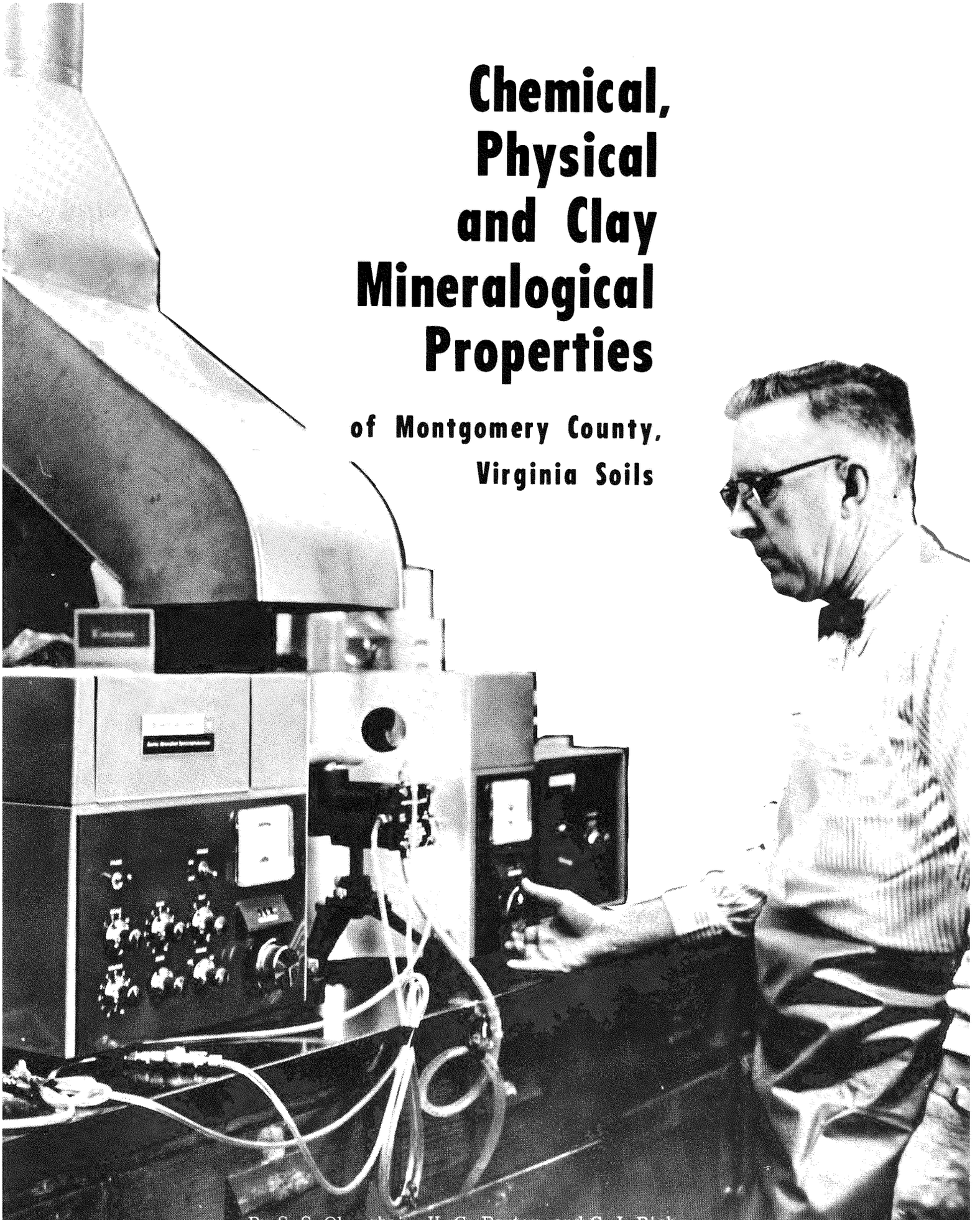
Chemical, Physical and Clay Mineralogical Properties

of Montgomery County, Virginia Soils



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CHEMICAL, PHYSICAL AND CLAY MINERALOGICAL PROPERTIES OF MONTGOMERY COUNTY, VIRGINIA SOILS[a]

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A soil survey of Montgomery County was completed in 1961 by the Virginia Agricultural Experiment Station, in cooperation with the Soil Conservation Service.

The completed soil survey field sheets show the location and extent of each different kind of soil in the county. A soil survey report (not yet published) classifies the soils, grouping them according to specific use and management classes. Groupings are based on interpretations of their morphological, genetic, and physico-chemical properties. To help classify different soils and to make interpretations for use and management, laboratory studies were made during the survey. On completion of the field mapping, soil samples were collected for physical and chemical analyses, and clay mineralogy determinations. The data presented here supplement the soil survey report and other related publications.

Data Sheets

Each data sheet includes tables and a brief description of the soil analyzed. Three of the tables on these data sheets indicate chemical, engineering, and mechanical properties of the soil; the fourth gives data on clay mineralogy.

Chemical Properties

When a proper balance of plant food and organic matter is maintained in the plow-layer of a well drained soil, good plant growth may be expected. Certain other properties of the soil profile--effective depth, structure, texture, consistency, and density--are also quite important. These characteristics largely determine water infiltration, permeability, and drainage. Together they govern crop adaptation to the soil.

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The O2 horizon is not a part of the mineral soil, but is rather an accumulation of organic matter and consists of partly decomposed forest debris and plant remains. The A horizon, sometimes called the surface soil, includes the plowed portion of the soil. In Virginia, that layer of soil is affected most by leaching and erosion. The B1, B2, B3, etc., horizons are subdivisions representing layers of the subsoil. The B2 ordinarily contains more clay and is usually finer textured than the rest of the soil. Soil parent material is designated the C horizon, and layers are called C1, C2, etc.

Degree of soil acidity is expressed by pH. The following descriptive designations have been applied to pH values:

Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral (essentially)	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 +

Truog phosphorus, a dilute acid soluble phosphorus, is an estimate of the amount of phosphorus readily available to plants in acid soils (6). Generally, 25 ppm. (50 pounds per acre) is adequate for most crops grown in Virginia.

Calcium, magnesium, and potassium are exchangeable cations and important plant nutrients. When these elements are in exchangeable form, they are available to plants in varying degrees. Potassium is generally more available and calcium less available than magnesium. As these bases are removed by plants, aluminum and hydrogen ions take their place. Because aluminum and hydrogen act as acids, the exchangeable hydrogen reported includes exchangeable aluminum. The percent base saturation is the proportion of the total cations made up of exchangeable calcium, magnesium, and potassium. For Virginia conditions, a fertile soil usually has a high percent base saturation.

The sum of the exchangeable cations, including aluminum and hydrogen, is equal to the total cation exchange capacity of the soil. The value is usually higher when there is higher clay or organic matter content in the soil. Certain types of clay yield a higher value than others; but with few exceptions, humus or organic matter give a higher value, pound for pound, than clay. The higher the cation exchange capacity, the greater the nutrient-holding capacity of soil. Soils with low cation exchange capacities release stored nutrients to plants more easily at lower total nutrient content. It is much easier to raise the pH of a soil with low exchange capacity.

Milli-equivalents (m.e.) per 100 grams of soil can be converted to pounds per acre on the basis that an acre of soil 6 or 7" deep weighs approximately 2,000,000 pounds. One m.e. per 100 grams of soil is equivalent to 940 pounds of potash or 1,000 pounds of limestone ($CaCO_3$) per acre furrow slice.

In Virginia, at least 50% base saturation is desirable in 6 to 7" of the surface. These bases should be present in a proportion of about 10 times as much calcium and 2 times as much magnesium as potassium, if there is a minimum of 0.3 m.e. of potassium. A soil with a total of 10 m.e. of exchangeable cations would have a good nutrient condition if there were 5 m.e. of hydrogen, 4 m.e. of calcium, 0.7 m.e. of magnesium, and 0.3 m.e. of potassium. If the soil has a high cation exchange capacity, it would be important to have much more calcium and slightly more potassium and magnesium. If the soil has a lower cation exchange capacity, the calcium requirement is less; the magnesium, and most important, the potassium, levels should be the same. Many cultivated soils in Virginia contain a high proportion of magnesium as a result of the widespread use of dolomitic limestone.

Results of chemical analyses made in the Soils Laboratory at the Virginia Agricultural Experiment Station are shown under "Chemical Characteristics" on the data sheets (5[c], 6).

Engineering Properties

Under "Engineering Characteristics", results of tests made by the Virginia Department of Highways are listed. These analyses were run according to the standard procedure of the American Association of State Highway Officials (1). The results differ from those shown under particle size distribution. In the A.A.S.H.O. procedure, the amount of fine material is determined by the use of a hydrometer and the various grain-size fractions are calculated on the basis of all the material, including that which is coarser than 2 millimeters in diameter. They are not suitable for use in designating soil textural classes. According to the Soil Survey Laboratory procedure (results listed under "Particle Size Distribution" on data sheets), the fine material is analyzed by the pipette method. Material coarser than 2 millimeters in diameter is excluded from grain-size fractions.

The system approved by A.A.S.H.O. recognizes 7 main groups (1). These groups range from stone fragments through highly plastic clays, and are designated as: A-1 (stone fragments, gravel, and sand) to A-4 (nonplastic to moderately plastic silty soils) to A-6 (medium plastic clays), and A-7-6 (highly plastic clays).

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[c]Modified for determinations on original extracts with Beckman DU Flame Spectrophotometer for exchangeable calcium, magnesium, and potassium. (Also modified for determination of exchangeable manganese with Klett-Summerson Photoelectric Colorimeter.)

The unified classification system is made up of 15 classes (7). Of these, 8 are coarse-grained, 6 are fine-grained, and 1 is highly organic. In the fine-grained classes, over 50% of the soil material passes a No. 200 sieve. ML includes inorganic silts and very fine sands, silty or clayey fine sands, and clayey silts of slight plasticity. CL is comprised of inorganic clays of low to medium plasticity, gravelly clays, sandy clays, and silty clays. Both ML and CL have liquid limits below 50. MH includes inorganic silts, micaceous fine sandy soils or silty soils. CH includes inorganic clays of high plasticity.

Classes in both systems give general interpretations of their rating for subgrade, foundation material, embankment, and other engineering uses.

Mechanical Analyses

Particle size distribution and textural class of samples from each soil horizon are shown under "Mechanical Analysis" (2, 3, 4) on the data sheets. Analyses for this table were made in the Soil Survey Laboratory, Soil Conservation Service, Lincoln, Nebraska.

Clay Mineralogy

Quantitative estimates of the minerals found in the clay fraction of soils are based on X-ray diffraction analyses, differential thermal analyses, and cation-exchange capacity analyses.

Minerals in the clay fraction are principally layer silicates. These include kaolinite and halloysite, which are made up of alternate silica and alumina layers and are classed as 1:1 types. Halloysite rolls up and is tubular. The other major group consists of the 2:1 layer silicates made up of 3 layers; that is, 2 silica layers between which is sandwiched an alumina layer. In this group are the micas, vermiculite, and montmorillonite. These 3 minerals differ in degree of separation of the 3-layer packets from other 3-layer packets. The mica packets are very close together, but potassium is held between them. Vermiculite has limited expansion (but 40% over mica) and is normally expanded to this extent. Montmorillonite swells to a greater extent and this swelling varies considerably, depending on the moisture level and cation status. If montmorillonite is sodium saturated, there is great swelling, but is not a naturally occurring situation in this county.

Chlorite is a 2:2 type clay mineral in which magnesium-aluminum hydroxide layers completely fill the interlayer space of the 2:1 layer silicates. This mineral does not swell, is found in calcareous soils, and apparently is inherited from the parent rock.

One variety of chlorite is characterized by the interlayer spece being filled with aluminum hydroxide-like material. Since this open or interlayer space is only partially filled in this manner, such minerals are designated "vermiculite-chlorite".

Iron oxides give the red and yellow colors and materially affect the physical and chemical properties of soil. They cause and protect the aggregation of the soil, increase the lime needed to raise the pH, and hold phosphate, sulfate, and chloride in the soil.

Some properties of the clay minerals are summarized as follows:

Clay Mineral	Swelling	Cation Exchange Capacity, m.e./100g
Kaolinite	low	2 - 10
Halloysite	low	2 - 10
Vermiculite	low +	100 - 150
Vermiculite-Chlorite	low	50 - 80
Chlorite	very low	5
Montmorillonite	very high	75 - 125

References

(1) American Association of State Highway Officials. Standard Specifications for Highway Materials and Methods of Sampling and Testing.
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(2) Kilmer, V. J., and L. T. Alexander. Methods of making mechanical analyses of soils. Soil Sci. 68:15-24, 1949.

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(4) Olmstead, L. B., L. T. Alexander, and H. E. Middleton. A pipette method of mechanical analysis of soils based on improved dispersion procedure. U.S.D.A. Technical Bulletin 170, 1930.

(5) Peech, M., L. T. Alexander, L. A. Dean, and J. F. Reed. Methods of soil analysis for soil fertility investigations. U.S.D.A. Circular 757, 1947.

(6) Truog, E. The determination of the readily-available phosphorus of soils. Jour. Amer. Soc. Agron. 22:874-882, 1930.

(7) Unified Classification System. Tech. Memo. No. 3-357, Vol. 1, Waterways Expt. Sta. Corps of Engineers, 1953.

ALLEN COBBLY FINE SANDY LOAM

Ap	0-9"	Yellowish-brown (10YR-5/4), very friable cobbly fine sandy loam; moderate, fine, granular structure.
A2	9-15"	Light yellowish-brown (10YR-6/4), very friable fine sandy loam; fine, granular structure; gradual, smooth boundary.
B1	15-21"	Strong brown (7.5YR-5/6), friable sandy clay loam; weak, medium, subangular blocky structure; gradual smooth boundary.
B21	21-37"	Yellowish-red (5YR-5/6), friable light fine sandy clay loam; moderate, medium, subangular blocky structure; gradual, wavy boundary.
B22	37-52"	Red (10R-4/8), friable light clay loam; moderate, medium, subangular blocky structure.
B3	52-72"	Red (10R-4/8), mottled yellow and gray, slightly plastic, sticky clay loam.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/][1/]	Total[2/]	
Ap	6.62	8.98	1.63	0.91	3.19	0.08	0.08	1.94	0.04	5.29	63.33
A2	6.06	3.37	0.74	1.28	1.49	0.09	0.08	2.09	0.13	3.75	44.27
B1	4.74	3.37	0.28	1.10	0.75	0.09	0.04	3.16	0.70	4.04	21.78
B21	4.70	2.90	0.19	0.37	1.09	0.52	0.10	4.37	0.98	6.08	28.13
B22	4.70	3.83	0.21	0.73	1.52	0.70	0.10	12.89	3.19	15.21	15.25
B3	4.68	4.30	0.24	0.37	0.29	0.37	0.08	17.08	5.22	17.82	4.15

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
Ap	2.0c	3.5c	6.1	24.7	10.7	43.5	9.5	36.4	33.5
A2	1.5c	3.1	5.6	24.4	10.4	44.4	10.6	36.3	34.0
B1	1.8c	3.5	5.3	22.8	9.7	43.9	13.0	34.2	34.1
B21	1.4c	3.2	5.4	21.9	10.5	37.8	19.8	33.3	28.8
B22	0.9	1.8	3.0	12.8	5.3	17.8	58.4	17.3	14.0
B3	1.0	1.9	3.3	13.2	6.9	16.7	57.0	22.2	10.1

Mineralogical Data[4/]

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
Ap	8.3	6	0	15	5	0	0	23	0	10	41
B22	18.3	13	0	10	0	5	0	22	0	0	50
B3	18.5	12	0	5	0	10	0	18	0	5	50

c. Many Fe/Mn?-bearing aggregates.

1/ Numbers refer to notes on back cover.

AUGUSTA FINE SANDY LOAM

A1	0-2"	Very dark gray (10YR-3/1), very friable fine sandy loam; granular structure; few roundish quartz gravel.
A2	2-8"	Pale brown (10YR-6/3), friable fine sandy loam, with many streaks, splotches and pockets of dark gray and faint mottles of yellowish-brown in lower portion; weak, fine granular structure; few roundish gravel; many small roots; clear, smooth boundary.
A3	8-11"	Pale brown (10YR-6/3), friable heavy fine sandy loam; slightly compact and faintly mottled with yellowish-brown; very weak, fine, subangular blocky structure; few small gravel.
B21	11-17"	Pale brown (10YR-6/3), slightly compact but friable light fine sandy clay loam, mottled with yellowish-brown and light gray.
B22	17-21"	Yellowish-brown (10YR-5/4 to 5/6), plastic, sticky clay to heavy clay loam, faintly mottled with yellowish-red in lower part; medium, subangular blocky structure; few fine gravel; gradual, smooth boundary.
B3	21-34"	Mottled yellowish-brown and red, firm sandy clay to clay; distinct patchy clay films; few small round quartz gravel.
D	34-66"	Mottled gray, red and brownish-yellow plastic clay which becomes slightly lighter in texture in lower portion.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]/	Total[2]/	
A1	5.80	16.57	5.11	3.11	3.69	1.16	0.25	7.73	0.70	12.83	39.75
A2	5.20	10.10	2.28	1.28	0.85	0.27	0.12	6.89	1.17	8.13	15.25
A3	4.98	6.87	0.68	0.73	0.28	0.07	0.06	3.80	0.98	4.21	9.74
B21	4.80	4.45	0.41	0.00	0.38	0.16	0.10	3.65	1.30	4.29	14.92
B22	4.68	4.85	0.48	0.37	1.44	1.32	0.27	10.35	2.99	13.38	22.65
B3	4.70	2.02	0.17	0.00	0.45	0.57	0.16	9.67	3.49	10.85	10.88
D	4.62	2.83	0.12	0.00	0.26	0.45	0.16	10.97	5.46	11.84	7.35

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	2.5	7.8	8.1	17.3	11.3	43.8	9.2	33.3	30.6
A2	2.0	7.8	8.4	18.3	10.7	43.4	9.4	33.0	30.4
A3	1.1	7.1	8.2	18.1	10.5	43.2	11.8	32.3	30.8
B21	1.1	6.0	7.6	16.8	9.6	41.8	17.1	29.6	30.5
B22	0.9	4.5	5.5	12.7	7.3	27.3	41.8	22.0	19.3
B3	0.9	5.2	6.6	13.9	10.7	22.5	40.2	25.9	13.8
D	0.4	2.8	3.6	11.4	7.7	20.1	54.0	21.3	12.9

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A2	33.5	3	0	20	0	0	0	42	0	20	15
B22	31.9	3	0	10	0	0	0	37	0	25	25
D	17.0	0	0	5	0	0	15	5	0	35	40

BLACKSBURG SILT LOAM*

Ap1	0-1"	Dark brown (10YR-3/3), very friable silt loam; weak, very fine, granular structure; clear, smooth boundary.
Ap2	1-8"	Brown (10YR-5/3), very friable silt loam, with medium mottles of yellowish-brown; moderate, fine and very fine, granular structure; few shale fragments; pores common; clear, smooth boundary.
B1	8-12"	Yellowish-brown (10YR-5/6), slightly plastic silty clay loam; weak, fine, subangular blocky structure; gradual wavy boundary.
B2	12-20"	Yellowish-brown (10YR-5/8), slightly plastic silty clay loam; moderate, fine, subangular blocky structure; pores common; few pockets and lenses of clay; tongues of shale, clay and silt; gradual, wavy boundary.
B3	20-25"	Yellowish-brown (10YR-5/6), slightly plastic silty clay loam; weak, medium, subangular blocky structure; thin patches of discontinuous clay films and lenses between shale fragments; diffuse, irregular boundary.
C1	25-36"	Yellowish-brown, partially weathered shale with thin lenses of silty clay loam soil material; few fine roots; thin coatings around shale fragments; 95% shale, mostly horizontally bedded.
C2	36-56"	Yellowish-brown, weathered shale mixed with little soil material.
C3	56-95"	Yellowish-brown, grayish and black brittle shale.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
Ap1	6.30	46.85	9.41	1.65	10.52	4.45	1.00	7.68	0.11	23.65	67.53
Ap2	5.00	8.04	1.77	0.55	2.83	1.58	0.29	8.80	1.71	13.50	34.81
B1	4.86	4.49	0.65	0.18	3.63	2.00	0.19	7.10	1.92	12.92	45.05
B2	4.98	5.70	0.48	0.18	4.03	2.60	0.18	7.55	2.35	14.36	47.42
B3	4.84	4.30	0.41	0.73	3.59	3.75	0.21	6.83	2.31	14.38	52.50
C1	5.00	3.83	0.32	0.73	3.80	5.45	0.24	7.95	1.47	17.44	54.42
C2	5.46	5.24	0.10	1.28	1.61	10.90	0.33	5.73	0.43	18.57	69.14
C3	5.24	11.31	0.10	1.65	2.17	11.10	0.41	6.19	0.45	19.87	68.85

Engineering Characteristics[4,5/]

Horizon	Percentage Passing Sieve Size									Percentage Smaller Than				Liquid Limit	Plasticity Index	Max Dry Density Lbs./Cu/Ft.	Opt. H_2O %	Classification	
	In Inches						In Millimeters			In Millimeters								Uni-fied	AASHO
	3.0	2.0	1.5	1.0	.75	.375	4.7	2.0	.42	.25	.074	.05	.02	.005	.002						
Ap2						100	99	83	79	71		71	48	13	7	33	5	100	20	ML	A-4(7)
B2							100	92	90	85		83	68	35	22	36	10	101	19	ML-CL	A-4(8)
C2		100	99	98		95	88	58	54	46		43	27	12	8	41	15	100	20	SM-SC	A-7-6(4)
C3				100		99	96	60	53	43		37	24	12	8	37	14	6/	6/	SM-SC	A-6(3)

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
Ap1	3.6	4.8	2.7	6.4	10.0	57.1	15.4	39.0	31.6
Ap2	6.1	4.7	2.0	5.0	8.6	56.3	17.3	35.2	32.7
B1	1.9	2.2	1.2	3.5	7.7	57.0	26.5	30.6	36.2
B2	1.0	2.0	1.0	3.3	6.0	55.0	31.7	27.9	35.1
B3	6.7	7.7	3.5	7.1	8.4	37.8	28.8	27.5	22.8
C1	9.3	7.1	2.4	5.3	8.3	35.5	32.1	25.1	21.5
C2	12.8	9.4	3.1	5.4	6.8	37.6	24.9	23.9	23.5
C3	13.6	14.7	5.4	8.4	9.6	28.9	19.4	26.0	16.5

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
Ap2	33.8	7	0	5	5	10	10	23	0	20	20
B2	22.9	12	0	5	0	15	15	13	0	20	20
C2	31.4	9	0	5	0	15	15	19	0	20	17

See Appendix, Table 2, for chemical characteristics of rock fragments in each horizon.

