depth (in.)	6A1a Organic carbon Pct.	Nitrogen Pct.	C/N	Carbonate as CaCO ₃ Pct.	6C1a 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.	8C1c (1:1) KCl	8C1a (1:1) H ₂ O			
0-5	4.20														5.5
5-13	0.89														4.8
13-17	0.23														4.6
17-26	0.17														4.8
26-32	0.11														4.8
32-37	0.08														4.9

Depth (in.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay 8D1			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 OH Pct.	
0-5	5.3	1.4	0.1	0.5	7.3	14.1	21.4				1.65		3.8	34	
5-13	0.7	0.2	0.1	0.2	1.2	7.3	8.5				0.65			14	
13-17	0.6	tr.	0.1	0.2	0.9	8.1	9.0				0.51			10	
17-26	1.1	0.9	0.1	0.2	2.3	7.7	10.0				0.53			23	
26-32	1.6	1.4	tr.	0.2	3.2	7.3	10.5				0.73		1.1	30	
32-37	1.1	1.4	tr.	0.2	2.7	5.6	8.3				0.84		0.8	32	

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt.	Chl.	Vm.	Mi.	Int.	Qtz.	Kl.	Gibbsite
0-5								
5-13		xxx	xxx	x			xxx	
13-17			xxxx	x			xxx	
17-26			xxxx	x			xxx	
26-32			xxxx	x			xxx	
32-37			xxxx	x			xxx	

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.

Pedon Classification: Typic Hapludult; fine-loamy, mixed, mesic

Soil: Lansdale taxadjunct ^{1/}

Soil No.: 855Pa-36-8

Location: Lancaster County, Pennsylvania. 1-1/2 mile north of Rhums and 1-1/2 mile east of Elizabethtown, Raymond Myers farm, in woods 250 feet west of road, 70 feet from south edge of woods. Aerial photo No. AHG-7D-30.

Vegetation and land use: Oak, hickory, ash, hackberry, sassafras, poison ivy, and dogwood.

Slope and land form: 5 percent.

Drainage: Well drained.

Permeability: Moderate.

Described by: F. G. Loughry.

Horizon and

Beltsville

Lab. No.

O1	1-1/2 to 1/2 inch.	Hardwood leaf litter.
Not sampled		
O2	1/2 inch to 0.	Rotted leaf mold.
Not sampled		
A1	0 to 5 inches.	Very dark gray brown (10YR 3/2) loam with weak fine granular structure; very friable; medium acid; clear wavy boundary.
551588		
A2	5 to 13 inches.	Brown (10YR 5/3) loam with weak fine medium subangular blocky structure; friable; strongly acid; clear smooth boundary.
551589		
B1t	13 to 17 inches.	Brown (7.5YR 5/4) silt loam with moderate medium fine subangular blocky structure; friable; strongly acid; gradual smooth boundary.
551590		
B2t	17 to 26 inches.	Dark brown (7.5YR 4/4) heavy silt loam with moderate medium subangular blocky structure; friable; strongly acid; gradual smooth boundary.
551591		
B3	26 to 32 inches.	Dark brown (7.5YR 4/4) gritty heavy silt loam with moderate medium subangular blocky structure; friable; strongly acid; gradual wavy boundary.
551592		
C	32 to 37 inches.	Dark brown (7.5YR 3/2 - 4/4) sandy loam with moderate medium subangular blocky structure; friable; strongly acid; diffuse irregular boundary; contains about 50 percent weathered yellowish gray arkosic sandstone.
551593		
D	37 inches plus.	Mixed red and yellow Triassic rocks.
Not sampled		

Notes: Colors are for moist soil.

^{1/} This pedon is a taxadjunct because it is in a fine-loamy family particle size class, whereas the Lansdale series is in a coarse-loamy class.