BOLTON LOAM

A1	0-1"	Dark brown (10YR-3/3), friable loam; moderate, fine and very fine granular structure; clear, smooth boundary.
A2	1-11"	Dark yellowish-brown (10YR-4/4), very friable loam; moderate, medium, granular structure; few small black concretions; few small chert fragments; fine pores common; clear, smooth boundary.
B1	11-15"	Yellowish-brown (10YR-5/6), friable loam; weak, medium, subangular blocky structure; fine and medium black concretions common; occasional small chert fragments; fine pores common; gradual, smooth boundary.
B21	15-33"	Yellowish-red (5YR-5/6), friable clay loam, with common, medium faint mottles of light brown; moderate, medium, subangular blocky structure; few chert fragments; many black concretions; gradual, smooth boundary.
B22	33-50"	Reddish-brown (5YR-4/4), slightly plastic clay loam; moderate medium subangular blocky structure.
B2b	50-102"	Red (10R-4/6), mottled with reddish-brown, very firm clay; massive structure.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]	Total[2]	
A1	5.62	7.57	4.42	19.02	3.05	0.73	0.47	7.52	0.43	11.77	36.11
A2	5.58	3.37	1.48	9.69	1.52	0.23	0.15	5.73	0.54	7.63	24.90
B1	5.90	2.90	0.32	4.02	2.61	0.28	0.08	3.19	0.04	6.16	48.21
B21	6.02	2.10	0.14	1.28	3.51	0.55	0.10	2.73	0.05	6.89	60.38
B22	5.72	1.64	0.07	0.73	2.69	0.62	0.10	2.43	0.11	5.84	58.39
B2b	5.78	3.97	0.07	0.91	3.65	1.27	0.12	2.88	0.01	7.92	63.64

Engineering Characteristics

Horizon	Percentage Passing Sieve Size								Percentage Smaller Than				Liquid Limit	Plasticity Index	Max Dry Density Lbs./Cu/Ft.	Opt. H_2O %	Classification	
	In Inches					In Millimeters			In Millimeters								Unified	AASHO
	3.0	2.0	1.5	1.0	.75	.375	4.7	2.0	.42	.25	.074	.05	.02	.005	.002						
A2				100	98	96	88	83	72	59	38	12	5	25	6	110	15	ML-CL	A-4(7)
B21					100	99	93	89	80	73	58	33	21	28	12	121	13	CL	A-6(9)
B22				100	99	98	90	85	76	72	59	34	23	28	13	119	14	CL	A-6(9)
B2b			100	98	96	95	86	84	77	74	63	45	34	40	23	112	17	CL	A-6(13)

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	2.7b	3.7b	4.4	7.9	7.5	58.1	15.7	26.7	42.5
A2	2.7b	3.7b	4.7	8.4	6.6	58.0	15.9	26.3	42.5
B1	2.8b	3.4b	4.3	7.8	6.4	57.6	17.7	24.7	43.2
B21	1.9b	3.2b	4.0	7.2	6.5	54.2	23.0	24.4	39.7
B22	2.1b	3.4b	3.8	7.5	6.8	51.7	24.7	25.7	36.6
B2b	2.7	2.8	2.6	5.0	5.1	40.9	40.9	18.2	30.3

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A2	29.2	5	0	25	5	0	5	18	10	10	22
B22	16.3	8	0	25	5	0	10	12	0	10	30
B2b	15.3	11	0	20	0	0	10	8	0	10	41

b. Few Fe/Mn?-bearing aggregates.

BODINE VERY CHERTY SILT LOAM, SHALLOW

A1 0-3" Very dark grayish-brown (10YR-3/2), very friable very cherty silt loam; 25-50% small chert fragments with chert on the surface from 3 to 5 inches in diameter; clear, smooth boundary.

A2 3-9" Pale brown friable very cherty silt loam; contains 50-80% small, medium and large chert fragments usually 1/4 to 4 inches in size.

C 9-22" Pale brown with many fine distinct mottles of yellowish-brown partly weathered chert fragments mixed with silt loam material of similar color; 80-95% chert fragments ranging in size from 1/4 to 6 inches, usually less than 2 inches.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
A1	5.52	9.58	7.73	11.70	4.55	0.75	0.38	11.01	0.70	16.69	34.03
A2	5.30	6.78	0.97	2.38	0.65	0.07	0.04	3.64	0.49	4.40	17.27
C	5.18	2.57	0.37	0.91	0.73	0.14	0.05	2.58	0.59	3.50	26.29

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	7.9	4.3	3.9	10.6	6.3	55.5	11.5	24.9	42.8
A2	7.4	4.2	4.0	10.4	5.9	56.9	11.2	23.7	45.0
C	10.5	5.6	4.0	10.1	6.0	51.4	12.4	22.1	41.0

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A2	8.2	3	0	20	5	0	0	44	0	10	18
C	15.8	4	0	25	0	0	0	39	0	15	17

BRANDYWINE LOAM

Ap	0-7"	Dark yellowish-brown (10YR-4/4), very friable coarse loam; fine, granular structure; clear, smooth boundary.
A3	7-10"	Yellowish-brown (10YR-5/6), friable coarse loam; fine, granular structure; clear, wavy boundary.
C	10-38"	Mottled and streaked yellowish-red, brown, reddish-yellow, white and black, partly weathered rock fragments mixed with loamy soil material; few brown clay films on some rock fragments.
D	38-66"	Partly weathered rock.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
Ap	5.20	7.68	1.14	1.65	0.98	0.22	0.10	5.84	0.81	7.14	18.21
A3	5.10	5.66	0.33	0.55	1.11	0.28	0.09	5.10	0.93	6.58	22.49
C	4.90	4.85	0.14	1.65	0.56	0.70	0.12	5.07	1.19	6.45	21.40
D	5.20	2.42	0.03	2.19	0.33	0.36	0.09	2.16	0.39	2.94	26.53

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
Ap	11.6	14.1	8.3	13.0	9.8	35.5	7.7	32.6	19.1
A3	8.7	13.2	7.5	15.6	7.3	36.4	11.3	30.8	21.7
C	11.6	16.4	7.6	12.6	9.5	33.3	9.0	31.5	17.8
D	14.2	20.2	10.3	14.3	10.0	28.0	3.0	32.1	12.8

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmor-illonite %	Vermic-ulite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
Ap	30.0	4	0	5	0	0	10	35	0	21	25
C	26.2	6	0	5	0	0	5	39	0	25	20

CAPTINA SILT LOAM

Ap	0-10"	Brown friable silt loam; weak, fine granular structure; few medium sand grains; clear, smooth boundary.
B1	10-14"	Yellowish-brown friable silt loam; weak, medium, subangular blocky structure; patchy clay films.
B21	14-20"	Yellowish-brown, friable, slightly sticky, slightly plastic silty clay loam; thin distinct continuous clay films.
B22	20-29"	Grayish-brown mottled with strong brown and yellowish-brown, firm silty clay; moderate, medium, subangular blocky.
B3m	29-53"	Mottled yellowish-brown and gray silty clay loam; coarse, platy structure; brownish-gray coating on structural faces.
Bb	53-83"	Mottled brownish-yellow, light brownish-gray and gray with many black to dark brown mineral concretions and streaks, friable loamy soil material with pockets and streaks of clay; structureless.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]	Total[2]	
Ap	5.94	25.01	1.81	3.66	5.63	0.80	0.16	6.34	0.17	12.93	50.97
B1	5.20	7.71	0.52	0.55	3.49	1.59	0.08	6.98	0.76	12.14	42.50
B21	5.18	4.91	0.41	0.18	3.58	3.08	0.11	8.95	1.51	15.72	43.07
B22	6.10	6.31	0.40	0.18	6.92	9.75	0.20	6.55	0.14	23.42	72.03
B3m	7.42	25.01	0.40	0.18	8.09	8.45	0.13	1.97	0.04	18.64	89.43
Bb	7.58	10.05	0.04	0.37	5.47	5.90	0.09	2.58	0.00	14.04	81.62

Engineering Characteristics

Horizon	Percentage Passing Sieve Size In Inches				Percentage Passing Sieve Size In Millimeters				Percentage Smaller Than In Millimeters				Liquid Limit	Plasticity Index	Max Dry Density Lbs./Cu/Ft.	Opt. H_2O %	Classification Unified	Classification AASHO
	3.0	2.0	1.5	1.0	.75	.375	4.7	2.0	.42	.25	.074	.05	.02	.005	.002					
Ap							100	94	92	84	79	54	20	8	28	5	105	18	ML-CL	A-4(8)
B21 & B22									100	96	89	78	54	43	54	30	102	22	CH	A-7-6(19)
B3m							100	99	98	92	89	74	48	35	40	20	106	19	CL	A-6(12)

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
Ap	0.7c	2.0c	1.4c	4.6	9.7	61.5	20.1	36.4	37.9
B1	0.2c	1.0c	1.1c	4.0	9.4	56.9	27.4	31.9	37.0
B21	0.1c	0.4c	0.6	4.1	8.3	51.7	34.8	27.0	36.0
B22	<0.1	<0.1	0.2	2.6	5.1	42.8	49.3	18.2	31.6
B3m	0.4c	1.4c	1.7c	5.0	6.4	49.2	35.9	24.8	33.7
Bb	3.1	8.2	8.0	13.4	11.2	33.3	22.8	28.2	22.7

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
Ap	20.3	7	0	10	5	0	27	10	0	25	16
B22	30.5	7	0	10	10	10	23	0	0	20	20
B3m	29.2	7	0	10	5	10	23	0	5	20	20
Bb	33.5	7	0	10	0	5	17	0	5	20	36

c. Many Fe/Mn?-bearing aggregates.

CALVIN SILT LOAM

O2	3/4-0"	Dark reddish-brown to black partially decomposed forest litter, mainly from oak and pine trees.
A1	0-1"	Dark reddish-brown, very friable silt loam; weak, very fine, granular structure; many small pores; 10-15% weak red and purplish-red shale and shaly sandstone; clear, smooth boundary.
A2	1-8"	Reddish-brown and red friable silt loam; weak, very fine, structure; 15-25% weak red and purplish-red shale and sandstone fragments; many small roots and small pores; few dark colored soil particles along root channels.
C	8-16"	Reddish-brown to red friable silt loam soil material mixed with 60-80% purplish-red shaly sandstone; rock controlled structure; gradual, wavy boundary.
D	16-26"	Slightly weathered purplish and reddish-brown shale mixed with a small amount of soil material; few roots below 16 inches.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]	Total[2]	
O2	4.20	33.54	38.78	73.89	9.90	1.90	1.05	54.08	6.53	66.93	19.20
A1	5.08	10.10	10.02	19.56	7.06	1.28	0.33	15.76	2.05	24.43	35.49
A2	4.62	4.45	2.79	2.19	0.84	0.22	0.16	8.65	2.16	9.87	12.36
C	4.52	2.42	1.03	0.37	0.67	0.33	0.12	8.19	2.95	9.31	12.03
D	4.58	2.02	0.77	0.00	0.96	0.44	0.12	7.57	N.R.[3]	9.09	16.72

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	4.0	1.6	1.1	2.8	10.9	66.3	13.3	40.5	38.5
A2	2.9	0.7	0.5	1.5	8.9	70.7	14.8	38.2	42.4
C	3.8	3.5	1.2	1.9	9.0	64.2	16.4	37.0	37.3
D	3.5	3.2	1.2	1.4	7.6	66.2	16.9	37.4	37.2

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A2	25.8	3	0	5	0	0	0	52	0	25	15
C	15.4	5	0	5	0	0	0	40	0	35	15

CARBO SILTY CLAY LOAM

Ap1	0-2"	Brown, friable silty clay loam; moderate, fine, granular structure; clear, smooth boundary.
Ap2	2-7"	Yellowish-brown, friable silty clay loam; moderate, medium, granular structure; clear, gradual boundary.
B1	7-9"	Reddish-yellow, splotched with yellowish-brown, friable silty clay; weak, medium, subangular blocky structure; few yellow and brownish shale fragments; clear, smooth boundary.
B2	9-21"	Yellowish-red splotched with red firm clay; subangular blocky structure; few shale particles; clear, smooth boundary.
B3	21-29"	Dominantly yellowish-brown mottled with yellowish-red, black, olive, sticky, plastic massive clay; few fine roots.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
Ap1	6.42	10.05	5.47	1.65	14.47	1.78	0.26	3.34	0.05	19.85	83.17
Ap2	6.22	6.31	3.19	2.01	11.17	1.24	0.16	5.92	0.05	18.49	67.98
B1	6.28	3.97	1.32	1.10	8.99	0.57	0.09	5.16	0.15	14.81	65.16
B2	4.98	3.51	0.90	0.73	13.02	0.74	0.22	22.91	7.40	36.89	37.90
B3	7.18	35.30	1.01	0.37	40.07	1.15	0.24	4.55	0.11	46.01	90.11

Engineering Characteristics

Horizon	Percentage Passing Sieve Size								Percentage Smaller Than				Liquid Limit	Plasticity Index	Max Dry Density Lbs./Cu/Ft.	Opt. H_2O %	Classification	
	In Inches						In Millimeters				In Millimeters								Unified	AASHO
	3.0	2.0	1.5	1.0	.75	.375	4.7	2.0	.42	.25	.074	.05	.02	.005	.002					
Ap1 & Ap2							100	91	87	82	62	50	26	12	44	15	95	23	ML	A-7-6(11)
B2							100	98	98	97	95	92	82	68	75	46	91	28	CH	A-7-6(20)

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
Ap1	0.7c	2.3c	2.3c	3.1c	2.2c	54.9	34.5	11.5	47.0
Ap2	1.0c	2.2c	2.2c	2.6c	1.9b	54.8	35.3	10.4	47.5
B1	0.3c	1.4c	2.1c	2.4c	1.8b	56.4	35.6	9.9	49.4
B2	<0.1	0.4	0.3	0.9	1.2	20.3	76.9	2.5	19.5
B3	<0.1	0.1	0.1	0.7	1.4	25.6	72.1	4.6	22.8

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
Ap2	31.4	5	0	20	0	20	5	12	0	15	23
B2	48.5	8	0	20	0	15	5	10	0	15	27

b. Many Fe/Mn?-bearing aggregates.
c. Few Fe/Mn?-bearing aggregates.

CHESTER LOAM

A1	0-2"	Dark brown (10YR-4/3), very friable loam; moderate, fine, granular structure; clear, smooth boundary.
A2	2-7"	Dark yellowish-brown (10YR-4/4), very friable loam; weak, fine, granular structure; clear, smooth boundary.
B2	7-18"	Strong brown (7.5YR-5/6), friable loam; moderate, fine and medium, subangular blocky structure; thin continuous clay films.
B3	18-23"	Dark brown (7.5YR-4/4), friable loam; weak, fine and very fine, subangular blocky structure; thin continuous clay film coatings on peds; gradual, wavy boundary.
C1	23-34"	Dark brown, strong brown, and yellowish-red, friable loamy soil material; fine mica flakes common; few patchy clay films.
C2	34-50"	Brown, dark yellowish-brown, and yellowish-red; highly weathered rock material which is easily crushed to a granular loamy mass; mica flakes and quartz particles common; gradual, wavy boundary.
C3	50-75"	Mottled white, yellow, light gray, black and yellowish-red loamy soil material.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]	Total[2]	
A1	6.76	26.65	3.92	1.10	6.43	1.95	0.43	3.94	0.04	12.75	69.10
A2	6.48	10.75	1.90	1.10	3.50	1.44	0.15	4.52	0.05	9.61	52.97
B2	4.98	2.34	0.29	0.18	1.41	0.82	0.14	7.43	1.49	9.80	24.18
B3	5.00	1.87	0.22	0.37	0.92	0.74	0.16	8.01	1.61	9.83	18.51
C1	5.02	1.87	0.14	0.91	0.39	0.50	0.21	9.41	2.46	10.51	10.47
C2	5.13	1.87	0.05	1.83	0.21	0.34	0.19	7.74	2.11	8.48	8.73
C3	4.96	2.34	0.04	1.10	0.16	0.30	0.14	4.43	1.58	5.03	11.93

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	7.8	13.0	6.2	8.3	7.5	41.9	15.3	28.3	25.2
A2	8.8	11.0	5.8	8.8	8.3	42.1	15.2	30.1	24.7
B2	10.8	8.4	3.5	5.6	6.2	41.0	24.5	22.4	27.8
B3	12.3	8.2	3.2a	5.7a	7.0a	40.7	22.9	23.6	27.3
C1	12.0	8.2	3.2a	6.6a	8.2a	35.6	26.2	27.7	20.1
C2	11.5	10.0	4.3a	8.7a	11.7a	39.4	14.4	35.7	20.6
C3	13.4	12.1	5.1a	10.4a	13.4a	43.1	2.5	39.8	22.9

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A2	17.8	7	0	10	0	0	0	33	0	25	25
B2	14.5	8	0	10	0	0	0	17	0	20	45
C2	24.7	12	0	10	0	0	0	13	5	20	40

a. Few mica flakes.

CHILHOWIE VERY ROCKY SILTY CLAY LOAM

A1	0-2"	Very dark grayish-brown (10YR-3/2), friable silty clay; moderate to strong, very fine and fine, granular structure; many fine and medium roots; gradual, smooth boundary.
A2	2-8"	Olive brown (2.5Y-4/4), silty clay with a few fine, faint yellowish-brown mottles; moderate, fine, angular blocky structure; many fine fragments of shaly limestone; gradual, smooth boundary.
C	8-15"	Olive brown (2.5Y-4/4), plastic silty clay; rock controlled structure; about 90% rock.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
A1	6.78	46.99	7.51	1.65	24.27	1.35	0.60	4.64	0.06	30.86	84.96
A2	7.50	27.82	2.75	0.37	26.12	1.00	0.28	3.34	0.01	30.74	89.13
C	7.76	10.05	1.33	0.37	35.42	0.63	0.19	1.18	0.10	37.42	96.85

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	2.0	4.3	2.4	4.0	2.9	40.1	44.3	10.0	35.0
A2	1.1	1.6	1.2	2.4	2.0	32.7	59.0	7.2	28.7
C	5.6	6.5	2.3	3.8	2.6	33.2	46.0	7.7	30.0

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A2	32.6	7	0	15	0	20	0	0	0	20	38
C	41.7	6	0	5	0	15	10	0	0	20	44

CONGAREE FINE SANDY LOAM (1)

1 0-12" Dark yellowish-brown, very friable fine sandy loam; weak, very fine, granular structure; many fine mica flakes and shiny quartz particles; gradual, smooth boundary.

2 12-21" Dark brown, very friable light fine sandy loam; very weak, very fine, granular structure; gradual, smooth boundary.

3 21-58" Dark yellowish-brown, very friable to loose loamy fine sand; very weak, very fine, granular structure; no roots; gradual, smooth boundary.

4 58-78" Mottled pale brown, light brownish-gray and dark reddish-brown, friable sandy loam; structureless; contains few fine gravel and coarse sand particles.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]/	Total[2]/	
1	5.42	11.32	1.63	2.93	3.02	0.40	0.08	6.61	0.54	10.11	34.62
2	5.96	5.66	0.97	0.91	3.18	0.47	0.04	3.86	0.23	7.55	48.87
3	6.12	6.06	0.58	0.73	2.33	0.39	0.03	2.32	0.11	5.07	54.24
4	6.20	7.27	0.32	2.19	1.90	0.84	0.03	2.32	0.11	5.09	54.42

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
1	0.1a	2.2a	8.9	38.9	22.5	18.7	8.7	53.7	9.3
2	0.1a	4.9a	14.4	41.3	20.9	13.1	5.3	49.7	6.3
3	0.1a	5.0a	16.4	48.7	16.6	10.1	3.1	45.2	5.3
4	0.3a	7.2a	19.2	42.9	15.0	11.9	3.5	41.5	5.7

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
1	38.7	7	3	5	0	0	13	22	5	25	20
2	N.R.	0	2	5	0	0	25	18	5	25	20
4	36.5	8	1	5	0	0	25	11	5	25	20

a. Few mica flakes.

CONGAREE FINE SANDY LOAM (2)

1 0-21" Dark brown (10YR-3/3), friable fine sandy loam; very fine, granular structure; fine mica flakes and quartz particles common.

2 21-32" Brown (10YR-4/3), friable fine sandy loam; very weak, fine, granular structure; many small mica and quartz particles.

3 32-72" Very dark grayish-brown (10YR-3/2), friable loam with many fine mottles of reddish-brown and gray; weak, fine, granular structure; many fine mica flakes.

4 72-105" Brown (10YR-4/3), very friable porous loam; weak, fine, granular structure; mica flakes and quartz particles plentiful.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
1	7.20	16.13	1.36	0.18	5.20	1.45	0.06	2.03	0.00	8.74	76.77
2	7.00	6.78	0.57	0.55	3.70	1.03	0.04	1.82	0.00	6.59	72.38
3	6.30	5.38	0.66	0.73	6.41	1.45	0.08	3.79	0.06	11.73	67.69
4	6.02	25.95	0.21	0.55	5.75	1.15	0.06	3.76	0.11	10.72	64.93

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
1	0.1	1.9	6.7	41.0	23.8	17.6	8.9	58.7	8.4
2	<0.1	1.6	7.8	46.0	21.2	15.3	8.1	56.0	8.2
3	0.2	1.1	2.7	27.2	26.5	26.7	15.6	58.5	14.3
4	0.5	5.0	5.5	26.5	23.2	25.1	14.2	51.6	14.0

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
1	18.7	11	2	5	0	0	10	16	5	15	36
2	22.8	10	2	5	0	0	21	0	5	25	32
4	21.0	10	4	5	0	0	30	10	0	15	26

DANDRIDGE SILT LOAM

A1	0-2"	Dark brown (10YR-3/3), very friable silt loam; moderate, fine, granular structure; gradual, smooth boundary.
A2	2-5"	Yellowish-brown (10YR-5/4), very friable silt loam with infiltrations of dark brown from A1 horizon; moderate, fine and very fine, granular structure; gradual, smooth boundary.
C	5-10"	Brownish-yellow (10YR-6/6), to yellowish-brown (10YR-5/8), friable, slightly plastic silt loam; rock controlled structure; 70 to 90% shaly fragments.
D	10-17"	Nearly black, hard calcareous shale with very little soil material.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]	Total[2]	
A1	6.32	242.41	11.62	0.18	17.78	2.43	2.00	7.86	0.15	30.07	73.86
A2	6.50	69.89	5.58	0.18	12.28	1.61	1.80	6.52	0.09	22.21	70.64
C	6.08	11.92	2.08	0.37	7.13	0.96	0.90	5.61	0.09	14.60	61.58
D	5.68	7.25	1.12	0.18	6.22	1.02	0.46	5.61	0.22	13.31	57.85

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	4.0	5.1	2.6	2.8	1.2	54.1	30.2	7.8	48.7
A2	4.7	2.9	0.8	0.8	1.1	54.9	34.8	4.2	52.0
C	1.7	1.4	0.6	1.1	1.2	59.3	34.7	5.8	55.3
D	3.9	3.3	1.2	1.6	1.3	54.1	34.6	7.0	49.2

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A2	20.0	5	0	25	0	0	20	15	0	15	20
C	19.5	5	0	25	0	0	15	15	5	15	20
D	18.9	5	0	20	0	0	25	10	10	15	15

ELK SILT LOAM

Ap1	0-3"	Very dark grayish-brown (10YR-3/2), friable silty clay loam; strong, medium, granular structure; diffuse boundary.
Ap2	3-12"	Very dark grayish-brown (10YR-3/2), friable silty clay loam; moderate, fine, subangular blocky structure; many fine medium and large pores; gradual, smooth boundary.
B21	12-38"	Dark reddish-brown (5YR-3/2), friable silty clay loam; moderate, medium, subangular blocky structure; fine and medium pores common; few krotovinas; gradual, smooth boundary.
B22	38-48"	Dark reddish-brown (5YR-3/3), firm silty clay loam; weak, fine, subangular blocky structure; medium and large pores common; gradual boundary.
B3	48-73"	Dark brown (7.5YR-3/2), plastic, slightly sticky, light silty clay loam; weak, fine, subangular blocky structure; sand increases with depth.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
Ap1 & Ap2	7.04	20.34	3.50	3.11	19.54	1.38	0.20	4.10	0.03	25.22	83.74
B21	7.12	8.18	1.23	0.18	15.64	0.34	0.15	3.13	0.00	19.26	83.75
B22	7.20	21.27	0.94	0.18	14.44	0.27	0.15	3.06	0.00	17.92	82.92
B3	7.08	32.96	0.62	0.18	12.39	0.63	0.12	2.88	0.03	16.02	82.02

Engineering Characteristics

Horizon	Percentage Passing Sieve Size (In Inches)					Percentage Passing Sieve Size (In Millimeters)				Percentage Smaller Than (In Millimeters)				Liquid Limit	Plasticity Index	Max Dry Density Lbs./Cu/Ft.	Opt. H_2O %	Classification Unified	Classification AASHO
	3.0	2.0	1.5	1.0	.75	.375	4.7	2.0	.42	.25	.074	.05	.02	.005	.002						
Ap1 & Ap2						100	99	98	97	87	73	56	29	18	38	15	103	21	ML-CL	A-6(10)
B21									100	90	82	63	41	29	36	15	107	19	CL	A-6(10)
B22								100	99	85	70	60	36	24	33	15	110	17	CL	A-6(10)

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
Ap1 & Ap2	0.2	0.3	0.5	5.6	12.7	48.6	32.1	37.0	28.3
B21	<0.1	<0.1	0.6	6.5	12.2	47.7	33.0	35.8	28.7
B22	<0.1	0.1	1.3	8.5	13.7	45.9	30.5	37.2	27.7
B3	<0.1	0.3	2.3	14.9	16.3	39.0	27.2	41.4	22.6

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
Ap1 & Ap2	35.0	8	0	10	0	10	20	10	0	20	22
B22	30.3	5	0	5	0	10	15	5	20	20	20
B3	24.9	8	0	15	0	10	22	10	0	20	15

EMORY SILT LOAM (1)

A1	0-3"	Dark brown (10YR-4/3), friable silt loam; weak, very fine, granular structure; clear, smooth boundary.
A2	3-11"	Dark brown (7.5YR-4/4), very friable silt loam; weak, fine, granular structure; clear, smooth boundary.
B1	11-15"	Yellowish-red (5YR-4/8), friable, heavy silt loam; weak, medium, subangular blocky structure; gradual, smooth boundary.
B21	15-31"	Yellowish-red (5YR-4/8), friable silty clay; moderate, medium, subangular blocky structure; gradual, smooth boundary.
B22	31-54"	Yellowish-red (5YR-4/8), slightly plastic, sticky silty clay; moderate, medium, subangular blocky structure.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]/	Total[2]/	
A1 & A2	6.50	11.32	3.82	5.30	8.82	1.53	0.48	3.09	N.R.	13.92	77.80
B1	6.60	8.08	0.88	1.10	5.45	0.86	0.24	3.55	N.R.	10.10	64.85
B21	6.70	12.12	0.50	0.73	7.81	1.57	0.34	4.45	N.R.	14.17	68.60
B22	6.80	31.12	0.32	0.18	6.79	2.12	0.33	4.30	N.R.	13.54	68.24

EMORY SILT LOAM (2)

A1	0-3"	Dark brown (10YR-4/3), friable silt loam; weak, very fine, granular structure; clear, smooth boundary.
A2	3-11"	Dark brown (7.5YR-4/4), very friable silt loam; weak, fine, granular structure; clear, smooth boundary.
B1	11-15"	Yellowish-red (5YR-4/8), friable, heavy silt loam; weak, medium, subangular blocky structure; gradual, smooth boundary.
B21	15-31"	Yellowish-red (5YR-4/8), friable silty clay; moderate, medium, subangular blocky structure; gradual, smooth boundary.
B22	31-54"	Yellowish-red (5YR-4/8), slightly plastic, sticky silty clay; moderate, medium, subangular blocky structure.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]/	Total[2]/	
A1 & A2	6.50	12.93	4.02	5.30	8.94	1.78	0.56	6.46	N.R.	17.74	63.59
B1	6.70	6.06	0.95	0.09	5.68	0.99	0.22	3.71	N.R.	10.60	65.00
B21	6.86	12.12	0.43	0.73	8.02	1.42	0.33	4.17	N.R.	13.94	70.09
B22	6.82	21.82	0.33	0.18	7.00	1.64	0.35	3.99	N.R.	12.98	69.26

EMORY SILT LOAM (3)

A1	0-8"	Dark brown (7.5YR-3/2), very friable silt loam; fine, granular structure; clear, smooth boundary.
A2	8-20"	Dark brown (10YR-4/3), very friable silt loam; very fine to fine, granular structure; many small roots and worm holes; gradual, smooth boundary.
B1	20-38"	Dark reddish-brown (5YR-3/4), and yellowish-red (5YR-4/8), light silty clay loam with a few small chert and shale fragments; moderate, medium, subangular blocky structure; few small roots; gradual, smooth boundary.
B2	38-62"	Yellowish-red (5YR-4/8), silty clay with 25-30% chert and shale fragments; weak, fine to medium, subangular blocky structure; few small roots; gradual boundary.
B3	62-88"	Yellowish-red (5YR-5/8), silty clay loam; massive structure; 20-30% shale, some chert and limestone fragments.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
A1	7.30	69.43	4.78	2.38	13.79	4.46	0.85	2.70	N.R.	21.80	87.61
A2	7.66	52.60	2.15	0.18	11.49	3.41	0.55	1.97	0.00	17.42	88.69
B1	7.66	25.95	0.86	0.18	10.53	2.22	0.24	2.43	0.00	15.42	84.24
B2	7.48	23.61	0.55	0.18	9.57	3.96	0.26	2.55	0.01	16.34	84.39
B3	7.28	39.51	0.42	0.18	6.62	3.86	0.20	2.12	0.02	12.80	83.44

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	10.5	8.7	4.3	7.7	9.1	35.6	24.1	27.1	21.5
A2	7.2	8.0	4.1	8.9	9.2	40.6	22.0	31.3	23.5
B1	5.9	5.7	3.1	6.7	9.1	38.2	31.3	27.7	23.1
B2	4.5	4.1	2.7	6.4	8.9	31.6	41.8	24.6	19.3
B3	7.4	6.6	3.6	8.1	9.6	32.9	31.8	26.0	20.9

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A1	18.7	12	0	5	0	10	10	13	20	15	15
B2	26.1	8	0	5	5	15	12	18	15	10	12
B3	12.3	8	0	15	5	0	0	40	5	10	17

EMORY SILT LOAM (4)

Ap	0-9"	Dark reddish-brown, very friable silt loam; moderate, fine, granular structure; clear, smooth boundary.
B1	9-17"	Red (2.5YR-4/6), friable silty clay loam; moderate, fine, subangular blocky structure; clear, smooth boundary.
B21	17-36"	Red (2.5YR-4/6), slightly sticky, slightly plastic silty clay loam; moderate, medium, subangular blocky structure; clay films fairly distinct.
B22	36-46"	Dark red (2.5YR-3/6), slightly sticky, plastic clay; moderate to medium, subangular blocky structure; clay skins distinct and continuous; gradual, smooth boundary.
B1b	46-66"	Red, dark red and yellowish-brown, plastic, sticky silty clay; few shale particles; moderate, fine, angular blocky structure.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]/	Total[2]/	
Ap	7.56	21.51	3.96	2.74	12.92	4.65	1.25	2.11	N.R.	20.93	89.92
B1	7.88	6.08	0.71	0.00	4.21	1.68	0.90	0.93	N.R.	7.72	87.95
B21	7.72	2.34	0.38	0.18	7.62	2.80	0.55	2.08	N.R.	13.05	84.06
B22	7.52	6.48	0.70	0.73	9.05	4.00	0.74	2.53	N.R.	16.32	84.50
B1b	7.38	6.08	0.57	0.00	7.55	4.65	0.65	2.44	N.R.	15.29	84.04

ETOWAH SILT LOAM

Ap	0-9"	Dark brown (7.5YR-3/2), friable silt loam; moderate, fine, granular structure; clear, smooth boundary.
B1	9-13"	Brown to dark brown (7.5YR-4/4), friable silty clay loam; weak, fine, subangular blocky structure; few chert, shale and quartz gravel; many small mineral concretions; small and medium roots; clear, smooth boundary.
B21	13-26"	Yellowish-red (5YR-5/8), friable silty clay loam; fine, subangular blocky structure; black concretions plentiful; gradual, smooth boundary.
B22	26-42"	Yellowish-red (5YR-5/8), firm silty clay; moderate, medium, subangular and angular blocky structure; many small mineral concretions; gradual, smooth boundary.
B3	42-84"	Mottled red, yellowish-red and strong brown, firm, plastic, sticky silty clay loam; moderate, medium, angular blocky structure; few small black mineral concretions and yellow shale fragments; gradual boundary.
C	84-96"	Mottled red, white and brown, firm silty clay; no roots; few small shale and chert fragments; gradual, smooth boundary.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]/	Total[2]/	
Ap	6.82	55.40	4.02	2.74	11.54	1.35	0.35	5.16	0.06	18.40	71.96
B1	7.22	29.22	0.84	0.18	7.52	1.17	0.25	4.28	0.01	13.22	67.62
B21	7.22	25.48	0.47	0.73	7.24	1.68	0.29	4.49	0.02	13.70	67.23
B22	6.20	18.93	0.12	0.55	5.26	1.71	0.25	6.28	0.05	13.50	53.48
B3	4.72	9.12	0.12	0.73	1.65	1.44	0.47	9.01	1.19	12.57	28.32
C	4.80	6.78	0.11	0.73	1.67	1.06	0.37	7.65	1.27	10.75	28.84

Engineering Characteristics

Horizon	Percentage Passing Sieve Size: In Inches					Percentage Passing Sieve Size: In Millimeters					Percentage Smaller Than: In Millimeters				Liquid Limit	Plasticity Index	Max Dry Density Lbs./Cu/Ft.	Opt. H_2O %	Classification: Unified	Classification: AASHO
	3.0	2.0	1.5	1.0	.75	.375	4.7	2.0	.42	.25	.074	.05	.02	.005	.002						
Ap						100	99	89	84	72	55	39	15	7	37	12	95	22	ML-CL	A-6(9)
B21			100	99	99	98	97	82	79	71	65	55	45	39	41	23	106	19	CL	A-7-6(13)
B22							100	93	91	84	78	69	58	52	50	31	103	21	CL	A-7-6(18)
B3							100	96	94	88	82	72	58	51	46	22	104	22	CL	A-7-6(14)

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent): Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
Ap	2.5b	3.9b	3.6b	7.8	8.1	46.2	27.9	25.6	32.8
B1	2.2b	3.7b	2.9b	6.8	6.6	40.1	37.7	21.8	28.7
B21	5.7b	3.4b	2.5b	5.8	5.4	32.2	45.0	18.9	21.8
B22	3.1b	3.2b	2.4b	4.8	5.6	29.4	51.5	17.4	20.0
B3	1.4	2.2	1.6	4.2	4.8	33.9	51.9	17.5	23.7
C	2.7	2.8	2.0	4.3	6.7	34.3	47.2	21.5	21.8

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
Ap	26.5	11	0	5	10	10	15	13	10	15	11
B22	22.7	8	0	10	5	10	15	12	0	15	25
C	14.4	9	0	10	0	5	15	11	0	15	35

b. Few Fe/Mn?-bearing aggregates.

FREDERICK SILT LOAM, POROUS SUBSTRATUM

A1	0-2"	Dark brown (10YR-4/3), very friable silt loam; moderate, fine, granular structure; clear, smooth boundary.
A2	2-7"	Yellowish-brown (10YR-5/4), friable silt loam; moderate, fine, granular structure; gradual, smooth boundary.
B1	7-12"	Strong brown (7.5YR-5/6), friable silt loam; weak, medium, subangular blocky structure; few faint patchy clay films; gradual, smooth boundary.
B21	12-25"	Yellowish-red (5YR-5/6), firm silty clay; moderate, medium, subangular blocky structure; few black mineral films; infiltration of darker material from above horizon; gradual, smooth boundary.
B22	25-50"	Yellowish-red (5YR-5/6), firm clay; faintly mottled with yellowish-brown and red; moderate, medium, angular blocky structure; few small yellowish shale and chert fragments; gradual, smooth boundary.
B23	50-66"	Mottled red, brown and yellow clay; few chert and yellow shale fragments; patchy, thin, distinct clay films.
B3	66-94"	Mottled red, yellow and brownish, very firm clay; few gray weathered shale, limestone and chert fragments.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
A1	5.55	12.39	6.10	5.49	5.45	1.69	0.55	9.34	N.R.	17.03	45.16
A2	5.30	5.38	2.00	2.56	2.40	0.90	0.39	5.83	0.59	9.52	38.76
B1	5.82	4.44	1.07	2.19	2.53	1.23	0.50	4.31	0.23	8.57	49.71
B21	5.36	2.10	0.32	2.56	3.06	1.97	1.35	6.52	0.71	12.90	49.46
B22	5.08	4.44	0.31	1.83	2.67	2.76	1.30	10.38	2.08	17.11	39.33
B23	5.12	3.04	0.23	3.29	4.59	4.63	0.72	7.62	0.70	17.56	56.61
B3	5.42	11.92	0.26	3.11	5.57	5.48	0.45	6.16	0.48	17.66	65.12

Engineering Characteristics

Horizon	Percentage Passing Sieve Size								Percentage Smaller Than				Liquid Limit	Plasticity Index	Max Dry Density Lbs./Cu/Ft.	Opt. H_2O %	Classification	
	In Inches					In Millimeters			In Millimeters								Uni-fied	AASHO
	3.0	2.0	1.5	1.0	.75	.375	4.7	2.0	.42	.25	.074	.05	.02	.005	.002						
A2							100	99	98	94	87	61	20	9	29	4	99	20	ML	A-4(8)
B21 & B22							100	99	99	96	88	73	48	39	50	25	99	21	CL	A-7-6(16)
B23							100	99	99	98	96	82	63	58	69	42	91	27	CH	A-7-6(20)

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	0.5b	0.9b	1.0b	2.6	7.4	70.8	16.8	41.1	38.5
A2	0.9b	0.8b	1.0b	2.3	7.3	71.0	16.7	40.9	38.5
B1	0.8b	0.8b	0.8b	2.1	6.7	69.1	19.7	39.7	37.2
B21	0.2	0.4	0.5	1.7	6.5	49.4	41.3	33.9	23.1
B22	0.1	0.1	0.2	1.1	4.5	35.4	58.6	24.3	16.4
B23	0.1	0.2	0.1	0.6	4.9	38.7	55.4	25.2	18.8
B3	0.1	0.3	0.2	1.3	7.0	33.0	58.1	26.8	14.1

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A2	24.0	8	0	20	0	0	0	34	0	15	23
B22	28.2	12	0	13	0	10	0	31	0	10	23
B3	28.3	12	0	15	0	10	0	32	0	15	16

b. Few Fe/Mn?-bearing aggregates.