FEDON CLASSIFICATION: Typic Hapludult; fine-loamy, mixed, mesic
SOIL Series not designated

SOIL Nos. S56Pa-15-7

LOCATION Chester County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 561523 - 561528

Depth (in.)	Horizon	1B1b Size class and particle diameter (mm) SA1											3B2 Cm	3B1 Coarse fragments		
		Total				Sand				Silt				2A2 > 2 < 76 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)	(2-0.1)				
0-3	A1	28.8	55.9	15.3	0.9	3.0	4.9	11.9	8.1	19.9	36.0	34.9	20.7	1.00	tr.	
3-8	A2	28.2	56.0	15.8	0.8	2.9	4.8	11.9	7.8	22.9	33.1	37.3	20.4	1.00	tr.	
8-11	B1	27.0	56.8	16.2	0.8	2.8	4.7	11.1	7.6	20.3	36.5	34.1	19.4	1.00	tr.	
11-16	B2t	29.2	53.5	17.3	0.6	3.0	4.9	12.1	8.6	21.1	32.4	36.6	20.6	0.98	4	
16-24	B22t	32.4	48.1	19.5	0.4	2.9	5.5	13.0	10.6	17.8	30.3	35.9	21.8	0.99	2	
24-30	C1	31.4	47.7	20.9	0.5	3.5	5.6	12.9	8.9	18.5	29.2	34.3	22.5	1.00	tr.	

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	Carbonate as CaCO ₃ Pct.	6C1a 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			
														g/cc	g/cc
0-3	3.98	0.213	19		1.5		0.89			27.9	7.7	0.18		4.4	
3-8	0.97	0.076	13		1.5		1.08			24.3	5.2	0.21		4.5	
8-11	0.50	0.041	12		1.5		1.29			23.3	5.4	0.23		4.3	
11-16	0.26				1.7		1.41			22.7	5.9	0.23		4.4	
16-24	0.15				2.0		1.50			22.8	7.3	0.23		4.2	
24-30	0.04				2.2		1.58			21.5	9.8	0.18		4.4	

Depth (in.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay 8D1			8D3 Ca/Mg	Base saturation			
	6N2d Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A3a Sum cations	Ext. iron		15-bar water	CEC Sum	Ext. iron		15-bar water	Ca/Mg	5C3 Sum cations Pct.	5C1 NH ₄ OAc Pct.
0-3	1.8	0.6	0.1	0.4	2.9	16.0	18.9			1.24	0.10	0.50		15			
3-8	0.3	0.2	0.1	0.2	0.8	9.7	10.5			0.66	0.09	0.33		8			
8-11	0.4	0.3	tr.	0.2	0.9	8.3	9.2			0.57	0.09	0.33		10			
11-16	0.3	0.3	0.1	0.2	0.9	8.1	9.0			0.52	0.10	0.34		10			
16-24	0.2	0.5	tr.	0.2	0.9	9.1	10.0			0.51	0.10	0.37		9			
24-30	0.6	1.6	0.1	0.3	2.6	9.4	12.0			0.57	0.11	0.47		22			

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt.	Chl.	Vm.	Mi.	Int.	Qtz.	Kl.	Gibbsite
	7A2 X-ray				7A3			
0-3								
3-8			xxxx	xx			x	
8-11			xxx	xx			x	
11-16			xx	xx			x	
16-24			xx	xxx			x	
24-30			x	xxx			x	

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.

Pedon Classification: Typic Hapludult; fine-loamy, mixed, mesic

Soil: Series not designated

Soil No.: S56Pa-15-7

Location: Chester County, Pennsylvania. William F. Tyson farm, East Coventry Twp. 1/2 mile south of cemetery on Schuylkill road east of Kenilworth. In small patch of woods 40 feet east of township road T531, 70 feet from south edge of woods. Aerial photo AHK-44-52.

Vegetation and land use: Woodland; small woodlot adjacent to fields and township road. Trees include scarlet oak, pin oak, hickory, white oak, cherry, beech, ground cover of Hall's honeysuckle, and poison ivy. Tree roots penetrate into the C1 horizon.