FREDERICK CHERTY SILT LOAM

Ap	0-7"	Dark yellowish-brown, very friable cherty silt loam; weak, fine, granular structure; clear, smooth boundary.
B1	7-14"	Yellowish-brown, friable silt loam; moderate, medium, subangular blocky structure; few chert fragments common; gradual, smooth boundary.
B21	14-22"	Strong brown (7.5YR-5/6), faintly mottled firm clay; moderate, medium, blocky structure; chert fragments common; clear, smooth boundary.
B22	22-74"	Mottled red, yellow and brown firm clay; medium, angular blocky structure; few small chart fragments; clay films continuous and distinct; gradual, wavy boundary.
B3	74-86"	Brownish-yellow mottled with red and brown, firm clay; weak, fine, subangular blocky structure.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
Ap	6.96	5.38	2.72	1.28	3.91	1.39	0.29	2.59	N.R.	8.18	68.34
B1	4.96	1.64	0.66	2.01	0.62	0.36	0.14	4.63	N.R.	5.75	19.48
B21	4.85	3.97	0.34	0.18	1.91	0.75	0.18	10.39	N.R.	13.23	21.47
B22	4.84	2.57	0.21	0.18	1.56	0.77	0.19	14.94	5.39	17.46	14.43
B3	4.69	2.57	0.20	0.37	0.47	0.33	0.14	13.27	6.05	14.21	6.62

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
Ap	2.9	2.3	1.9	4.6	4.8	67.0	16.5	26.3	48.0
B1	1.7	1.9	1.6	4.0	4.3	64.3	22.2	23.1	47.7
B21	0.5	0.8	0.9	2.1	2.5	40.5	52.7	14.0	30.1
B22	0.4	0.2	0.4	1.1	1.4	24.7	71.8	8.1	18.6
B3	0.5	0.4	0.4	0.9	0.9	28.9	68.0	6.0	24.3

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
Ap	12.3	6	1	19	0	0	0	38	0	10	26
B22	26.6	9	1	15	0	5	0	17	0	10	43
B3	23.0	8	0	15	0	0	0	13	0	15	49

GREENDALE SILT LOAM (1)

A11	0-1"	Brown (10YR-4/3), silt loam; weak, very fine, granular structure; abrupt, smooth boundary.
A12	1-7"	Dark yellowish-brown (10YR-4/4), very friable silt loam; weak, very fine, granular structure; gradual, smooth boundary.
A13	7-23"	Dark yellowish-brown (10YR-4/4), friable silt loam; very weak, fine, granular structure; gradual boundary.
B1	23-34"	Yellowish-brown (10YR-5/4), friable silty clay loam; medium, subangular blocky structure; many small manganese concretions; clear, smooth boundary.
B2	34-37"	Yellowish-brown (10YR-5/6), friable silty clay loam; weak, medium, subangular blocky structure; grayish shale and chert fragments make up 5-10% of this horizon; clear, smooth boundary.
B1b	37-47"	Yellowish-brown firm clay mottled with yellow, red and gray; moderate, medium, angular blocky structure; gradual, wavy boundary.
B2b	47-64"	Distinctly mottled yellow, red and gray, firm clay; moderate, medium, angular blocky structure; gradual, wavy boundary.
B3b	64-82"	Distinctly mottled brownish-yellow, white, and gray firm clay; small pockets of shale and a few fine sandy particles; wavy boundary.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]/	Total[2]/	
A11	5.60	19.40	6.27	8.59	5.61	1.27	0.50	9.31	0.70	16.69	44.22
A12	5.70	6.55	2.19	3.47	2.36	0.17	0.16	6.40	0.54	9.09	29.59
A13	5.40	2.81	1.36	3.84	1.38	0.04	0.05	6.16	0.65	7.63	19.27
B1	5.52	1.87	0.40	1.65	4.43	0.73	0.11	4.73	0.11	10.00	52.70
B2	5.60	1.87	0.37	1.28	4.85	0.84	0.13	4.34	N.R.	10.16	57.28
B1b	4.90	2.81	0.29	0.18	4.03	2.12	0.22	7.74	N.R.	14.11	45.15
B2b	5.00	3.74	0.23	0.37	3.13	3.16	0.47	11.44	N.R.	18.20	37.14
B3b	5.02	4.91	0.10	0.37	3.01	3.40	0.40	7.34	N.R.	14.15	48.13

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A11	0.5b	1.1b	1.3b	6.6	10.5	65.3	14.7	37.6	42.8
A12	0.9b	1.3b	1.1	5.8	10.5	65.6	14.8	37.0	43.0
A13	1.1b	2.0b	2.3	9.2	10.8	59.0	15.6	35.7	40.1
B1	0.3	1.4	1.7	6.4	7.5	51.7	31.0	25.5	37.6
B2	0.7	1.7	2.0	6.7	7.3	48.5	33.1	25.7	34.2
B1b	1.1	1.8	1.4	3.8	4.1	30.9	56.9	15.2	22.1
B2b	0.3	0.7	0.8	2.5	3.3	23.0	69.4	10.4	17.4
B3b	1.1	1.4	1.3	4.0	5.7	30.5	56.0	17.0	21.6

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A12	19.0	7	0	15	5	0	0	48	0	10	15
B2	14.4	11	0	15	5	5	0	19	0	20	25
B1b	25.0	10	0	10	0	10	15	5	0	20	30
B2b	11.4	8	0	15	10	10	5	17	0	15	20

b. Few Fe/Mn?-bearing aggregates.

GREENDALE SILT LOAM (2)

Ap	0-9"	Dark yellowish-brown (10YR-4/4), very friable silt loam; weak, fine, granular structure; gradual, smooth boundary.
B1	9-16"	Dark yellowish-brown (10YR-4/4), friable silt loam; weak, fine, subangular blocky structure; clear, smooth boundary.
B21	16-26"	Yellowish-brown (10YR-5/6), firm silty clay; moderate, medium, subangular blocky structure; gradual, smooth boundary.
B22g	26-29"	Yellowish-brown, very firm silty clay with a few medium and fine mottles of gray.
Bm	29-41"	Gray (10YR-6/1), compact, very firm silty clay loam, faintly mottled with yellow and red; weak, medium, platy structure; few fine weathered shale and quartz fragments; clear, smooth boundary.
B1b	41-51"	Brown, firm silty clay; moderate to strong, subangular blocky structure; few small shale, chert and quartz fragments; gradual, wavy boundary.
B2b	51-63"	Very dark grayish brown very firm clay mottled with black and dark gray.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
Ap	5.50	4.44	2.15	3.29	2.43	0.45	0.50	7.34	N.R.	10.72	31.53
B1	5.42	2.34	1.41	2.56	2.18	0.33	0.14	6.89	N.R.	9.54	27.78
B21	4.80	2.34	0.31	0.55	2.20	1.07	0.20	10.10	N.R.	13.57	25.57
B22g	4.68	1.17	0.30	0.37	1.47	1.57	0.24	10.41	N.R.	13.69	23.96
Bm	4.70	1.17	0.17	0.37	1.21	1.18	0.21	7.19	N.R.	9.79	26.56
B1b	5.66	4.21	0.28	0.37	4.20	3.70	0.28	4.58	0.00	12.76	64.11
B2b	7.32	9.35	0.50	0.37	11.14	9.10	0.53	3.52	0.00	24.29	85.51

Engineering Characteristics

Horizon	Percentage Passing Sieve Size In Inches					Percentage Passing Sieve Size In Millimeters				Percentage Smaller Than In Millimeters				Liquid Limit	Plasticity Index	Max Dry Density Lbs./Cu/Ft.	Opt. H_2O %	Classification Unified	Classification AASHO
	3.0	2.0	1.5	1.0	.75	.375	4.7	2.0	.42	.25	.074	.05	.02	.005	.002						
Ap				100	99	97	93	80	77	70		65	47	14	6	27	5	108	16	ML-CL	A-4(7)
B21							100	99	98	95		90	76	54	42	51	26	100	22	CH	A-7-6(17)
Bm							100	99	98	93		88	71	45	33	39	18	108	17	CL	A-6(11)

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
Ap	7.5b	4.3b	2.5b	4.9	6.6	56.9	17.3	23.4	42.7
B1	3.2b	2.9b	2.1b	5.5	7.1	59.5	19.7	25.7	44.2
B21	0.5b	0.6b	0.7b	2.2	4.6	49.5	41.9	20.0	35.5
B22g	0.1	0.2	0.4	1.7	3.7	49.7	44.2	19.0	35.5
Bm	0.4	0.6	0.7	3.2	7.1	55.3	32.7	29.9	34.7
B1b	2.8b	2.9b	2.2	6.4	6.8	36.5	42.4	24.2	22.8
B2b	0.4	0.7	0.6	2.0	2.5	21.6	72.2	9.5	15.8

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
Ap	17.0	12	0	15	10	5	23	0	0	15	20
B21	16.2	11	0	10	5	15	14	10	0	20	15
B22g	38.9	11	0	10	5	15	29	0	0	20	10
B2b	27.4	8	0	10	10	15	26	0	0	20	11

b. Few Fe/Mn?-bearing aggregates.

GROSECLOSE SILT LOAM, POROUS SUBSTRATUM

Ap1	0-1"	Brown to dark brown (10YR-4/3), friable silt loam; moderate granular structure; few shale particles; clear, smooth boundary.
Ap2	1-7"	Brown (10YR-4/3), friable silt loam; fine, granular structure; clear, smooth boundary.
B1	7-11"	Yellowish-brown (10YR-5/6), firm silty clay loam; moderate, medium to coarse, subangular blocky structure; clay films continuous and distinct; few shale and chert fragments; clear, smooth boundary.
B2	11-25"	Strong brown (7.5YR-5/6), firm clay; moderate, medium, subangular blocky structure; yellow shale fragments increase with depth; chert common; gradual, wavy boundary.
B3	25-32"	Mottled brownish-yellow and yellow, friable silty clay loam; weak, medium, subangular blocky structure; discontinuous but distinct clay films; black films on ped surfaces.
C	32-88"	Brownish-yellow, friable silt loam soil material; mottled with white and yellow; gradual, wavy boundary.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]	Total[2]	
Ap1	6.15	175.79	7.98	9.69	8.50	1.96	2.24	7.71	0.22	20.41	62.22
Ap2	5.50	17.77	1.90	4.57	2.82	0.66	0.54	6.07	0.54	10.09	39.84
B1	5.16	2.81	0.57	1.28	3.45	1.06	0.40	4.73	0.49	9.64	50.93
B2	4.89	2.34	0.44	0.37	3.78	1.60	0.37	9.16	1.94	14.91	38.56
B3	4.52	1.87	0.30	0.55	2.07	2.00	0.47	13.50	4.48	18.04	25.17
C	4.72	5.61	0.08	10.06	0.73	3.18	0.44	14.59	8.45	18.94	22.97

Engineering Characteristics

Horizon	Percentage Passing Sieve Size								Percentage Smaller Than				Liquid Limit	Plasticity Index	Max Dry Density	Opt. H_2O %	Classification	
	In Inches					In Millimeters			In Millimeters								Unified	AASHO
	3.0	2.0	1.5	1.0	.75	.375	4.7	2.0	.42	.25	.074	.05	.02	.005	.002				Lbs./Cu/Ft.			
Ap2						100	99	94	92	85	78	57	24	12	30	7	104	18	ML-CL	A-4(8)
B2						100	98	97	94	89	77	54	45	50	27	99	22	CL	A-7-6(17)	
C						100	89	86	78	72	60	45	40	61	30	92	27	MH-CH	A-7-5(20)	

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
Ap1	1.5f	3.4f	2.0b	5.3	7.0	63.0	17.8	30.1	43.0
Ap2	2.8b	2.2b	1.6b	4.2	7.0	64.2	18.0	29.4	44.3
B1	0.7b	2.1b	1.6b	4.1	5.5	55.6	30.4	22.9	40.6
B2	0.5	1.0	1.0	2.7	3.8	41.8	49.2	15.4	31.8
B3	0.2	0.4	0.3	1.8	4.1	33.6	59.6	12.7	26.3
C	1.0	3.1	2.0	5.6	7.3	39.2	41.8	23.4	26.5

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
Ap2	18.3	8	0	10	10	8	40	0	0	9	15
B2	27.1	8	0	5	2	2	40	0	0	20	23
C	35.8	13	0	5	0	10	22	0	0	25	25

b. Few Fe/Mn?-bearing aggregates.
f. Common organic matter fragments. Few Fe/Mn?-bearing aggregates.

HAGERSTOWN SILT LOAM

Ap	0-8"	Reddish brown (5YR-4/4), friable heavy silt loam; moderate, fine, granular structure; clear, smooth boundary.
B21	8-24"	Red (2.5YR-4/6), firm clay; moderate, fine, subangular blocky structure; black concretions common; few chert; clay films distinct and continuous around peds; clear, smooth boundary.
B22	24-50"	Red (2.5YR-4/6), friable clay splotched with black, reddish-yellow and yellow; moderate, fine, angular blocky structure; many black rounded concretions; few yellow shale particles; distinct, patchy clay films; gradual, wavy boundary.
B3	50-70"	Red, yellow, reddish-yellow and yellowish-red, firm clay; contains many weathered yellowish shale fragments and a few fine black concretions; limestone and brecciated rock materials are encountered at about 4 feet.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
Ap	6.39	3.74	2.48	1.83	3.57	1.75	0.40	5.92	0.05	11.64	49.14
B21	5.07	5.61	0.43	8.41	2.50	1.18	0.15	14.87	1.75	18.70	20.48
B22	4.98	5.14	0.16	3.47	0.61	0.66	0.19	11.68	3.40	13.14	11.11
B3	4.91	4.68	0.16	1.10	0.52	0.95	0.38	18.20	8.59	20.05	9.23

Engineering Characteristics

Horizon	Percentage Passing Sieve Size (In Inches)						Percentage Passing Sieve Size (In Millimeters)				Percentage Smaller Than (In Millimeters)				Liquid Limit	Plasticity Index	Max Dry Density Lbs./Cu/Ft.	Opt. H_2O %	Classification	
	3.0	2.0	1.5	1.0	.75	.375	4.7	2.0	.42	.25	.074	.05	.02	.005	.002					Unified	AASHO
Ap				100	99	99	92	88	76			70	53	23	10	30	11	108	17	CL	A-6(8)
B21					100	97	95	89				82	73	58	51	52	31	98	23	CH	A-7-6(18)
B22				100	99	92	90	84				79	68	53	46	49	23	105	21	ML-CL	A-7-6(15)

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
Ap	1.6c	3.1c	3.0b	8.1	7.7	52.5	24.0	28.4	36.3
B21	0.4c	1.7c	1.9b	5.3	4.6	34.0	52.1	17.3	24.3
B22	3.2c	2.7c	1.8b	4.8	4.4	37.2	45.9	18.0	26.3
B3	0.9c	1.1c	0.8b	2.1	2.9	32.4	59.8	14.6	21.9

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
Ap	11.5	12	0	10	5	0	0	30	10	15	18
B22	26.6	10	0	10	0	10	0	33	0	10	27
B3	25.2	10	0	10	0	15	10	15	0	10	30

b. Few Fe/Mn?-bearing aggregates.
c. Many Fe/Mn?-bearing aggregates.

HAYESVILLE FINE SANDY LOAM

Ap	0-7"	Yellowish-brown (10YR-5/6), friable loam; fine, granular structure; clear, smooth boundary.
B1	7-11"	Yellowish-red (5YR-5/8), clay loam with abundant patches of dark gray; moderate, fine, subangular blocky structure; gradual, smooth boundary.
B2	11-21"	Red (2.5YR-4/8), clay loam with infrequent patches of dark gray; subangular blocky structure; clay films common on aggregate faces; clear, wavy boundary.
B3	21-29"	Red, yellow and white, friable clay loam soil material which covers weathered parent material of yellow and white; diffuse, irregular boundary.
C	29-39"	Light sandy loam soil material from mostly weathered granodiorite; structure is similar to weathered rock.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]	Total[2]	
Ap	6.29	5.61	2.84	0.55	3.20	1.68	0.54	4.85	0.15	10.27	52.78
B1	5.08	2.34	1.04	0.37	0.94	1.06	0.45	8.16	1.31	10.61	23.09
B2	5.10	2.34	0.43	0.55	0.48	1.09	0.49	13.02	2.33	15.08	13.66
B3	5.08	1.87	0.15	0.18	0.10	0.47	0.26	12.14	3.47	12.97	6.40
C	5.00	0.94	0.08	0.55	0.03	0.35	0.15	8.80	N.R.	9.33	5.68

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
Ap	7.7	10.9	5.8	8.8	4.1	42.3	20.4	17.0	33.7
B1	5.0	8.1	4.2	6.3	3.0	35.4	38.0	12.9	28.6
B2	3.3	4.2	1.9	3.2	2.3	21.3	63.8	8.3	17.0
B3	6.1	6.5	2.8	5.2	4.1	27.4	47.9	13.3	21.1
C	11.7	9.3	3.6	6.6	5.8	40.1	22.9	18.1	31.6

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmor-illonite %	Vermic-ulite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
Ap	13.0	7	0	5	0	0	0	33	0	15	40
B1	11.3	9	1	5	0	0	0	25	0	10	50
B2	23.8	11	0	5	0	0	0	14	0	10	60
B3	19.0	11	0	5	0	0	0	14	0	10	60
C	22.7	10	0	5	0	0	0	14	0	10	61

HIWASSEE FINE SANDY LOAM, LIGHT SURFACE VARIANT (1)

O2	1/2-0"	Partly decomposed forest litter of mostly oak, hickory and maple leaves and twigs.
A1	0-1"	Dark yellowish-brown (10YR-4/4), very friable fine sandy loam; weak, fine, granular structure; clear, smooth boundary.
A2	1-8"	Yellowish-brown (10YR-5/4), friable fine sandy loam; weak, fine, granular structure; gradual, smooth boundary.
B1	8-15"	Yellowish-brown (10YR-5/6), friable fine sandy loam; weak, medium, subangular blocky structure; gradual, smooth boundary.
B21	15-20"	Yellowish-red (5YR-5/6 to 5/8), friable fine sandy clay loam; weak, medium, subangular blocky structure; gradual, smooth boundary.
B22	20-64"	Dark red (10R-3/6), firm clay; moderate, medium, subangular blocky structure; continuous brown clay films; gradual, wavy boundary.
B3	64-84"	Red (2.5YR-4/8), firm clay loam, mottled with brownish-yellow; weak, medium, subangular blocky structure; small mica flakes and quartz fragments are abundant.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]	Total[2]	
O2	4.58	99.41	40.30	45.90	16.02	4.65	1.40	41.72	3.08	63.79	34.60
A1	4.72	4.04	3.97	2.93	0.81	0.34	0.09	7.26	1.20	8.50	14.59
A2	4.90	2.83	1.58	0.91	0.42	0.18	0.08	4.91	1.09	5.59	12.16
B1	4.84	4.45	0.71	0.55	0.17	0.31	0.09	4.60	1.13	5.17	11.03
B21	4.72	2.42	0.43	0.00	0.11	1.41	0.24	9.12	2.37	10.88	16.18
B22	4.92	4.04	0.14	0.18	0.13	0.71	0.14	11.12	3.15	12.10	8.10
B3	4.90	2.83	0.14	0.00	0.10	0.26	0.07	9.36	2.48	9.79	4.39

Engineering Characteristics

Horizon	Percentage Passing Sieve Size In Inches				Percentage Passing Sieve Size In Millimeters				Percentage Smaller Than In Millimeters				Liquid Limit	Plasticity Index	Max Dry Density Lbs./Cu/Ft.	Opt. H_2O %	Classification Unified	Classification AASHO
	3.0	2.0	1.5	1.0	.75	.375	4.7	2.0	.42	.25	.074	.05	.02	.005	.002					
A2							100	97	88	61	57	50	16	8	16	NP[7]	117	12	ML	A-4(5)
B21 & B22							100	97	89	70	67	62	55	53	48	18	98	25	ML	A-7-5(12)
B3							100	98	91	68	63	58	50	44	48	20	104	22	ML-CL	A-7-6(12)

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	0.9b	4.4b	8.4	22.2	13.1	42.8	8.2	38.4	28.5
A2	0.5b	3.7b	8.0	20.4	13.9	43.9	9.6	36.6	30.9
B1	0.4b	3.4b	7.5	20.3	12.5	40.5	15.4	33.7	29.3
B21	0.4b	2.7b	6.5	16.4	9.4	30.9	33.7	25.7	22.7
B22	0.2	3.0	7.3	17.3	7.9	11.9	52.4	20.2	7.4
B3	0.2	2.2	6.1	18.1	11.4	16.4	45.6	27.6	9.7

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A1	7.7	1	0	25	5	0	0	44	0	10	15
A2	9.7	1	0	25	5	0	0	39	0	15	15
B1	16.4	5	0	15	0	5	5	40	0	5	25
B21	24.8	11	0	5	0	0	5	34	0	5	40
B22	23.6	11	0	5	0	0	5	24	0	5	50
B3	15.6	10	0	5	0	0	5	15	0	15	50

b. Few Fe/Mn?-bearing aggregates.

HIWASSEE FINE SANDY LOAM, LIGHT SURFACE VARIANT (2)

Ap	0-7"	Dark yellowish-brown (10YR-4/4), very friable fine sandy loam; fine, granular structure; clear, smooth boundary.
B1	7-17"	Strong brown (7.5YR-5/6), friable sandy clay loam; weak, medium, subangular blocky structure; few rounded angular quartz gravel and cobbles; few small mica flakes; gradual, smooth boundary.
B21	17-28"	Yellowish-red (5YR-5/6), friable clay loam, faintly mottled with red, brown and yellowish-brown; few mica flakes; gradual, wavy boundary.
B22	28-54"	Dark red (10R-3/6), friable, slightly compact silty clay loam, mottled with yellow, red, and brown; weak to moderate, medium, subangular blocky structure; clay films prominent and continuous; few sandstone and quartz gravel and cobbles.
B3	54-63"	Red, friable fine sandy clay loam; many quartz and sandstone gravel; few mica flakes.
C	63-78"	Red, friable fine sandy loam; contains many roundish quartz and sandstone gravel.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
Ap	6.56	12.93	1.70	1.83	3.08	0.47	0.06	2.78	0.08	6.39	56.49
B1	5.42	2.42	0.40	0.00	1.86	1.07	0.07	4.60	0.15	7.60	39.47
B21	4.56	3.23	0.16	0.18	0.74	0.85	0.18	10.51	1.51	12.28	14.41
B22	4.62	2.83	0.12	0.18	0.17	0.54	0.20	11.12	2.00	12.03	7.56
B3	4.80	4.04	0.10	0.18	0.36	0.54	0.17	10.78	1.79	11.85	9.03
C	5.00	4.45	0.08	0.00	0.11	0.14	0.11	7.57	0.94	7.93	4.54

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
Ap	1.4c	3.6b	9.2	25.7	10.8	35.9	13.4	32.4	26.6
B1	1.2c	2.4b	6.6	21.0	10.5	31.4	26.9	28.3	23.6
B21	0.8b	2.0b	5.9	17.5	8.0	18.2	47.6	21.0	13.8
B22	0.4	2.3	6.2	17.8	6.6	13.0	53.7	19.5	8.9
B3	0.7	2.8	6.2	16.4	7.8	10.3	55.8	19.9	6.6
C	0.8	6.8	14.0	25.3	7.9	11.6	33.6	23.0	7.9

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
Ap	13.0	3	4	10	0	0	0	58	0	5	20
B1	11.8	6	2	5	0	0	0	52	0	5	30
B21	14.3	11	0	5	0	0	0	22	0	5	57
B22	11.1	11	0	5	0	0	0	19	0	5	60
B3	14.0	13	0	5	5	0	0	12	0	15	50
C	11.7	16	1	5	10	0	0	9	0	20	39

b. Few Fe/Mn?-bearing aggregates.
c. Many Fe/Mn?-bearing aggregates.

HAYTER LOAM

A1	0-3"	Dark brown (7.5YR-3/2), very friable loam; moderate, fine, granular structure; gradual, smooth boundary.
A2	3-9"	Brown (7.5YR-5/4), friable loam; moderate, medium, granular structure; gradual, smooth boundary.
B21	9-22"	Strong brown to yellowish-red, friable silty clay loam; moderate, medium, subangular blocky structure; gradual, smooth boundary.
B22	22-33"	Reddish-brown (5YR-4/4), friable silty clay loam, mottled with brown and yellow; moderate, medium, subangular blocky structure; gradual, smooth boundary.
C	33-50"	Reddish-brown (5YR-5/3), friable light silty clay loam, with many medium distinct mottles of brownish-yellow, red, strong brown and faint shades of olive yellow; structureless.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]	Total[2]	
A1	5.76	18.47	5.00	11.34	8.05	1.10	0.49	10.21	0.55	19.85	48.56
A2	5.49	5.38	2.38	8.59	5.76	0.59	0.21	9.36	1.02	15.92	41.21
B21	6.10	8.65	0.56	1.83	7.93	0.48	0.14	5.99	0.19	14.54	58.80
B22	5.20	5.84	0.72	6.77	6.13	1.44	0.17	10.54	1.47	18.28	42.34
C	4.94	9.12	0.59	8.23	4.31	1.62	0.23	12.97	3.19	19.13	32.20

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	3.8	3.3	2.0	6.7	8.6	50.9	24.7	28.9	35.1
A2	2.5	2.6	1.8	6.2	9.3	51.5	26.1	28.1	37.0
B21	3.5	2.6	1.6	6.1	7.8	45.8	32.6	24.9	32.9
B22	3.7	2.9	1.7	6.1	7.7	41.3	36.6	23.2	30.0
C	4.6	5.1	2.9	7.5	7.4	35.0	37.5	20.8	26.4

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A2	23.9	5	0	5	0	0	37	10	0	25	18
B22	26.7	7	0	5	0	0	40	10	0	25	13
C	32.1	7	0	15	0	0	14	5	5	25	29

HOLSTON LOAM

A1	0-1"	Dark grayish-brown (2.5Y-4/2), very friable loam; moderate, fine, granular structure; gradual, smooth boundary.
A2	1-8"	Light yellowish-brown (2.5Y-6/4), very friable loam; moderate, fine, granular structure; gradual, smooth boundary.
B1	8-14"	Yellow (2.5Y-7/6), friable loam; weak, medium, subangular blocky structure; gradual, smooth boundary.
B21	14-32"	Brownish-yellow (10YR-6/6), friable silty clay loam; moderate, medium, subangular blocky structure; gradual, smooth boundary.
B22	32-50"	Brownish-yellow (10YR-6/6), friable silty clay loam, mottled with red and gray; moderate, medium, subangular blocky structure; gradual, smooth boundary.
C	50-75"	Mottled light brownish-gray and red very firm massive clay.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]/	Total[2]/	
A1	5.22	4.44	5.27	1.10	3.74	1.10	0.21	7.51	1.24	12.56	40.21
A2	5.12	3.04	1.70	0.18	0.70	0.31	0.10	4.78	1.07	5.89	18.85
B1	4.69	1.64	0.28	0.18	0.32	0.12	0.09	5.05	1.84	5.58	9.50
B21	4.54	1.64	0.39	0.18	0.42	0.63	0.15	10.39	3.72	11.59	10.35
B22	4.70	3.04	0.30	0.18	0.12	0.85	0.17	18.13	5.99	19.27	5.92
C	4.63	0.70	0.21	0.18	1.16	0.55	0.13	16.16	6.70	18.00	10.22

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	1.8b	4.1b	7.3	9.4	7.7	61.8	7.9	32.4	40.9
A2	0.8b	3.7b	7.2	9.2	7.0	63.0	9.1	30.4	43.3
B1	0.7b	3.0b	5.6	7.4	6.1	60.8	16.4	27.1	42.8
B21	0.7b	2.4b	4.7	5.4	5.2	50.2	31.4	21.9	35.8
B22	0.3	2.1	4.0	3.5	7.6	31.3	51.2	21.4	18.9
C	0.1	1.0	3.1	9.8	11.9	35.5	38.6	33.2	19.0

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A2	25.7	4	0	5	5	20	15	35	0	10	6
B22	38.1	14	0	5	0	15	20	12	0	10	24
C	42.3	6	0	15	0	5	30	0	0	10	34

b. Few Fe/Mn?-bearing aggregates.

HUNTINGTON LOAM, CALCAREOUS* (1)

1	0-8"	Dark brown (7.5YR-4/2), friable silt loam; weak, fine granular structure; many lime concretions; many fine to very fine pores; clear, smooth boundary.
2	8-22"	Very dark grayish-brown (10YR-3/2), friable silt loam; weak, fine, subangular blocky structure which crushes readily to weak, fine, granular; gradual, wavy boundary.
3	22-37"	Dark yellowish-brown (10YR-4/4), very friable silty clay loam, with distinct mottles of red, black, and light yellowish-brown; structureless; clear, smooth boundary.
4	37-55"	Mottled brownish-yellow, yellowish-brown, dark red and black, compact highly calcareous marl material.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]/	Total[2]/	
1	8.00	4.85	2.82	0.27	23.96	0.88	0.16	0.43	N.R.	25.43	98.31
2	8.08	2.83	1.99	0.27	22.66	0.96	0.16	0.31	N.R.	24.09	98.71
3	8.02	2.42	1.06	0.37	20.46	1.58	0.19	0.31	N.R.	22.54	98.62
4	8.10	4.04	0.78	0.46	19.28	1.71	0.12	0.00	N.R.	21.11	100.00

See Appendix, Table 1, for carbonates data on this profile.

HUNTINGTON LOAM, CALCAREOUS* (2)

1	0-8"	Dark brown, friable silt loam; weak, fine granular structure; many lime concretions; many fine to very fine pores; clear, smooth boundary.
2	8-22"	Very dark grayish-brown (10YR-3/2), friable silt loam; weak, fine, subangular blocky structure, which crushes readily to weak, fine, granular; gradual, wavy boundary.
3	22-37"	Dark yellowish-brown (10YR-4/4), friable silty clay loam, with distinct mottles of red, black, and light yellowish-brown; structureless; clear, smooth boundary.
4	37-55"	Mottled brownish-yellow, yellowish-brown, dark red and black, compact highly calcareous marl material.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]/	Total[2]/	
1	8.08	6.47	3.01	0.73	23.58	0.92	0.16	0.46	N.R.	25.12	98.17
2	8.06	3.23	2.04	0.46	23.48	0.99	0.15	0.31	N.R.	24.93	98.76
3	8.02	2.02	1.06	0.64	20.38	1.59	0.18	0.28	N.R.	22.43	98.75
4	8.16	2.42	0.76	0.64	18.58	1.68	0.12	0.00	N.R.	20.38	100.00

See Appendix, Table 1, for carbonates data on this profile.

HUNTINGTON SILT LOAM

1 0-2" Brown to dark grayish-brown, friable silt loam; moderate, fine granular structure; few small rock fragments; gradual, smooth boundary.

2 2-30" Very dark grayish-brown, friable silt loam; soft black fine mineral concretions common; thin discontinuous clay films; moderate, fine, granular structure; clear, smooth boundary.

3 30-56" Brown to dark brown, friable loam to fine sandy clay loam; weak, fine to medium, subangular blocky structure; few fine chert, quartzite, sandstone, and shale gravel.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]	Total[2]	
1	6.21	18.93	5.99	6.77	12.78	1.65	0.34	6.75	0.12	21.52	68.63
2	6.75	3.51	1.46	1.28	13.33	1.29	0.12	4.02	0.05	18.76	78.57
3	6.99	22.21	0.91	0.18	9.58	1.56	0.10	2.81	0.03	14.05	80.00

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
1	<0.1	0.4	1.5	9.8	12.9	48.8	26.6	36.6	31.6
2	0.1	0.7	2.6	14.9	15.7	36.8	29.2	39.4	22.6
3	3.4	6.3	8.3	21.7	12.1	25.5	22.7	32.5	16.5

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
2	41.2	10	0	10	5	15	44	0	0	10	6

JEFFERSON STONY FINE SANDY LOAM

O2	1-0"	Loose, partly decomposed oak, pine, teaberry and huckleberry leaves and twigs.
A1	0-3"	Light yellowish-brown (10YR-6/4), stony, very friable, fine sandy loam; weak, fine, granular structure; clear, smooth boundary.
A2	3-8"	Light yellowish-brown (10YR-6/4), friable fine sandy loam; weak, fine, granular structure; clear, smooth boundary.
B21	8-13"	Yellowish-brown (10YR-5/8), friable fine sandy clay loam; weak, medium, subangular blocky structure; gradual, smooth boundary.
B22	13-31"	Yellowish-brown (10YR-5/6), firm fine sandy clay loam; moderate, medium to fine, subangular blocky structure; gradual, smooth boundary.
B3	31-41"	Brownish-yellow (10YR-6/8), firm sandy clay loam, with few, fine and faint pale brown mottles which increase with depth; weak, fine and medium, subangular blocky structure; gradual, smooth boundary.
C	41-55"	Mottled yellow, pale yellow, grayish-brown and reddish-brown, friable fine sandy loam soil material; very weak, medium, subangular blocky structure; clear, smooth boundary.
D	55-65"	Multi-colored partly weathered shale; very few fine roots; this is the D horizon of the buried Montevallo silt loam.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
O2	3.72	39.04	63.76	8.40	8.88	1.95	1.10	73.20	8.90	85.13	14.01
A1	4.25	4.91	2.68	0.18	0.19	0.07	0.09	9.63	2.80	9.98	3.51
A2	4.40	2.10	1.69	0.18	0.10	0.06	0.08	6.90	N.R.	7.14	3.36
B21	4.58	1.64	0.72	0.18	0.21	0.08	0.08	5.23	N.R.	5.60	6.61
B22	4.65	1.17	0.32	0.18	0.19	0.28	0.12	7.75	N.R.	8.34	7.07
B3	4.71	0.70	0.15	0.46	0.06	0.14	0.11	7.75	2.59	8.06	3.85
C	4.62	2.10	0.13	0.82	0.19	0.09	0.10	6.87	2.80	7.25	5.24
D	4.49	0.23	0.25	0.82	0.09	0.23	0.16	10.33	4.99	10.81	4.44

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	0.3c	1.1	6.3	33.3	11.9	33.8	13.3	40.1	25.3
A2	0.2c	1.1	6.3	32.4	11.6	34.3	14.1	38.9	26.2
B21	0.4c	1.2	5.8	30.8	11.4	33.8	16.6	37.0	26.2
B22	0.2c	0.9	5.2	27.2	9.3	28.0	29.2	31.6	21.6
B3	0.2	1.8	7.1	31.9	10.1	19.9	29.0	33.9	14.2
C	0.2	1.3	6.6	37.6	11.7	19.0	23.6	40.1	12.9
D	<0.1	0.4	1.3	5.0	2.0	52.7	38.6	17.3	40.2

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A2	29.0	8	0	10	5	0	15	31	0	20	11
B22	28.7	9	1	15	5	0	15	25	0	15	15

c. Many Fe/Mn?-bearing aggregates.

LEADVALE SILT LOAM

O2	1/4-0"	Partly decomposed oak and maple leaves, twigs and roots of small undergrowth.
A1	0-2"	Light yellowish-brown (10YR-6/4), friable silt loam; weak, granular structure; gravel 1/16 to 3" in size; common green mold on surface; clear, smooth boundary.
A2	2-6"	Light yellowish-brown (2.5Y-6/4), friable silt loam; very weak, medium, subangular blocky structure; clear, smooth boundary.
B21	6-22"	Yellowish-brown (10YR-5/8), firm silty clay; moderate, medium, subangular blocky structure; gradual, smooth boundary.
B22	22-25"	Yellowish-brown (10YR-5/8), firm silty clay, mottled with yellow; moderate, medium, subangular blocky structure; clear, smooth boundary.
B23m	25-68"	Mottled white, gray and yellow plastic, sticky silty clay; coarse to very coarse blocky structure.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]	Total[2]	
O2	5.51	60.08	43.54	69.21	43.20	4.05	1.40	31.17	1.24	79.82	60.95
A1	4.60	3.51	3.78	14.54	1.13	0.16	0.14	11.39	2.41	12.82	11.15
A2	4.52	2.10	2.41	11.98	0.31	0.00	0.10	9.27	2.28	9.68	4.24
B21	4.61	1.17	0.28	0.27	0.11	0.29	0.12	9.42	4.48	9.94	5.23
B22	4.65	0.23	0.14	0.27	0.13	0.21	0.12	10.60	4.92	11.06	4.16
B23m	4.62	0.70	0.17	0.27	0.16	0.30	0.12	11.39	6.63	11.97	4.85

Engineering Characteristics

Horizon	Percentage Passing Sieve Size								Percentage Smaller Than				Liquid Limit	Plasticity Index	Max Dry Density Lbs./Cu/Ft.	Opt. H_2O %	Classification	
	In Inches								In Millimeters								Unified	AASHO
	3.0	2.0	1.5	1.0	.75	.375	4.7	2.0	.42	.25	.074	.05	.02	.005	.002					
A2		100	98	98	98	96	93	83	80	68	27	15	30	6	100	20	ML-CL	A-4(8)
B21 & B22				100	99	96	94	88	87	79	50	32	46	20	102	21	ML-CL	A-7-6(13)
B23m					100	99	98	94	92	82	59	42	54	27	102	22	CH	A-7-6(18)

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	0.9b	1.4b	2.0b	7.8	5.4	66.0	16.5	28.5	47.4
A2	0.3b	1.0b	2.0b	7.6	5.3	66.6	17.2	28.2	48.2
B21	0.5b	0.8b	1.5b	5.6	3.7	54.3	33.6	20.5	40.8
B22	0.1	0.4	1.1	4.0	2.4	52.5	39.5	16.2	41.0
B23m	<0.1	0.4	1.1	3.9	2.4	49.4	42.8	15.3	38.7

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A2	29.0	7	0	15	5	15	10	19	0	15	14
B22	25.6	8	0	20	5	15	10	13	0	15	14

b. Few Fe/Mn?-bearing aggregates.

LITZ SILT LOAM

Ap1 0-3" Brown (10YR-4/3), very friable silt loam; weak, very fine and fine, granular structure; few small brownish shale fragments 1/4 to 1/2" across; clear, smooth boundary.

Ap2 3-7" Brown (10YR-5/3), very friable silt loam; weak, very fine, granular structure; 8 to 10% small multi-colored shale fragments 1/4 to 1" across; clear, smooth boundary.

C 7-13" Light yellowish-brown (10YR-6/4), friable silt loam soil material mixed with 30 to 50% angular, partly weathered, brownish and yellowish shale fragments; rock controlled structure; dark grayish-brown (10YR-4/2), pockets of soil material transported by insects from Ap horizon; gradual, wavy boundary.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]/	Total[2]/	
Ap1	5.74	7.95	5.73	5.12	5.53	1.38	0.60	9.41	0.77	16.92	44.39
Ap2	5.78	1.87	2.17	1.65	1.83	0.44	0.23	8.04	1.08	10.54	23.72
C-S**	5.30	3.27	0.88	1.10	1.05	0.21	0.15	5.31	0.97	6.72	20.98
C-R***	5.48	5.14	0.18	0.00	1.29	0.40	0.21	3.81	N.R.	5.71	33.27

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
Ap1	7.3	6.1	2.6	4.3	5.7	60.0	14.0	28.6	39.4
Ap2	10.8	5.5	2.3	3.8	5.2	58.3	14.1	26.6	39.0
C-S**	6.0	5.1	2.5	4.1	6.6	61.4	14.3	28.7	41.6

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
Ap2	21.7	7	0	10	5	0	0	43	0	20	15
C-S**	20.2	7	0	10	5	0	0	43	0	20	15

LODI CHERTY LOAM

Ap	0-8"	Brown, friable cherty silt loam; weak, fine, granular structure; clear, smooth boundary.
B1	8-12"	Yellowish-brown, friable silty clay loam; weak, fine subangular blocky structure; clear, smooth boundary.
B21	12-20"	Strong brown, firm clay; moderate, subangular blocky structure; gradual, smooth boundary.
B22	20-45"	Yellowish-brown, friable silty clay; moderate, medium, angular blocky structure; faint, fine mottlings of reddish-yellow; gradual, smooth boundary.
B3	45-53"	Yellowish-red, friable clay; weak, fine, angular blocky structure; many distinct medium mottles of yellowish-brown.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]/	Total[2]/	
Ap	6.08	59.84	2.97	3.84	4.64	0.36	0.55	4.87	N.R.	10.42	53.26
B1	4.78	6.08	0.83	2.74	2.94	0.51	0.10	6.39	N.R.	9.94	35.71
B21	4.46	3.27	0.44	0.18	2.42	1.11	0.21	14.88	N.R.	18.62	20.09
B22	4.54	4.68	0.20	0.55	0.81	0.75	0.20	16.98	N.R.	18.74	9.39
B3	4.88	3.74	0.15	0.18	0.23	0.33	0.18	17.46	N.R.	18.20	4.07

LODI LOAM, POROUS SUBSTRATUM

A1	0-2"	Dark brown (10YR-3/3), very friable loam; moderate, fine, granular structure; gradual, wavy boundary.
A2	2-8"	Yellowish-brown (10YR-5/4), very friable loam; moderate, fine, granular structure; gradual, smooth boundary.
B1	8-13"	Yellowish-brown (10YR-5/8), friable loam; moderate, medium, subangular blocky structure; gradual, smooth boundary.
B21	13-19"	Strong brown (7.5YR-5/8), firm silty clay; moderate, medium, subangular blocky structure; gradual, smooth boundary.
B22	19-41"	Yellowish-red (5YR-5/8), firm clay, mottled with yellowish-brown and brownish-yellow; moderate, medium, angular and subangular blocky structure; clay films prominent and continuous; gradual, smooth boundary.
B3	41-52"	Mottled red, yellow and light brownish-gray, firm plastic silty clay; weak, medium and fine, subangular blocky structure; clear, smooth boundary.
C	52-106"	Mottled and streaked yellowish-red, red and white, slightly plastic silty clay loam; structureless.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
A1	5.68	44.18	5.35	3.75	4.91	0.84	0.64	7.15	0.54	13.54	47.19
A2	5.13	13.79	1.55	1.74	1.26	0.15	0.21	5.32	1.09	6.94	23.34
B1	4.80	2.10	0.31	0.46	1.26	0.08	0.20	4.72	1.36	6.26	24.60
B21	4.75	2.10	0.32	0.00	1.81	0.39	0.20	7.45	2.10	9.85	24.37
B22	4.81	1.64	0.27	0.00	1.83	1.38	0.27	12.45	3.78	15.93	21.85
B3	4.90	1.64	0.14	0.00	0.23	0.67	0.35	12.58	4.99	13.83	9.04
C	4.68	0.70	0.08	0.00	0.09	0.41	0.28	10.33	4.97	11.11	7.02

Engineering Characteristics

Horizon	Percentage Passing Sieve Size									Percentage Smaller Than				Liquid Limit	Plasticity Index	Max Dry Density Lbs./Cu/Ft.	Opt. H_2O %	Classification	
	In Inches					In Millimeters				In Millimeters								Unified	AASHO
	3.0	2.0	1.5	1.0	.75	.375	4.7	2.0	.42	.25	.074	.05	.02	.005	.002						
A2					100	99	95	92	75	66	41	16	7	20	NP[7/]	111	13	ML	A-4(8)
B22						100	99	98	94	92	83	68	62	63	34	93	27	CH	A-7-6(20)
C						100	96	94	89	83	72	57	50	63	30	88	30	MH-CH	A-7-5(20)

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	1.2b	2.7b	3.4b	12.7	13.0	54.6	12.4	41.6	33.6
A2	1.5b	2.3b	3.1b	12.3	13.7	55.1	12.0	42.4	34.1
B1	1.5b	1.9b	2.3	8.2	10.0	54.1	22.0	32.4	36.7
B21	1.1b	1.3b	1.7	6.1	8.0	47.3	34.5	26.7	32.4
B22	0.6	0.8	1.0	2.8	4.3	29.4	61.1	15.1	20.3
B3	0.4	0.8	0.8	2.5	4.2	31.8	59.5	14.9	22.7
C	2.3	1.8	1.2	3.5	7.3	34.9	49.0	20.5	24.0

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A2	18.1	5	0	20	5	0	0	22	0	5	43
B22	23.5	10	0	13	4	5	0	10	0	7	51
C	18.5	9	0	10	5	5	0	2	0	15	54

b. Few Fe/Mn?-bearing aggregates.