Slope and land form: 3.5 percent.

Erosion: No apparent sheet or gully erosion.

Drainage: Well drained.

Permeability: Moderate.

Sampled by: Merrill Kunkle, E. J. Pedersen, F. G. Loughry, J. J. Noll, John B. Carey, and G. M. Phibbs.

Horizon and

Beltsville

Lab. No.

O1	1-1/2 to 1/2 inch.	Hardwood leaf litter.
Not sampled		
O2	1/2 inch to 0.	Rotted leafmold.
Not sampled		
A1	0 to 3 inches.	Dark reddish brown (5YR 3/2) silt loam with weak fine granular structure, very friable when moist; pH 4.8; clear wavy lower boundary; thickness ranges from 2 to 5 inches.
561523		
A2	3 to 8 inches.	Reddish brown (2.5YR 4/4) silt loam, with very weak thin platy to weak fine granular structure, very friable consistence when moist; pH 4.8; clear wavy lower boundary; thickness ranges from 3 to 6 inches.
561524		
B1	8 to 11 inches.	Reddish brown (2.5YR 4/4) fine silt loam, with weak fine to medium subangular blocky structure; peds with partial clay coats; friable consistence; pH 5.4; gradual wavy lower boundary; thickness ranges from 2 to 4 inches.
561525		
B21	11 to 16 inches.	Weak red (10R 4/3) silt loam, with moderate medium subangular blocky structure; peds have continuous clay coats; firm consistence when moist; pH 5.3; gradual wavy lower boundary; thickness ranges from 3 to 7 inches.
561526		
B22t	16 to 24 inches.	Weak red (10R 4/3) fine silt loam with moderate medium subangular blocky structure; consistence is hard when dry, firm when moist and slightly plastic when wet; pH 5.3; clear wavy lower boundary; thickness ranges from 6 to 10 inches.
561527		
C1	24 to 30 inches.	Weak red loam and 80 to 90 percent rotten sandstone with weak medium platy structure, firm in place; pH 5.3; clay coatings on fractured sandstone. This material continues below 30 inches becoming harder and less weathered.
561528		

Notes: Colors are for moist soil.

^{1/}This pedon was sampled as a representative of the Penn series, but the base saturation is too low. Penn is in a fine-loamy, mixed, mesic family of Ultic Hapludalfs.

FEDON CLASSIFICATION: Typic Hapludult; fine-silty, mixed, mesic
SOIL Chester taxadjunct SOIL Nos. 855Pa-36-12

LOCATION Lancaster County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 551608 - 551615

Depth (in.)	Horizon	Size class and particle diameter (mm) 3A1											3B2 Cm	Coarse fragments 3B1			
		Total					Sand				Silt			Int. II (0.2-0.02)	2A2 > 2 < 76 Pct.	2-19 Pct.	19-76 Pct.
		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)	0.05-0.02	Int. III (0.02-0.002)						
2-0	O2	15.3	62.4	22.3	1.6	2.1	1.2	3.8	6.6	18.1	44.3	27.1	8.7				
0-4	A1	14.1	62.6	23.3	2.2	1.8	1.1	3.0	6.0	18.3	44.3	26.4	8.1				
4-10	A2	11.4	56.5	32.1	1.7	1.4	0.8	2.4	5.1	15.1	41.4	21.8	6.3				
10-15	B1t	11.6	53.8	34.6	1.5	1.3	0.8	2.7	5.3	13.8	40.0	21.0	6.3				
15-23	B21t	12.6	55.7	31.7	1.8	1.6	1.0	2.8	5.4	13.6	42.1	21.0	7.2				
23-29	B22t	21.7	52.5	25.8	2.6	3.2	1.8	5.2	8.9	11.8	40.7	24.1	12.8				
29-34	B3	33.3	48.9	17.8	3.6	5.0	3.0	9.0	12.7	11.7	37.2	30.2	20.6				
34-45	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 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	
2-0	21.1														
0-4	6.50														D/ 5.5
4-10	1.96														4.7
10-15	0.35														4.7
15-23	0.22														4.9
23-29	0.15														5.0
29-34	0.14														5.1
34-45	0.08														5.1