MASADA FINE SANDY LOAM

O2	3/4-0"	Thin coating of partially decomposed forest litter.
A1	0-2"	Dark brown (10YR-3/3), very friable fine sandy loam; weak, fine, granular structure; clear, smooth boundary.
A2	2-9"	Light olive brown (2.5Y-5/4), friable fine sandy loam; weak, fine, granular structure; gradual, smooth boundary.
B1	9-15"	Faintly mottled brown and gray, fine sandy loam; very weak, medium, subangular blocky structure; gradual, smooth boundary.
B21	15-22"	Strong brown, friable sandy clay loam; weak, medium, subangular blocky structure; gradual, wavy boundary.
B22	22-37"	Yellowish-red, firm clay, with many large and distinct mottles and streaks of red and pale brown.
B3	37-88"	Red, firm, slightly compact sandy clay loam, mottled with yellowish-red and brownish-yellow; many tiny quartz fragments; few small mica flakes; gradual, smooth boundary.
C	88-109"	Red, friable, slightly compact, sandy clay loam; weak, subangular blocky structure; small mica flakes common, increasing with depth.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
O2	4.90	52.13	45.95	90.34	29.63	4.80	2.04	46.35	3.02	82.82	44.04
A1	3.92	3.23	6.79	0.91	0.55	0.19	0.09	11.90	2.75	12.73	6.52
A2	4.84	2.83	1.06	0.91	0.12	0.02	0.06	4.02	0.81	4.22	4.74
B1	4.90	1.21	0.37	0.91	0.19	0.23	0.10	3.09	0.81	3.61	14.40
B21	4.62	5.25	0.28	0.73	0.29	0.73	0.15	6.33	1.81	7.50	15.60
B22	4.90	2.83	0.20	0.37	0.48	0.75	0.19	11.74	2.48	13.16	10.79
B3	4.90	2.02	0.11	0.55	0.03	0.26	0.09	8.84	2.48	9.22	4.12
C	4.76	2.02	0.09	0.18	0.03	0.13	0.05	6.95	2.05	7.16	2.93

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	1.1b	7.6b	14.0	26.9	10.3	33.3	6.8	31.0	24.2
A2	0.5b	7.2	14.2	27.3	9.3	34.3	7.2	29.9	25.5
B1	0.4b	6.4	12.9	24.7	10.1	33.2	12.3	28.9	24.7
B21	0.4b	5.2	10.9	22.5	7.6	29.2	24.2	24.5	22.1
B22	0.1	3.4	8.4	18.0	6.6	17.1	46.4	18.1	13.0
B3	<0.1	5.8	16.2	23.5	6.2	10.3	38.0	18.7	7.5
C	0.3	13.6	25.4	19.3	3.8	23.6	14.0	12.1	20.8

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A2	8.2	3	0	25	5	0	0	45	0	10	15
B22	22.8	14	0	5	0	0	10	21	0	10	40
C	16.9	13	0	5	0	0	10	22	0	10	40

b. Few Fe/Mn?-bearing aggregates.

MONTEVALLO SILT LOAM

O2	1/4-0"	Thin covering of partially decomposed forest litter.
A1	0-1"	Dark grayish-brown (2.5Y-4/2), friable silt loam; weak, fine, granular structure; 5 to 10% small shale fragments; clear, smooth boundary.
A2	1-7"	Yellowish-brown (10YR-5/4), friable heavy silt loam; weak, fine, subangular blocky structure; 10 to 20% shale particles.
C	7-21"	Brown (10YR-5/3), friable heavy silt loam to light silty clay loam soil material mixed with 40 to 60% shale fragments.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]/	Total[2]/	
O2	5.69	40.44	34.98	38.79	35.99	5.85	0.95	31.17	0.97	73.96	57.86
A1	4.68	7.71	11.87	21.03	7.76	1.79	0.27	19.46	4.22	29.28	33.54
A2	4.55	2.57	3.65	4.75	1.27	0.34	0.16	13.82	4.27	15.59	11.35
C	4.52	2.10	1.74	0.00	0.55	0.18	0.14	10.48	4.21	11.35	7.67

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	11.4	4.4	1.3	1.7	0.9	59.0	21.3	8.2	52.4
A2	9.6	3.6	1.0	1.3	0.7	59.5	24.3	5.9	54.9
C	5.7	2.7	1.0	1.4	0.6	62.1	26.5	5.7	57.6

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmor-illonite %	Vermic-ulite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A2	27.0	3	0	20	0	15	26	0	0	25	10

MUSKINGUM FINE SANDY LOAM

O2	3/4-0"	Partially decomposed oak, scrub pine, maple, laurel and huckleberry leaves and twigs.
A1	0-2"	Dark grayish-brown (10YR-4/2), friable fine sandy loam; fine, granular structure; sandstone fragments from small gravel to cobble size; clear, smooth boundary.
A2	2-8"	Yellowish-brown (10YR-5/6), very friable fine sandy loam; weak, fine, granular structure; many fine pores; 15 to 25% sandstone fragments ranging from gravel to cobble size.
B	8-15"	Yellowish-brown (10YR-5/8), friable fine sandy loam; very weak, subangular blocky structure that crushes easily to fine granular; very faint clay films; common sandstone fragments.
C	15-23"	Yellowish-brown (10YR-5/8), friable fine sandy loam soil material, mixed with partially weathered sandstone; structureless to very weak, fine and very fine, granular.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
O2	3.98	36.77	65.96	14.62	14.07	3.25	1.54	79.57	10.04	98.43	19.16
A1	3.80	3.64	9.03	0.37	0.39	0.19	0.09	18.23	5.72	18.90	3.54
A2	4.54	1.62	1.41	0.37	0.08	0.00	0.06	5.10	1.19	5.24	2.67
B	4.78	1.21	0.52	0.18	0.06	0.00	0.06	3.52	0.92	3.64	3.30
C	4.80	2.02	0.24	0.37	0.09	0.00	0.07	3.52	1.19	3.68	4.35

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	0.3d	1.6d	11.1	32.9	16.3	16.9	20.9	38.8	5.5
A2	0.3	0.9	10.5	35.3	14.8	29.6	8.6	35.4	20.4
B	0.3	1.3	9.8	33.3	14.2	17.3	23.8	34.6	8.1
C	2.6e	4.5e	11.8	31.5	12.1	27.6	9.9	31.2	19.0

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A2	9.0	5	0	25	5	0	0	30	0	20	15
B	7.0	2	4	25	9	0	0	25	0	20	15
C	6.9	4	1	25	10	0	0	25	0	20	15

d. Common organic matter fragments.
e. Many sandstone fragments.

MUSKINGUM VERY FINE SANDY LOAM

O2	1/2-0"	Partially decomposed oak and pine leaves, twigs and fine roots.
A1	0-1"	Light olive brown (2.5Y-5/4), very friable very fine sandy loam; weak, very fine to fine, granular structure; clear, smooth boundary.
A2	1-9"	Light yellowish-brown, friable very fine sandy loam; weak, very fine, granular structure; angular gravel few to common.
B	9-17"	Brownish-yellow (10YR-6/6), friable silt loam mixed with rock fragments; very weak subangular blocky structure; gradual, wavy boundary.
C	17-28"	Brownish-yellow (10YR-6/6), friable very fine sandy loam soil material mixed with rock fragments; in places, tongues of soil extend 4 to 5 feet into rock crevices.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
O2	4.52	37.99	44.30	55.15	16.67	2.90	1.58	41.56	5.59	62.71	33.73
A1	4.24	5.25	5.93	2.10	0.51	0.22	0.16	12.02	3.02	12.91	6.89
A2	4.44	1.62	1.57	0.18	0.08	0.01	0.08	5.84	1.51	6.01	2.83
B	4.66	3.23	0.70	0.18	0.14	0.09	0.09	5.72	1.89	6.04	5.30
C	4.60	1.62	0.39	0.18	0.14	0.12	0.10	6.18	2.59	6.54	5.50

Engineering Characteristics

Horizon	Percentage Passing Sieve Size In Inches					Percentage Passing Sieve Size In Millimeters					Percentage Smaller Than In Millimeters				Liquid Limit	Plasticity Index	Max Dry Density Lbs./Cu/Ft.	Opt. H_2O %	Classification Unified	Classification AASHO
	3.0	2.0	1.5	1.0	.75	.375	4.7	2.0	.42	.25	.074	.05	.02	.005	.002						
A2				100	99	96	95	94	94	90		75	49	18	9	25	NP[7/]	105	16	ML	A-4(8)
B		100	98	95	93	90	86	79	78	73		64	44	19	9	23	NP[7/]	113	14	ML	A-4(8)

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	0.8d	0.7d	0.5	1.8	27.3	59.2	9.7	55.8	31.6
A2	0.1	0.3	0.3	1.5	25.9	52.9	19.0	52.9	26.8
B	0.8	0.8	0.4	2.0	23.0	52.2	20.8	49.1	27.5
C	2.5e	1.7e	0.6	1.8	23.0	40.8	29.6	50.5	14.4

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A2	7.3	2	0	25	10	0	0	33	0	20	10
B	6.9	2	0	25	10	0	0	31	0	20	12

d. Common organic matter fragments.
e. Many sandstone fragments.

PEDLAR VERY ROCKY SILT LOAM* (1)

Ap	0-5"	Dark reddish-brown, very friable, very rocky silty clay loam; fragments of partially weathered limestone and shale; moderate, fine granular structure; clear, smooth boundary.
B	5-12"	Dark red, friable silty clay loam; moderate, fine, subangular blocky structure; gradual, smooth boundary.
C1	12-24"	Mottled yellowish-red, light olive brown and dark yellowish-brown, friable limy soil material; rock controlled structure; granular when crushed.
C2	24-36"	Gray to grayish-brown, weathered brecciated limestone.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]	Total[2]	
Ap	7.96	22.21	3.64	0.00	23.68	2.33	0.55	0.76	N.R.	27.32	97.22
B	7.94	9.12	2.26	0.37	25.18	3.23	0.47	0.49	N.R.	29.37	98.33
C1	8.42	4.91	0.47	0.18	16.48	1.09	0.08	0.00	N.R.	17.65	100.00
C2	8.60	6.78	0.47	0.37	15.38	0.76	0.04	0.00	N.R.	16.18	100.00

See Appendix, Table 1, for carbonates data on this profile.

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
Ap	4.2	3.5	1.7	3.7	6.0	53.5	27.4	33.4	28.1
B	2.8	2.4	1.5	3.8	5.4	45.6	38.5	26.3	26.9
C1	8.5	7.3	2.8	4.3	5.4	60.9	10.8	42.6	26.0
C2	5.0	6.1	2.8	5.2	10.2	65.1	5.6	54.1	24.0

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
Ap	34.7	10	0	10	5	10	20	10	10	20	5
B	26.8	10	0	10	5	10	15	15	10	20	5
C2	18.0	10	0	10	15	10	5	10	5	30	5

PEDLAR VERY ROCKY SILT LOAM* (2)

Ap 0-7" Dark reddish-brown, friable silt loam; granular structure; gradual, clear boundary.
C 7-14" Dark brown, gray and white, friable silt loam soil material mixed with crushed limestone, quartz and/or chert fragments ranging in size from coarse sand to 2" in diameter; gradual, irregular boundary.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]	Total[2]	
Ap	7.72	87.29	7.00	0.55	23.12	6.00	0.49	3.37	0.04	32.98	89.78
C	7.92	8.89	1.39	0.55	10.77	1.89	0.08	0.62	0.08	13.36	95.36

See Appendix, Table 1, for carbonates data on this profile.

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
Ap	2.9b	3.8b	2.9	7.4	5.7	41.5	35.8	24.6	26.8
C	6.6	8.5	6.3	12.7	9.3	47.4	9.2	39.2	23.9

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
Ap	54.7	6	0	5	0	5	20	24	0	25	15
C	45.0	6	0	5	0	0	20	29	0	25	15

b. Few Fe/Mn?-bearing aggregates.

PEDLAR VERY ROCKY SILT LOAM* (3)

Ap 0-8" Dark reddish-brown (5YR-3/4), very friable silt loam; weak, very fine, granular structure; 25 to 40% loose angular limestone fragments; many fine roots; clear, wavy boundary.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]/	Total[2]/	
Ap	7.76	133.76	5.93	0.18	20.96	8.60	0.38	1.55	N.R.	31.49	95.08

RAMSEY SILT LOAM

O2 1/2-0" Very dark brown and dark reddish-brown, loose, soft, partially decomposed, forest litter.

A1 0-1" Dark yellowish-brown, very friable silt loam; very fine, granular structure; phyllite fragments and angular quartzite gravel; clear, smooth boundary.

A2 1-6" Yellowish-brown to strong brown, friable silt loam; fine, granular structure; 10 to 15% phyllite fragments; many small and medium sized roots; gradual, wavy boundary.

C 6-16" Strong brown, friable silt loam soil material, mixed with 50 to 70% hard, partly weathered, multi-colored, phyllite rock fragments and a few quartzite and sandstone fragments.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]/	Total[2]/	
O2	4.06	42.03	70.24	35.67	9.62	5.15	1.35	80.19	5.83	96.31	16.74
A1	4.68	3.64	6.27	0.09	0.14	0.19	0.15	15.45	2.05	15.93	3.01
A2	4.78	2.83	2.95	0.09	0.08	0.12	0.12	11.43	1.76	11.75	2.72
C	5.00	1.21	0.67	0.09	0.07	0.41	0.24	5.72	0.94	6.44	11.18

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	9.5	4.7	2.7	9.6	8.7	52.6	12.2	28.4	39.0
A2	5.8	3.5	2.4	8.0	8.8	56.5	15.0	23.0	47.1
C	6.4	4.4	2.8	8.4	7.9	54.4	15.7	21.5	45.8

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A2	9.7	8	0	10	5	0	0	45	0	15	17

RAMSEY SILT LOAM, MODERATELY DEEP (1)

O2	1/2-0"	Partially decomposed oak leaves, twigs and roots.
A1	0-1"	Yellowish-brown (10YR-5/4), very friable silt loam; very fine granular structure; many shale fragments (1/2 to 3" thick).
A2	1-6"	Yellowish-brown (10YR-5/6), friable silt loam; fine, granular structure; shale and quartz fragments common.
B	6-13"	Strong brown (7.5YR-5/6), friable silt loam, mixed with partly weathered shale fragments; weak, fine, subangular blocky structure; few quartz gravel; few distinct, thin clay films on faces of soil next to rock fragments.
C	13-34"	Brown, friable silt loam soil material, mixed with partially weathered, multi-colored red, olive, brown, gray and black shale fragments.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]	Total[2]	
O2	3.96	40.01	57.13	67.95	8.92	3.05	2.68	64.12	7.95	78.77	18.60
A1	4.16	2.83	5.05	1.01	0.19	0.12	0.14	13.87	3.15	14.32	3.14
A2	4.38	2.83	2.97	1.19	0.11	0.04	0.13	10.04	4.64	10.32	2.71
B	4.58	3.23	1.06	0.46	0.12	0.10	0.12	7.11	1.64	7.45	4.56
C	4.62	2.02	0.63	0.46	0.13	0.21	0.09	5.87	1.80	6.30	6.83

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	6.2	5.1	3.1	7.4	5.8	66.3	6.1	16.6	59.2
A2	2.0	3.7	3.3	6.8	8.0	54.2	22.0	18.3	46.7
B	6.2	4.9	2.9	7.1	4.8	63.5	10.6	14.9	57.2
C	12.3	11.8	5.3	8.3	6.5	39.3	16.5	16.9	32.7

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A2	10.2	6	0	10	0	0	0	28	0	30	26
B	22.2	7	0	10	0	0	0	28	0	32	23

RAMSEY SILT LOAM, MODERATELY DEEP (2)

A1	0-1"	Yellowish-brown, friable silt loam; weak, fine granular structure; clear, smooth boundary.
A2	1-6"	Brownish-yellow, friable silt loam; very fine granular structure; fine shale and quartz gravel; clear, smooth boundary.
B	6-9"	Yellowish-brown, friable silt loam; weak, medium subangular blocky structure; some patchy clay skins and shale fragments.
C	9-26"	Strong brown, silt loam, mixed with shale and quartz fragments.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]	Total[2]	
A1	4.60	3.64	4.33	10.88	0.94	0.16	0.17	10.66	N.R.	11.93	10.65
A2	4.74	11.32	2.68	5.03	0.56	0.13	0.16	9.15	N.R.	10.00	8.50
B	5.22	2.02	1.58	2.74	1.57	0.15	0.17	7.73	N.R.	9.62	19.65
C	4.82	2.02	0.50	0.46	0.87	0.46	0.18	8.31	N.R.	9.82	15.38

RAMSEY STONY LOAM

A1	0-2"	Dark brown (10YR-4/3), friable stony loam; fine, granular structure; gradual, smooth boundary.
A2	2-7"	Yellowish-brown (10YR-5/6), friable heavy loam; weak, fine, granular structure; few angular quartzite gravel, cobbles and stones; gradual, wavy boundary.
C	7-18"	Yellowish-brown (10YR-5/6), friable loam soil material, mixed with quartzite and phyllite fragments; gradual, wavy boundary.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]	Total[2]	
A1	4.38	3.23	4.80	0.46	0.25	0.12	0.14	13.60	2.55	14.11	3.61
A2	4.48	2.83	1.94	0.09	0.08	0.03	0.16	8.81	1.75	9.08	2.97
C	4.62	2.83	0.99	0.09	0.05	0.05	0.16	6.49	1.35	6.75	3.85

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	8.4	13.2	6.1	9.2	4.0	47.0	12.1	17.9	37.5
A2	7.0	11.3	5.7	8.1	3.9	49.4	14.6	14.7	42.6
C	14.4	11.5	5.4	7.8	3.8	43.0	14.1	13.5	37.1

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A2	14.0	8	0	10	5	0	0	33	0	20	24

ROBERTSVILLE SILT LOAM

Ap	0-9"	Very dark gray (7.5YR-3/0), slightly sticky silty clay loam; weak, fine to medium, granular structure; clear, wavy boundary.
B21	9-37"	Gray (10YR-5/1), plastic clay, mottled with yellowish-brown and red; weak, medium, angular blocky structure; gradual, smooth boundary.
B22	37-48"	Gray (7.5YR-6/0), and brownish-yellow (10YR-6/8), very plastic clay; massive structure; distinct clay films; clear, smooth boundary.
B23	48-51"	Brownish-yellow (10YR-6/8), plastic clay, faintly mottled with gray; massive structure; clear, smooth boundary.
B3	51-66"	Gray, plastic, sticky clay, with a few fine to medium mottles of yellowish-brown and brownish-yellow; massive structure.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]	Total[2]	
Ap	5.92	3.51	2.48	0.00	6.43	2.74	0.16	5.32	N.R.	14.65	63.69
B21	4.65	1.64	0.46	0.00	4.40	6.80	0.29	14.88	N.R.	26.37	43.57
B22	6.83	5.38	0.14	0.00	6.14	13.00	0.27	2.20	N.R.	21.61	89.82
B23	7.10	2.57	0.12	0.00	6.01	13.40	0.24	1.90	0.04	21.55	91.18
B3	7.02	2.10	0.10	0.00	4.94	10.00	0.23	1.23	N.R.	16.40	92.50

Engineering Characteristics

Horizon	Percentage Passing Sieve Size									Percentage Smaller Than				Liquid Limit	Plasticity Index	Max Dry Density Lbs./Cu/Ft.	Opt. H_2O %	Classification	
	In Inches							In Millimeters			In Millimeters								Unified	AASHO
	3.0	2.0	1.5	1.0	.75	.375	4.7	2.0	.42	.25	.074	.05	.02	.005	.002					
Ap						100	99	97	81	70	55	27	18	27	8	105	16	CL	A-4(8)
B21								100	94	80	73	58	52	67	46	97	21	CH	A-7-6(20)
B22						100	99	98	92	88	77	62	54	62	47	107	19	CH	A-7-6(20)

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
Ap	0.3	0.9	1.5	10.0	12.9	47.2	27.2	37.2	30.2
B21	0.1	0.4	0.6	4.9	6.6	30.4	57.0	19.7	20.8
B22	<0.1	0.4	0.5	4.4	6.2	37.9	50.6	20.2	27.0
B23	0.1	0.4	0.7	5.0	6.8	39.5	47.5	21.9	27.9
B3	0.4	0.8	1.0	8.7	11.0	40.3	37.8	31.5	26.0

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
Ap	35.5	4	0	10	0	15	26	20	0	5	20
B22	47.3	1	0	10	10	15	20	14	0	10	20

SWAIM SILTY CLAY LOAM (1)