Depth (in.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay 8D1			8D3 Ca/Mg	Base saturation	
	6N2d Ca	8O2b 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.
2-0	10.5	2.7	0.3	0.6	14.1	35.3	49.4					3.9	29		
0-4	1.0	0.8	0.3	0.2	2.3	22.6	24.9						9		
4-10	0.2	0.5	0.1	0.3	1.1	13.6	14.7						7		
10-15	0.2	0.7	tr.	0.3	1.2	8.8	10.0						12		
15-23	0.3	2.3	0.1	0.4	3.1	8.3	11.8						30		
23-29	0.2	2.8	0.1	0.3	3.4	7.9	11.3						30		
29-34	tr.	1.5	tr.	0.3	1.6	4.3	6.1						30		
34-45	0.1	0.8	tr.	0.1	1.0	4.1	5.1						20		

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt.	Chl.	Vm.	Mi.	Int.	Qtz.	Kl.	Gibbsite
	7A2 X-ray				7A3			
2-0								
0-4								
4-10		xx	xx				xxx	
10-15								
15-23		xx	xx				xxx	
23-29								
29-34							xxx	
34-45			xxx	x			xxx	

D/ Undecomposed organic matter in sand fraction.
D/ 1:5 dilution.

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.

Pedon Classification: Typic Hapludult; fine-silty, mixed, mesic

Soil: Chester taxadjunct^{1/}

Soil No.: 855Pa-36-12

Location: Lancaster County, Pennsylvania. One mile northeast Manorville, 1-1/2 miles south Mountville, 8,000 feet east southeast Gott Allely Church, 110 feet north and 90 feet west of southeast corner of woods. Aerial photo No. R-1-09.

Vegetation and land use: (At sample site) Forest - white oak, red oak, tulip poplar, scarlet oak, red maple, sassafras, dogwood, and hickory.

Slope and land form: 2 percent.

Drainage: Well drained.

Permeability: Moderate.

Described by: F. G. Loughry.

Horizon and
Beltsville
Lab. No.

O1	3 to 2 inches. Mixed hardwood leaves.
Not sampled	
O2	2 inches to 0. Black (10YR 2/1) rotted leaf litter mixed with some wormcasts and granules of mineral soil; abrupt wavy boundary.
551508	
A1	0 to 4 inches. Dark brown (10YR 4/3) silt loam with weak very fine granular structure; very friable; strongly acid; clear irregular boundary.
551509	
A2	4 to 10 inches. Yellowish brown (10YR 5/4) silt loam with weak fine granular structure; very friable; strongly acid; clear wavy boundary.
551510	
B1t	10 to 15 inches. Strong brown (7.5YR 5/6) heavy silt loam with weak fine to medium subangular blocky structure; friable; strongly acid; gradual wavy boundary.
551511	
B21t	15 to 23 inches. Strong brown (7.5YR 5/6) heavy silt loam with moderate medium blocky structure; firm; strongly acid; gradual wavy boundary.
551512	
B22t	23 to 29 inches. Strong brown (7.5YR 5/6 - 5/8) heavy silt loam with moderate medium blocky structure; firm; strongly acid; gradual wavy boundary.
551513	
B3	29 to 34 inches. Yellowish brown to strong brown (10YR 5/6 to 7.5YR 5/6) silt loam with weak fine to medium blocky structure; friable; strongly acid; gradual irregular boundary.
551514	
C	34 to 45 inches. Very pale brown to yellowish brown (10YR 7/3 - 5/6) greasy weathered micaceous limestone schist with weak fine platy structure; very friable; medium acid.
551515	

Notes: Colors are for moist soil.

^{1/}This pedon is a taxadjunct to the Chester series because of family particle size class. Chester is in the fine-loamy class. Sampled as a representative of the Conestoga series which is in the Typic Hapludalfs.

FEDON CLASSIFICATION: Typic Hapludult; fine, mixed, mesic

SOIL Duffield taxadiunct

SOIL Nos. 855-Pa-36-5

LOCATION Lancaster County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 551557 - 551564

Depth (in.)	Horizon	181b Size class and particle diameter (mm) 3A1											3B2 Cm	3B1 Coarse fragments		
		Total			Sand					Silt				2A2 > 2 < 76 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)				
0-4	A1	12.1	68.5	19.4	1.9	1.9	1.4	2.5	4.4	22.8	45.7	28.5	7.7	11		
0-4	A1	10.1	67.7	22.2	1.5	1.6	1.2	1.9	3.9	21.3	46.4	26.2	6.2	8		
4-13	A2	10.4	60.9	28.7	1.5	1.6	1.2	1.9	4.2	19.6	41.3	24.8	6.2	4		
13-19	B21t	11.4	53.3	35.3	2.4	1.7	1.2	2.0	4.1	17.3	36.0	22.5	7.3	tr.		
19-26	B22t	12.1	42.1	45.8	1.8	1.8	1.3	2.2	5.0	14.1	28.0	20.3	7.1	tr.		
26-37	B23t	7.9	62.6	29.5	1.3	1.1	0.9	1.4	3.2	20.1	42.5	24.1	4.7	tr.		
37-49	B3	10.0	56.2	33.8	1.9	1.4	1.0	1.7	4.0	19.4	36.8	24.4	6.0	12		
49-66	C															

Depth (in.)	6A1a Organic carbon Pct.	Nitrogen Pct.	C/N	Carbonate as CaCO ₃ Pct.	6C1a Ext. iron as Fe Pct.	6C1a Bulk density			4D1 COLE	4D1 Water content			4C1 WRD in/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) H ₂ O		
						0-4	12.7					1.5					
0-4	3.33				2.0												4.9
4-13	0.36				2.7												4.4
13-19	0.22				3.3												4.5
19-26	0.12				4.1												4.9
26-37	0.13				3.1												4.8
37-49	0.12				3.5												4.9
49-66	0.11																5.0

Depth (in.)	Extractable bases 5B1a					6H1a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay 8D1			8B3 Ca/Mg	Base saturation	
	6N2a Ca	6O2b Mg	6P2a Na	6Q2a K	Sum		5A5e Sum	cations		CEC Sum	Ext. iron	15-bar water		5C3 Sum cations Pct.	5C1 NH ₄ OAc Pct.
	meq/100 g														
0-4	13.0	2.9	0.1	1.1	17.1	27.7	44.8						4.5	38	
0-4	2.0	1.8	tr.	0.4	4.2	17.0	21.2						1.1	20	
4-13	0.5	0.2	tr.	0.2	0.9	8.4	9.3							10	
13-19	0.7	0.3	tr.	0.2	1.2	10.3	11.5							10	
19-26	1.7	1.2	tr.	0.3	3.2	11.1	14.3							22	
26-37	1.0	2.2	tr.	0.3	3.5	11.2	14.7							24	
37-49	0.5	1.0	0.1	0.2	1.8	9.5	11.3							16	
49-66	0.8	1.7	0.1	0.2	2.8	9.3	12.1							23	

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt.	Chl.	Vm.	Mi.	Int.	Qtz.	Kl.	Gibbsite
	7A2 X-ray							
0-4								
0-4		xx	xx	x			xx	
4-13								
13-19		xx	xx	x			xx	
19-26								
26-37		xx	xx	x			xx	
37-49								
49-66		x	x	x			x	

8/1:5 dilution.

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.