Ap1	0-2"	Dark grayish-brown (10YR-4/2), friable silty clay loam; moderate, fine, granular structure; diffuse boundary.
Ap2	2-11"	Very dark grayish-brown (10YR-3/2), silty clay loam; fine, subangular blocky structure; pores common; clear, smooth boundary.
B21	11-23"	Very dark grayish-brown (10YR-3/2), firm silty clay; moderate, medium, subangular blocky structure; thin continuous clay skins; gradual, smooth boundary.
B22	23-43"	Dark grayish-brown (2.5Y-4/2), sticky, plastic silty clay to clay, with common faint fine mottles; moderate, medium, subangular blocky structure; gradual, smooth boundary.
Bb	43-72"	Mottled olive brown and dark reddish-brown, plastic, sticky silty clay; 25 to 50% partly weathered shale.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
Ap1	6.82	27.82	7.36	3.47	26.53	2.30	0.55	5.61	0.08	34.99	83.97
Ap2	7.10	17.06	4.57	1.83	26.93	1.19	0.29	4.85	0.02	33.26	85.42
B21	7.40	4.44	3.86	0.37	30.98	0.83	0.28	4.70	0.09	36.79	87.22
B22	7.50	9.58	1.84	0.37	26.98	0.90	0.26	3.03	0.05	31.17	90.28
Bb	7.64	4.44	0.88	0.37	20.28	0.84	0.19	2.12	0.05	23.43	90.95

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
Ap1	0.2	0.4	0.3	0.6	1.1	48.8	48.6	15.8	34.4
Ap2	0.3	0.5	0.4	0.8	1.2	40.5	56.3	5.8	36.3
B21	0.1	0.6	0.6	0.9	1.5	31.8	64.5	5.1	28.5
B22	0.6	1.6	1.5	2.7	2.2	32.6	58.8	4.3	31.9
Bb	0.8	1.3	0.8	1.5	1.7	46.9	47.0	8.7	40.6

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
Ap2	17.2	6	0	25	0	0	20	5	15	15	14
B22	19.1	7	0	25	0	10	19	0	5	15	19
Bb	21.3	7	0	25	5	15	15	0	0	15	18

SWAIM SILTY CLAY LOAM (2)

Ap	0-6"	Dark grayish-brown (10YR-4/2), slightly sticky, slightly plastic silty clay loam; moderate, fine, granular structure.
B1	6-10"	Mottled reddish-yellow, yellowish-red, yellowish-brown and red, silty clay loam; weak, fine and medium, subangular blocky structure.
B21	10-18"	Yellowish-brown (10YR-5/6), plastic, sticky clay, with common, medium to coarse and distinct mottles of red, reddish-yellow and light brownish-gray; tendency toward prismatic structure; gradual, smooth boundary.
B22g	18-36"	Plastic, sticky clay, with coarse and distinct mottles of red, reddish-yellow and light gray; gradual, wavy boundary.
C	36-44"	Mottled red, brown, yellow and gray, plastic silty clay soil material mixed with weathered shale.
D	44-50"	Dark colored calcareous shale materials washed from Dandridge, Carbo, and Chilhowie soils; grades into residual materials in the lower part.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
Ap	6.00	7.71	3.52	0.37	10.40	1.31	0.16	7.51	0.18	19.38	61.25
B1	5.94	2.57	1.84	3.66	10.74	0.91	0.13	6.30	0.16	18.08	65.15
B21	5.80	3.51	0.76	2.19	13.46	1.16	0.21	6.48	0.08	21.31	69.59
B22g	4.68	2.10	0.39	0.73	9.24	1.71	0.23	17.82	4.64	29.00	38.55
C	4.60	1.64	0.32	0.91	8.66	2.26	0.20	15.55	7.12	26.67	41.69
D-S**	4.94	3.51	0.25	0.37	13.66	3.04	0.19	6.45	0.46	23.34	72.37
D-R***	5.32	1.87	0.21	0.00	13.10	2.50	0.17	6.39	N.R.	22.16	71.16

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
Ap	2.4c	3.7c	1.5c	1.6c	0.9c	55.5	34.4	10.2	46.9
B1	1.8c	2.4c	1.2c	1.5c	0.9c	51.1	41.1	8.6	44.1
B21	0.2c	0.4c	0.2	0.6	0.5	28.4	69.7	3.4	25.8
B22g	0.8c	1.2	0.7	1.5	1.5	28.6	65.7	5.4	25.5
C	1.1	3.3	2.0	5.3	5.3	37.1	45.9	15.4	30.2
D-S**	7.7	11.3	4.9	9.3	6.8	29.2	30.8	19.3	21.8

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
Ap	24.8	5	0	20	0	10	25	10	0	15	15
B21	30.0	8	0	15	0	10	37	0	0	20	10

c. Many Fe/Mn?-bearing aggregates.

TAFT SILT LOAM

Ap	0-9"	Dark grayish-brown (10YR-4/2), friable silt loam; moderate, fine, granular structure; clear, smooth boundary.
B1	9-14"	Yellowish-brown (10YR-5/4), friable heavy silt loam, with many distinct, medium and fine, light brownish-gray mottles; weak, medium, subangular blocky structure; gradual, smooth boundary.
B2	14-33"	Yellowish-brown (10YR-5/8), slightly sticky and plastic heavy silty clay loam, with many medium and distinct gray mottles; moderate, medium and fine, subangular blocky structure; gradual, smooth boundary.
B2m	33-39"	Strong brown to yellowish-red, friable loam, with many medium and coarse gray and brownish mottles; weak, coarse to very coarse, platy structure; clear, smooth boundary.
C	39-60"	Mottled strong brown, gray and brownish-yellow, friable sandy loam; structureless; 50% or more of round quartz river gravel.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
Ap	6.32	20.34	2.70	0.55	9.34	1.06	0.14	6.30	0.14	16.84	62.59
B1	5.80	3.97	0.59	2.74	5.18	1.33	0.11	5.84	0.23	12.46	53.13
B2	5.36	3.04	0.33	1.83	5.88	3.12	0.15	6.96	0.39	16.11	56.80
B2m	5.38	3.97	0.21	0.00	3.56	2.64	0.12	5.69	0.49	12.01	52.62
C	5.44	5.84	0.19	0.18	3.84	2.48	0.12	5.39	0.19	11.83	54.44

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
Ap	1.9c	4.5c	1.7c	2.5c	6.8b	59.3	23.3	29.6	37.9
B1	4.4c	4.6c	1.5c	2.1c	6.1b	56.1	25.2	26.8	36.6
B2	0.2c	2.3c	1.7c	2.8b	3.9	47.9	41.2	18.7	34.6
B2m	3.9	10.0	6.2	8.3	5.9	34.7	31.0	21.4	23.4
C	8.5	9.8	5.1	6.7	5.7	39.0	25.2	24.3	23.8

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
Ap	26.8	5	0	10	5	0	25	10	5	25	15
B2	28.7	8	0	10	5	0	25	7	5	25	15

b. Few Fe/Mn?-bearing aggregates.
c. Many Fe/Mn?-bearing aggregates.

TEAS SILT LOAM

Ap1 0-3" Dark reddish-brown (5YR-3/2), very friable silt loam; weak, very fine and fine, granular structure; numerous purplish and brownish shale fragments; clear, smooth boundary.

Ap2 3-7" Reddish-brown (5YR-4/3), very friable silt loam; weak, very fine, granular structure; 10 to 15% weathered purplish and reddish shale fragments which increase in lower part; clear, smooth boundary.

C 7-14" Reddish-brown (5YR-4/4), very friable silt loam soil material mixed with 50 to 70% reddish-brown and purplish shale fragments which are 1/8 to 2" in diameter; gradual boundary.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]	Total[2]	
Ap1	5.80	11.22	6.29	7.31	6.11	1.67	0.65	9.25	0.57	17.68	47.68
Ap2-S**	5.34	7.95	2.55	3.11	2.09	0.71	0.35	8.04	1.06	11.19	28.15
Ap2-R***	5.72	7.48	0.32	2.93	1.70	0.61	0.37	4.63	0.22	7.31	36.66
C-S**	5.14	6.55	0.82	3.29	1.08	0.18	0.18	5.76	1.01	7.20	20.00
C-R***	5.28	10.29	0.12	1.65	1.37	0.24	0.26	3.20	N.R.	5.07	36.88

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
Ap1	12.8	7.6	3.0	4.2	3.9	52.4	16.1	22.4	36.0
Ap2-S**	11.6	7.4	3.2	4.7	4.6	53.4	15.1	23.8	36.6
C-S**	8.7	7.6	3.9	5.4	5.1	54.9	14.4	25.2	37.6

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
Ap2-S**	22.0	4	0	10	5	0	0	41	0	25	15
C-S**	20.9	6	0	10	5	0	0	39	0	25	15

UNGERS SILT LOAM

Ap 0-6" Reddish-brown (5YR-4/4), friable silt loam; moderate, fine and very fine, granular structure; gradual, smooth boundary.

B 6-21" Red (2.5YR-4/6), firm silty clay loam; moderate, medium and fine, subangular blocky structure; clay films thin, complete and fairly distinct; many reddish shaly and silt stone fragments, increasing with depth; clear, smooth boundary.

C 21-36" Reddish-brown (5YR-4/4), and red (2.5YR-4/6), firm, silty clay loam soil material, streaked with yellow and brown and mixed with weathered fragments of shale; tongues of B material extend into a few crevices among the rock materials.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil) Ca	Mg	K	H	Al[1/]	Total[2/]	Base Saturation (Percent)
Ap	5.30	4.91	2.15	6.40	3.29	0.95	0.10	6.02	0.75	10.36	41.89
B	4.36	2.57	0.32	0.00	1.28	0.66	0.15	12.12	5.13	14.21	14.71
C	4.40	2.10	0.16	0.18	0.21	0.88	0.17	12.03	5.89	13.29	9.48

Engineering Characteristics

Horizon	Percentage Passing Sieve Size In Inches 3.0	2.0	1.5	1.0	.75	.375	In Millimeters 4.7	2.0	.42	.25	.074	Percentage Smaller Than In Millimeters .05	.02	.005	.002	Liquid Limit	Plasticity Index	Max Dry Density Lbs./Cu/Ft.	Opt. H_2O %	Classification Unified	AASHO
Ap						100	99	95	94	87		75	54	20	10	31	6	100	20	ML	A-4(8)
B							100	95	94	89		82	67	47	34	38	11	105	20	ML	A-6(8)
C							100	90	89	82		66	47	32	25	36	10	103	19	ML-CL	A-4(8)

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent) Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
Ap	1.1b	1.0b	0.7	3.2	8.1	65.4	20.5	28.2	47.7
B	0.5b	1.1b	0.7	1.9	5.4	52.2	38.2	20.5	38.4
C	1.2	2.2	1.2	4.4	13.6	46.1	31.3	36.2	26.6

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
Ap	27.7	8	0	15	10	15	10	9	0	15	18
B	18.4	6	0	15	5	0	20	20	0	20	14

b. Few Fe/Mn?-bearing aggregates.

WEAVER LOAM (1)

1 0-9" Dark brown (10YR-3/3), very friable calcareous silt loam; weak, very fine to fine, granular structure; clear, smooth boundary.

2 9-21" Light brownish-gray to grayish-brown, very friable marl material, mottled with strong brown and yellowish-brown; numerous small shells; gradual, smooth boundary.

3 21-56" Light brownish-gray (2.5Y-6/2), very friable silt loam; mostly marl material.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]/	Total[2]/	
1	8.00	2.42	2.82	0.82	22.48	0.66	0.12	0.15	N.R.	23.41	99.36
2	8.18	3.23	2.13	0.64	20.93	0.45	0.06	0.00	N.R.	21.44	100.00
3	8.30	2.42	1.37	0.82	18.53	0.42	0.01	0.00	N.R.	18.96	100.00

See Appendix, Table 1, for carbonates data on this profile.

WEAVER LOAM (2)

1 0-9" Dark brown (10YR-3/3), very friable calcareous silt loam; weak, very fine to fine, granular structure; clear, smooth boundary.

2 9-21" Light brownish-gray to grayish-brown, friable marl material, mottled with strong brown and yellowish-brown; gradual, smooth boundary.

3 21-56" Light brownish-gray, very friable silt loam; mostly marl material.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]/	Total[2]/	
1	7.92	5.25	3.73	1.01	22.78	0.63	0.27	0.60	N.R.	24.28	97.53
2	8.12	2.83	2.52	0.46	20.48	0.45	0.06	0.00	N.R.	20.99	100.00
3	8.22	2.83	1.39	0.46	18.98	0.44	0.01	0.00	N.R.	19.43	100.00

See Appendix, Table 1, for carbonates data on this profile.

WEAVER LOAM (3)

1	0-6"	Very dark grayish-brown, very friable silt loam; moderate, medium, granular structure; clear, smooth boundary.
2	6-11"	Dark grayish-brown, friable silt loam, faintly mottled with brown, white, and dark gray; weak, fine granular structure; lime concretions common; gradual, wavy boundary.
3	11-16"	Very dark grayish-brown (10YR-3/2), clay; weak, fine, angular and subangular blocky structure; clear, smooth boundary.
4	16-33"	Very firm plastic clay; moderate, coarse prismatic structure; outer peds are very dark brown; inner peds are dark grayish-brown.
5	33-38"	Mottled white, dark grayish-brown and light gray, very friable silt loam soil material, mixed with many fine rounded lime concretions; weak, granular structure; clear, abrupt boundary.
6	38-52"	Dominantly dark grayish-brown, plastic, sticky clay; weak, coarse to very coarse, prismatic structure.
7	52-57"	Very dark grayish-brown, plastic, sticky clay; weak, medium subangular blocky; clear, smooth boundary.
8	57-82"	Grayish-brown, friable silt loam soil material mixed with many shells, concretions and limy materials.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
1	7.70	8.65	3.59	0.00	24.54	0.67	0.17	0.83	0.27	26.21	96.83
2	7.78	6.78	3.37	0.00	24.54	0.72	0.14	0.77	0.27	26.17	97.06
3	7.96	3.97	2.89	0.00	27.39	0.81	0.15	1.02	0.19	29.37	96.53
4	7.94	4.44	2.39	0.00	23.99	1.03	0.14	0.83	0.16	25.99	96.81
5	7.80	3.04	1.29	0.00	17.89	0.70	0.09	0.38	0.49	19.06	98.01
6	7.72	14.49	1.67	0.55	15.86	2.30	0.16	1.67	0.16	19.99	91.65
7	7.72	25.25	2.19	0.18	25.31	2.75	0.16	1.33	0.22	29.55	95.50
8	7.98	2.34	0.76	0.00	16.81	1.09	0.07	0.00	0.22	17.97	100.00

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
1	4.5g	3.5g	1.8g	5.2g	8.1g	51.6	25.3	29.0	33.9
2	2.9g	4.5g	2.4g	5.1g	7.0g	52.2	25.9	27.5	34.6
3	0.1g	0.3g	0.4g	1.7g	5.3g	60.0	32.2	26.5	39.9
4	<0.1	0.3g	0.5g	2.3g	8.9g	58.3	29.7	32.3	36.6
5	9.2g	8.9g	5.8g	8.1g	6.9g	41.3	19.8	25.1	27.0
6	0.1g	0.1g	0.2g	1.5g	5.5g	58.8	33.8	26.1	39.3
7	<0.1	0.2g	0.6g	3.1g	9.5g	56.2	30.4	31.0	36.9
8	14.0g	13.9g	7.2g	11.7g	9.5g	29.9	13.8	28.2	17.4

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
1	18.3	6	0	25	20	0	0	20	0	20	9
4	14.5	3	0	24	20	0	0	25	0	20	8

g. Many carbonates - calcareous aggretates?

WEAVER LOAM (4)

1 0-8" Dark brown (7.5YR-4/2), very friable silt loam; moderate, very fine and fine, granular structure; clear, smooth boundary.

2 8-14" Brown (10YR-4/3), very friable silt loam, faintly mottled in the lower part with dark gray; very weak, fine, subangular blocky structure; few to many white limy particles; few small lime concretions; gradual, smooth boundary.

3 14-36" Dark grayish-brown, friable, slightly sticky, heavy silt loam, with fine and medium distinct mottles of gray, yellowish-red and black; subangular blocky structure; many, fine and very fine, white limy particles; few fine lime concretions; clear, smooth boundary.

4 36-54" Dark grayish-brown (10YR-4/2), very friable loam, with few faint mottles of reddish-brown and gray; few small white limy fragments and concretions; clear, smooth boundary.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
1	7.86	13.56	3.31	0.00	24.10	0.60	0.31	0.02	0.19	25.03	99.92
2	8.00	2.81	2.32	0.18	21.40	0.51	0.09	0.00	0.22	22.00	100.00
3	8.14	2.34	3.43	0.00	26.25	0.69	0.07	0.00	0.21	27.01	100.00
4	8.15	1.87	2.24	0.00	20.60	1.05	0.03	0.00	0.22	21.68	100.00

See Appendix, Table 1, for carbonates data on this profile.

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
1	4.8g	6.2g	4.0g	9.1g	10.2g	43.1	22.6	27.9	30.5
2	7.6g	6.6g	3.6g	7.6g	9.7g	43.2	21.7	27.4	29.8
3	0.7g	0.9g	0.8g	3.0g	9.2g	59.4	26.0	27.8	42.6
4	4.5g	7.7g	5.8g	18.2g	16.6g	32.4	14.8	34.8	25.6

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
1	21.7	8	0	10	10	10	10	17	0	20	10
2	25.8	4	0	10	10	10	10	21	0	20	10
4	29.1	9	0	10	10	10	10	16	0	20	10

g. Many carbonates - calcareous aggregates?

WELLSTON LOAM (1)

O2	1-0"	Partially decomposed oak, pine and huckleberry leaves, twigs and roots.
A1	0-1"	Dark grayish-brown (10YR-4/2), very friable loam; very fine to fine, granular structure; clear, smooth boundary.
A2	1-5"	Light yellowish-brown (10YR-6/4), friable loam; weak, very fine and fine, granular structure.
B1	5-8"	Yellowish-brown (10YR-5/4), friable loam, mottled in the lower portion with strong brown and reddish-yellow; weak, medium, subangular blocky structure; clear, smooth boundary.
B2	8-19"	Reddish-yellow (7.5YR-6/6), firm clay loam; moderate, medium, subangular blocky structure; clear, wavy boundary.
B3	19-23"	Mottled red, yellow, brown, gray and white, plastic, sticky sandy clay; contains sandy clay loam streaks and pockets.
C	23-27"	Mottled red, yellowish-brown, gray and olive, sandy clay loam soil material, mixed with 50 to 90% sandstone conglomerate rock material; few sandy and some clay pockets; few patchy clay films.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]/	Total[2]/	
O2	4.00	31.12	48.99	82.27	9.47	1.55	1.45	67.05	7.43	79.52	15.68
A1	3.90	3.64	6.93	2.19	0.44	0.17	0.08	15.70	4.21	16.39	4.21
A2	4.48	1.62	1.72	6.40	0.10	0.05	0.05	6.71	1.89	6.91	2.89
B1	4.50	2.42	0.78	5.85	0.08	0.05	0.05	6.03	0.86	6.21	2.90
B2	4.36	2.02	0.41	0.55	0.08	0.09	0.11	9.73	5.32	10.01	2.80
B3	4.28	1.62	0.32	0.09	0.08	0.19	0.14	10.54	6.40	10.95	3.74
C	4.32	1.62	0.20	0.09	0.10	0.13	0.12	9.05	4.86	9.40	3.72

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	4.6d	3.2d	3.1	15.4	27.6	38.6	7.5	54.7	20.9
A2	1.2	1.5	2.5	13.5	28.3	42.3	10.7	54.4	24.6
B1	0.9	1.5	2.3	12.9	26.7	41.1	14.6	51.7	24.3
B2	2.0	1.8	2.2	9.6	22.5	29.9	32.0	38.5	19.0
B3	3.9	2.8	3.2	11.5	18.1	23.7	36.8	32.0	14.3
C	3.8	2.6	3.3	14.4	22.9	21.0	32.0	39.0	13.5

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A2	16.8	3	0	20	5	0	0	33	0	15	24
B2	20.7	4	0	25	5	0	0	24	0	25	17

d. Common organic matter fragments.