Pedon Classification: Typic Hapludult; fine, mixed, mesic
 Soil: Duffield taxadjunct ^{1/}
 Soil No.: 855Pa-36-5
 Location: Franklin County, Pennsylvania.
 Vegetation and land use: Woodland - red maple, white oak, scarlet oak, black cherry, elm, sassafras, dog-wood, beech, poison ivy, blackberry.
 Slope and land form: 5 percent.
 Drainage: Well drained.
 Permeability: Moderate.
 Described by: F. G. Loughry.

Horizon and
 Beltsville
 Lab. No.

O1 1-1/2 to 1/2 inch. Oak and maple leaves.
 Not sampled

O2 1/2 inch to 0. Dark reddish brown (5YR 3/2) organic mull; medium acid; abrupt wavy boundary.
 55157

A1 0 to 4 inches. Dark brown (7.5YR 3/2) silt loam with weak fine granular structure; very friable; medium acid; clear wavy boundary.
 55158

A2 4 to 13 inches. Dark brown (7.5YR 4/4) silt loam with weak indistinct medium platy breaking to fine granular structure; very friable; strongly acid; clear wavy boundary.
 55159

B21t 13 to 19 inches. Strong brown (7.5YR 5/6) heavy silt loam with weak medium subangular blocky structure; friable; strongly acid; clear wavy boundary.
 551560

B22t 19 to 26 inches. Yellowish red to strong brown (5YR 5/6 - 7.5YR 5/6) silty clay loam with mixed blocky and moderate medium subangular blocky structure; friable; firm when moist, slightly plastic when wet; strongly acid; gradual wavy boundary.
 551561

B23t 26 to 37 inches. Yellowish red (5YR 4/6) silty clay loam to silt loam with moderate medium blocky structure; firm when moist, slightly plastic when wet; strongly acid; gradual wavy boundary; some manganese coatings, distinct clay coatings on peds.
 551562

B3 37 to 49 inches. Strong brown (7.5YR 5/6) silt loam with moderate fine blocky structure; firm when moist, nonplastic when wet; strongly acid; clear irregular boundary; some manganese, clay coatings on peds.
 551563

C 49 to 66 inches plus. Yellowish brown to yellowish red (10YR 5/6 - 5YR 5/6) silt loam with weak medium platy structure; firm when moist, nonplastic when wet; strongly acid in upper horizon but increasing to slightly acid in lower portion; abrupt irregular boundary; some manganese concretions.
 551564

Notes: Colors are for moist soil.

^{1/} This pedon is a taxadjunct because it is in the fine family particle size class, whereas the Duffield series is in the fine-loamy class.

FEDON CLASSIFICATION: Humic Hapludult; coarse-loamy, mixed, mesic

SOIL Lansdale taxadjunct SOIL Nos. 855Pa-36-9 LOCATION Lancaster County, Pennsylvania

SOIL SURVEY LABORATORY Beltsville, Maryland

LAB. Nos. 551594 - 551599

Depth (in.)	Horizon	Size class and particle diameter (mm) SA1												3B2 Cm	Coarse fragments 3B1		
		1B1b Total					Sand				Silt				2A2 > 2 < 7.6 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)				
0-7	A1	51.9	34.4	13.7	7.4	14.5	10.2	13.0	6.8	9.6	24.8	22.7	45.1				9
7-11	A2	53.6	33.7	12.7	9.2	16.4	9.7	12.1	6.2	9.6	24.1	21.8	47.4				12
11-15	B1	52.4	33.7	13.9	10.9	15.0	9.1	11.6	9.8	10.0	23.7	21.3	46.6				13
15-19	B21t	51.7	33.0	15.3	11.6	14.8	8.6	11.1	5.6	9.6	23.4	20.5	46.1				20
19-24	B22t	58.1	24.9	17.0	12.6	15.2	10.5	13.4	6.4	8.0	16.9	20.5	51.7				tr.
24-32	B3	67.1	17.5	15.4	14.3	18.8	11.8	14.8	7.4	6.3	11.2	20.7	59.7				17

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.			8C1c (1:1) KCl	8C1a (1:1) H ₂ O
						0-7	1.97								
7-11	0.42														4.5
11-15	0.17														4.6
15-19	0.19														4.5
19-24	0.14														4.6
24-32	0.10														4.7

Depth (in.)	Extractable bases 8B1a					6H1a Ext. acidity	CEC		6G1d Ext. Al	Ratios to clay 8D1			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/100g														
0-7	0.6	0.4	tr.	0.2	1.2	12.8	14.0					1.02			8
7-11	0.3	0.4	tr.	0.2	0.9	5.6	6.5					0.51			14
11-15	0.2	0.1	tr.	0.2	0.5	5.6	6.1					0.44			8
15-19	0.3	tr.	tr.	0.2	0.5	6.5	7.0					0.46			7
19-24	0.9	1.5	tr.	0.3	2.7	6.9	9.6					0.56			28
24-32	0.6	0.8	tr.	0.2	1.6	7.1	8.7					0.56			18

Depth (in.)	Clay Fraction Analysis 7A1b-d							
	Mt.	Chl.	Vm.	Mi.	Int.	Qtz.	Kl.	Gibbsite
	7A2 X-ray		7A3					
0-7								
7-11		XX	XX	X			XX	
11-15								
15-19		XX	XX	X			XX	
19-24								
24-32		XX	XX	X			XX	

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.

Pedon Classification: Humic Hapludult; coarse-loamy, mixed, mesic

Soil: Lansdale taxadjunct 1

Soil No.: S55Pa-36-9

Location: Lancaster County, Pennsylvania. 1/2 mile north of Mastersonville, 90 feet east of southwest corner of woods, 40 feet north of road. Aerial photo No. AHG-20-22.

Vegetation and land use: Forest - second growth white oak, red oak, maple and poplar.

Slope and land form: 10 percent.

Drainage: Well drained.

Permeability: Moderate.

Described by: F. G. Loughry.

Horizon and
Beltsville
Lab. No.

- O1 1-1/2 to 1/2 inch. Mixed hardwood leaves; abrupt wavy boundary.
Not sampled
- O2 1/2 inch to 0. Dark reddish brown leaf mold; abrupt wavy boundary.
Not sampled
- A1 0 to 7 inches. Dark brown (10YR 3/3) loam with very weak fine granular structure; very friable; very strongly acid; clear wavy boundary.
551594
- A2 7 to 11 inches. Yellowish brown to light yellowish brown (10YR 5/4 - 6/4) loam with very weak medium platy structure; friable; strongly acid; clear wavy boundary; some quartz pebbles 5 to 10 cm.
551595
- B1 11 to 15 inches. Yellowish brown (10YR 5/4) gritty silt loam with weak medium subangular blocky structure; friable; strongly acid; gradual wavy boundary; some quartz pebbles.
551596
- B2t 15 to 19 inches. Yellowish brown (10YR 5/4) heavy gritty silt loam with weak medium blocky structure; friable; strongly acid; gradual wavy boundary; some quartz pebbles.
551597
- B2bt 19 to 24 inches. Yellowish brown (10YR 5/6) heavy gritty silt loam with moderate medium blocky structure; firm; strongly acid; gradual wavy boundary; some quartz pebbles.
551598
- B3 24 to 32 inches. Yellowish brown (10YR 5/4) sticky sandy loam with weak medium blocky structure; friable when moist, slightly sticky when wet; strongly acid; abrupt smooth boundary; many quartz pebbles; clay coatings, a few black coatings on peds.
551599
- D 32 inches plus. Dusky red (10R 3/2) shale; strongly acid.
Not sampled

Notes: Colors are for moist soil.

¹/_{This pedon is a taxadjunct because the Ap horizon is dark enough for Humic subgroup placement, whereas the Lansdale series is in the Typic subgroup of Hapludults.}

PENNSYLVANIA