WELLSTON LOAM (2)

A1	0-1"	Dark yellowish-brown (10YR-4/4), very friable loam; weak, very fine, granular structure; clear, smooth boundary.
A2	1-7"	Yellowish-brown (10YR-5/6), very friable very fine sandy loam; weak, fine, granular structure; clear, smooth boundary.
B1	7-10"	Brownish-yellow (10YR-6/8), friable loam; weak, medium, subangular blocky structure.
B2	10-20"	Strong brown (7.5YR-5/8) to reddish-yellow (7.5YR-6/8), firm, very fine sandy clay loam; moderate, medium, subangular blocky structure; clear, smooth boundary.
B3	20-23"	Yellowish-red (5YR-5/8), firm, fine sandy clay loam; weak, medium, blocky structure; gradual, smooth boundary.
C	23-52"	Yellowish-red (5YR-5/8) and reddish-brown (2.5YR-5/4), fine sandy loam soil material, mixed with highly weathered rock material; massive, rock controlled structure.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]/	Total[2]/	
A1	4.66	4.68	3.20	6.03	0.79	0.12	0.19	8.34	2.22	9.44	11.65
A2	4.70	1.87	1.89	2.74	0.12	0.03	0.10	6.22	1.73	6.47	3.86
B1	4.68	2.81	0.64	0.37	0.32	0.15	0.13	5.92	2.02	6.52	9.20
B2	4.62	3.27	0.46	0.00	0.29	0.24	0.17	8.04	2.59	8.74	8.01
B3	4.74	2.81	0.33	0.00	0.43	0.53	0.18	12.41	3.89	13.55	8.41
C	4.82	1.40	0.14	0.00	0.00	0.15	0.09	8.04	3.09	8.28	2.90

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	0.2	0.6	1.0	35.0	18.9	34.3	10.0	57.8	22.6
A2	0.6b	0.5b	0.8	34.2	19.0	34.6	10.3	57.3	23.0
B1	1.0b	0.9b	1.0	26.5	16.4	34.6	19.6	46.8	24.8
B2	0.7b	1.7b	2.3	25.6	13.9	28.2	27.6	40.6	19.9
B3	0.3	1.7	4.1	26.8	10.7	18.4	38.0	32.2	12.6
C	1.0	3.6	6.6	42.5	13.8	18.0	14.5	46.2	11.3

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmor-illonite %	Vermic-ulite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A2	12.2	4	0	20	5	0	0	26	0	20	25
B2	21.6	9	1	10	5	0	0	20	0	15	40

b. Few Fe/Mn?-bearing aggregates.

WESTMORELAND SILT LOAM

A1	0-2"	Brown to dark brown (7.5YR-4/2 to 3/2), friable silt loam; weak, fine, granular structure; clear, smooth boundary.
A2	2-8"	Dark yellowish-brown (10YR-4/4), very friable silt loam; weak, fine and very fine, granular structure; clear, smooth boundary.
B	8-12"	Brown (7.5YR-5/4) to yellowish-brown (10YR-5/4), faintly mottled, friable silt loam; weak, fine, subangular blocky structure; clear, smooth boundary.
C1	12-24"	Strong brown (7.5YR-5/6) to yellowish-brown (10YR-5/4), friable heavy silt loam; weak, fine and medium, subangular blocky structure; partially weathered shale fragments common and increasing with depth; gradual, smooth boundary.
C2	24-36"	Yellowish-brown, silt loam soil material as lenses and pockets between partially weathered shale.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
A1	5.82	10.29	5.80	11.52	7.02	2.00	0.55	8.27	0.36	17.84	53.64
A2	5.30	3.74	1.89	7.31	2.94	0.74	0.10	8.04	1.12	11.82	31.98
B	5.32	11.22	0.50	4.57	4.02	1.06	0.09	6.07	1.02	11.24	46.00
C1	5.28	7.95	0.30	3.29	4.79	1.98	0.13	6.37	1.13	13.27	52.00
C2	5.15	5.61	0.25	0.37	5.84	3.15	0.23	6.80	1.06	16.02	57.55

Engineering Characteristics

Horizon	Percentage Passing Sieve Size (In Inches)						Percentage Passing Sieve Size (In Millimeters)						Percentage Smaller Than (In Millimeters)				Liquid Limit	Plasticity Index	Max Dry Density Lbs./Cu/Ft.	Opt. H_2O %	Classification Unified	Classification AASHO
	3.0	2.0	1.5	1.0	.75	.375	4.7	2.0	.42	.25	.074	.05	.02	.005	.002							
A2						100	97	90	79	77	69	58	42	12	4	34	7	102	19	ML	A-4(7)
B & C1						100	99	95	82	78	67	61	48	25	13	28	9	112	15	CL	A-4(6)
C2	100	97	95	93	82	72	53	49	37	30	21	9	5	26	5	116	14	SM-SC	A-4(0)

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
A1	5.5b	4.5b	2.5	5.5	6.5	57.7	17.8	25.1	42.2
A2	5.2b	4.3b	2.4	5.0	6.3	59.0	17.8	25.0	43.2
B	3.8b	3.7b	2.3	5.6	8.6	56.6	19.4	28.3	40.3
C1	2.8	3.4	2.0	6.3	11.1	53.9	20.5	31.8	37.4
C2	5.9	5.7	2.9	9.7	14.2	44.7	16.9	36.6	28.9

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
A2	27.5	7	0	10	5	20	0	24	10	15	9
C1	37.2	6	0	10	5	20	0	18	10	15	16

b. Few Fe/Mn?-bearing aggregates.

WICKHAM LOAM (1)

Ap	0-10"	Dark yellowish-brown (10YR-4/4), friable loam; weak, fine, granular structure; clear, smooth boundary.
B1	10-15"	Dark brown (7.5YR-4/4) and yellowish-brown, heavy loam to light fine sandy clay loam; weak, medium, subangular blocky structure; clear, smooth boundary.
B2	15-28"	Dark brown (7.5YR-4/4), friable sandy clay loam; moderate, medium, subangular blocky structure; few to many fine mica and quartz particles; few rounded quartz gravel; gradual, smooth boundary.
B3	28-38"	Strong brown (7.5YR-5/6), friable loam; very weak, fine, subangular blocky structure; many quartz and mica fragments; gradual, wavy boundary.
C1	38-50"	Strong brown, friable fine sandy loam; contains many mica flakes; gradual, wavy boundary.
C2	50-78"	Pale brown, olive, yellowish-brown and gray, loamy soil material, mixed with many quartz fragments.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]/	Total[2]/	
Ap	7.10	36.37	1.17	1.55	3.91	1.15	0.04	2.46	0.00	7.56	67.46
B1	6.80	33.54	0.40	0.46	3.80	1.26	0.07	4.00	0.00	9.13	56.19
B2	5.84	10.51	0.18	1.19	3.95	1.20	0.15	6.32	0.02	11.62	45.61
B3	5.82	12.93	0.16	1.01	3.54	1.18	0.14	5.55	0.09	10.41	46.69
C1	5.86	17.38	0.16	1.37	3.26	1.06	0.12	5.08	0.00	9.52	46.64
C2	6.10	18.19	0.11	0.64	1.37	0.44	0.04	2.61	0.00	4.46	41.48

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
Ap	0.3	2.5	5.3	26.4	20.8	31.0	13.7	50.2	17.5
B1	0.3	2.4	5.3	23.4	17.6	28.2	22.8	43.1	16.6
B2	0.3	2.2	5.1	22.5	15.3	23.8	30.8	40.4	12.0
B3	0.5	2.6	6.6	27.3	16.2	20.9	25.9	41.2	11.5
C1	0.2	4.2	10.6	31.6	15.9	15.6	21.9	39.9	8.1
C2	0.9	19.7	25.8	29.4	7.2	8.3	8.7	21.5	5.0

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
Ap	15.4	6	1	10	0	0	0	32	10	15	26
B2	22.1	10	2	10	0	0	0	30	0	15	33
C1	21.9	10	2	10	0	0	0	28	5	25	20

WICKHAM LOAM (2)

Ap 0-11" Dark brown (10YR-3/3), friable loam; very fine, granular structure; mica flakes few to common; clear, smooth boundary.

B2 11-29" Strong brown (7.5YR-5/6), friable to firm fine sandy clay loam; moderate, medium, subangular blocky structure; few black mineral films and small rounded gravel; clear, smooth boundary.

B3 29-50" Strong brown, friable fine sandy clay loam, faintly mottled with black and yellowish-red; weak, medium, subangular and angular blocky structure; clear, smooth boundary.

C 50-71" Strong brown, friable fine sandy clay loam which gradually grades into a fine sandy loam; very weak, medium, subangular blocky structure; many small particles of mica and quartz; few cobbles and small gravel; weakly developed patchy clay films.

Chemical Characteristics

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1]/	Total[2]/	
Ap	5.68	6.55	3.31	5.30	5.29	0.99	0.12	9.41	0.54	15.81	40.48
B2	5.62	5.14	0.42	1.28	3.76	1.31	0.10	6.37	0.14	11.54	44.80
B3	5.64	6.55	0.23	2.01	3.46	1.63	0.11	5.76	0.21	10.96	47.45
C	5.68	6.08	0.21	2.93	3.62	1.53	0.08	5.46	0.32	10.69	48.92

Mechanical Analysis

Horizon	Particle Size Distribution (In Millimeters) (Percent)								
	Very Coarse Sand 2.0 to 1.0	Coarse Sand 1.0 to 0.5	Medium Sand 0.5 to 0.25	Fine Sand 0.25 to 0.10	Very Fine Sand 0.10 to 0.05	Silt 0.05 to 0.002	Clay Less Than 0.002	0.2 to 0.02	0.02 to 0.002
Ap	0.1	1.1	3.5	20.3	17.6	39.5	17.9	46.9	23.0
B2	0.3	1.1	3.5	21.7	16.5	30.5	26.4	42.0	18.5
B3	0.4a	1.6a	6.1a	31.7a	18.0a	21.6	20.6	46.5	12.3
C	0.1a	2.1a	8.2a	34.6a	16.7a	18.5	19.8	44.4	10.6

Mineralogical Data

Horizon	C.E.C. me./100 Grams of Soil	Free Iron Oxides %	Gibbsite %	Quartz %	Feldspar %	Montmorillonite %	Vermiculite %	Vermiculite-Chlorite %	Chlorite %	Mica %	Kaolinite and/or Halloysite %
Ap	22.8	8	1	10	0	0	0	34	5	15	27
B2	29.1	10	3	10	5	0	0	23	5	10	34

a. Few mica flakes.

APPENDIX

Table 1.--Carbonates Data.

Soil Type	Horizon	Depth (Inches)	Carbonates (Percent)
Huntington loam, calcareous (1)	1	0-8	37.55
	2	8-22	43.73
	3	22-37	22.23
	4	37-55	53.60
Huntington loam, calcareous (2)	1	0-8	39.03
	2	8-22	44.98
	3	22-37	23.25
	4	37-55	46.33
Pedlar very rocky silt loam (1)	Ap	0-5	46.93
	B	5-12	28.30
	C1	12-24	80.93
	C2	24-36	90.38
Pedlar very rocky silt loam (2)	Ap	0-7	26.73
	C	7-14	76.98
Weaver loam (1)	1	0-9	44.85
	2	9-21	81.40
	3	21-56	90.25
Weaver loam (2)	1	0-9	47.58
	2	9-21	80.48
	3	21-56	96.85
Weaver loam (4)	1	0-8	45.98
	2	8-14	46.95
	3	14-36	54.85
	4	36-54	82.03

APPENDIX

Table 2.--Chemical Characteristics of Rock Fragments Occurring in Each Horizon of Blacksburg Silt Loam.

Horizon	pH	Truog P (ppm.)	Organic Matter (Percent)	Exchangeable Manganese (ppm.)	Exchangeable Cations (Milli-equivalents per 100 grams of soil)						Base Saturation (Percent)
					Ca	Mg	K	H	Al[1/]	Total[2/]	
Ap1 0-1"	- Insufficient fragments for analysis -										
Ap2 1-8"	4.86	9.44	0.44	0.73	3.28	2.00	0.28	8.16	1.40	13.72	40.52
B1 8-12"	4.88	5.24	0.32	0.55	3.51	2.00	0.19	6.98	1.49	12.68	44.95
B2 12-20"	4.89	5.70	0.28	0.18	3.80	2.54	0.18	6.95	1.86	13.47	48.40
B3 20-25"	4.80	4.30	0.17	0.55	2.50	2.60	0.17	6.64	1.25	11.91	44.25
C1 25-36"	4.95	2.90	0.14	1.10	2.52	3.80	0.18	7.71	0.81	14.21	45.74
C2 36-56"	5.33	5.70	0.13	1.10	1.38	8.95	0.31	5.28	0.16	15.92	66.83
C3 56-95"	5.31	10.85	0.08	0.37	1.92	10.00	0.42	5.43	0.36	17.77	69.44

APPENDIX

Table 3.--Coarse Fragment Data.

Soil Type	Hor-izon	Depth (Inches)	Percent Passing							
			Inches						Milli-meters	
			10.0	3.0	2.0	1.5	1.0	.75	.375	4.76	2.0
Allen cobbly fine sandy loam	Ap	0-9				100	98	97	95	91	88
	A2	9-15					100	99	97	94	90
	B1	15-21					100	100	98	94	89
	B21	21-37					100	100	97	94	88
	B22	37-52						100	99	96	93
	B3	52-72						100	100	98	94
Augusta fine sandy loam	A1	0-2						100	99	97	96
	A2	2-8						100	100	99	97
	A3	8-11						100	99	99	99
	B21	11-17						100	100	99	98
	B22	17-21						100	100	99	99
	B3	21-34						100	100	100	98
	D	34-66									100
Blacksburg silt loam	Ap1	0-1						100	100	99	97
	Ap2	1-8						100	97	88	75
	B1	8-12						100	99	95	91
	B2	12-20				100	99	99	99	95	88
	B3	20-25					100	99	94	87	74
	C1	25-36				100	93	86	56	43	31
	C2	36-56				100	99	98	80	60	41
	C3	56-95					100	97	85	66	38
Bodine very cherty silt loam, shallow	A1	0-3					100	97	85	72	63
	A2	3-9			100	97	94	91	85	73	63
	C	9-22				100	98	95	77	64	51
Bolton loam	A1	0-1						100	98	96	90
	A2	1-11					100	100	97	93	88
	B1	11-15				100	99	98	97	92	84
	B21	15-33						100	97	87	76
	B22	33-50						100	94	84	74
	B2b	50-102					100	99	92	83	74
Brandywine loam	Ap	0-7						100	97	93	82
	A3	7-10						100	100	100	92
	C	10-38				100	97	95	93	92	91
	D	38-66							100	100	99
Calvin silt loam	O2	3/4-0						100	97	90	83
	A1	0-1					100	98	87	71	53
	A2	1-8				100	98	95	79	65	51
	C	8-16				100	96	88	68	55	43
	D	16-26		100	80	80	56	46	35	33	29
Captina silt loam	Ap	0-10								100	100
	B1	10-14									100
	B21	14-20									100
	B22	20-29									100
	B3m	29-53									100
	Bb	53-83						100	100	99	96
Carbo silty clay loam	Ap1	0-2							100	100	99
	Ap2	2-7						100	100	100	98
	B1	7-9					100	100	97	95	92
	B2	9-21							100	100	100
	B3	21-29							100	100	100
Chester loam	A1	0-2							100	100	99
	A2	2-7							100	100	98
	B2	7-18							100	99	96
	B3	18-23							100	99	98
	C1	23-34								100	98
	C2	34-50							100	100	95
	C3	50-75							100	100	97

APPENDIX

Table 3.--Coarse Fragment Data. (Continued).

Soil Type	Hor-izon	Depth (Inches)	Percent Passing							
			Inches						Milli-meters	
			10.0	3.0	2.0	1.5	1.0	.75	.375	4.76	2.0
Chilhowie very rocky silty clay loam	A1	0-2						100	100	100	99
	A2	2-8						100	99	99	98
	C	8-15				100	85	78	61	50	36
Congaree fine sandy loam (1)	1	0-12									100
	2	12-21									100
	3	21-58									100
	4	58-78									100
Congaree fine sandy loam (2)	1	0-21							100	100	100
	2	21-32								100	100
	3	32-72								100	100
	4	72-105									100
Dandridge silt loam	A1	0-2						100	100	99	97
	A2	2-5						100	98	93	81
	C	5-10				100	95	89	77	67	59
	D	10-17					100	89	62	44	33
Elk silt loam	Ap1 & Ap2	0-12							100	100	100
	B21	12-38									100
	B22	38-48									100
	B3	48-73									100
Emory silt loam (1)	A1 & A2	0-11						100	100	98	94
	B1	11-15						100	99	98	96
	B21	15-31						100	100	99	92
	B22	31-54						100	100	99	95
Emory silt loam (2)	A1 & A2	0-11						100	99	98	93
	B1	11-15						100	100	99	96
	B21	15-31						100	99	98	94
	B22	31-54						100	99	98	93
Emory silt loam (3)	A1	0-8							100	99	92
	A2	8-20						100	99	97	84
	B1	20-38					100	100	99	97	82
	B2	38-62						100	99	97	91
	B3	62-88						100	99	97	89
Emory silt loam (4)	Ap	0-9						100	98	97	91
	B1	9-17						100	98	96	90
	B21	17-36						100	100	99	92
	B22	36-46							100	99	92
	B1b	46-66						100	99	97	91
Etowah silt loam	Ap	0-9						100	100	99	98
	B1	9-13							100	100	97
	B21	13-26				100	98	95	88	81	68
	B22	26-42							100	100	96
	B3	42-84								100	100
	C	84-96						100	100	100	98
Frederick cherty silt loam	Ap	0-7				100	98	98	91	83	78
	B1	7-14						100	98	94	82
	B21	14-22							100	100	99
	B22	22-74							100	100	99
	B3	74-86						100	99	98	92
Frederick silt loam, porous substratum	A1	0-2								100	100
	A2	2-7							100	100	100
	B1	7-12							100	100	100
	B21	12-25							100	100	100
	B22	25-50								100	100
	B23	50-66								100	100
	B3	66-94								100	100

APPENDIX

Table 3.--Coarse Fragment Data. (Continued).

Soil Type	Horizon	Depth (Inches)	Percent Passing						
			Inches					Millimeters	
			10.0	3.0	2.0	1.5	1.0	.75	.375	4.76	2.0
Greendale silt loam (1)	A11	0-1						100	100	100	99
	A12	1-7						100	100	100	99
	A13	7-23						100	100	100	99
	B1	23-34					100	99	99	99	98
	B2	34-37					100	99	96	92	90
	B1b	37-47							100	100	99
	B2b	47-64						100	100	100	98
	B3b	64-82						100	100	100	97
Greendale silt loam (2)	Ap	0-9					100	100	99	94	86
	B1	9-16						100	99	96	91
	B21	16-26									100
	B22g	26-29							100	100	100
	Bm	29-41						100	100	100	100
	B1b	41-51					100	100	98	97	89
	B2b	51-63								100	100
Groseclose silt loam, porous substratum	Ap1	0-1							100	100	99
	Ap2	1-7							100	100	99
	B1	7-11								100	99
	B2	11-25								100	100
	B3	25-32									100
	C	32-88								100	100
Hagerstown silt loam	Ap	0-8						100	100	99	98
	B21	8-24							100	100	100
	B22	24-50					100	99	99	98	94
	B3	50-70							100	100	99
Hayesville fine sandy loam	Ap	0-7							100	100	98
	B1	7-11								100	99
	B2	11-21								100	99
	B3	21-29							100	100	98
	C	29-39							100	100	96
Hayter loam	A1	0-3					100	98	95	91	83
	A2	3-9					100	97	94	88	78
	B21	9-22					100	99	97	94	83
	B22	22-33					100	98	95	92	82
	C	33-50					100	99	93	88	73
Hiwassee fine sandy loam, light surface variant (1)	O2	1/2-0									100
	A1	0-1						100	100	100	100
	A2	1-8									100
	B1	8-15									100
	B21	15-20									100
	B22	20-64									100
	B3	64-84									100
Hiwassee fine sandy loam, light surface variant (2)	Ap	0-7						100	100	100	99
	B1	7-17							100	100	99
	B21	17-28							100	100	100
	B22	28-54									100
	B3	54-63					100	99	99	99	98
	C	63-78									100
Holston loam	A1	0-1					100	99	98	97	95
	A2	1-8					100	99	98	96	95
	B1	8-14						100	100	99	97
	B21	14-32							100	100	98
	B22	32-50						100	92	92	89
	C	50-75								100	100

APPENDIX

Table 3.--Coarse Fragment Data. (Continued).

Soil Type	Horizon	Depth (Inches)	Percent Passing							
			Inches						Millimeters	
			10.0	3.0	2.0	1.5	1.0	.75	.375	4.76	2.0
Huntington loam, calcareous (1)	1	0-8							100	100	99
	2	8-22						100	99	99	96
	3	22-37						100	98	91	72
	4	37-55			100	88	84	83	80	76	59
Huntington loam, calcareous (2)	1	0-8						100	100	100	97
	2	8-22						100	99	99	96
	3	22-37						100	99	93	73
	4	37-55						100	98	89	67
Huntington silt loam	1	0-2									100
	2	2-30								100	100
	3	30-56						100	97	96	93
Jefferson stony fine sandy loam	O2	1-0									100
	A1	0-3								100	100
	A2	3-8									100
	B21	8-13									100
	B22	13-31									100
	B3	31-41								100	100
	C	41-55									100
	D	55-65						100	98	98	98
Leadvale silt loam	O2	1/4-0									100
	A1	0-2						100	97	94	93
	A2	2-6						100	100	99	99
	B21	6-22							100	100	99
	B22	22-25							100	100	100
	B23m	25-68							100	100	100
Litz silt loam	Ap1	0-3					100	99	96	92	83
	Ap2	3-7					100	99	96	88	76
	C	7-13			100	96	85	82	73	67	60
Lodi cherty loam	Ap	0-8					100	97	90	81	71
	B1	8-12							100	99	97
	B21	12-20					100	98	98	98	97
	B22	20-45							100	100	99
	B3	45-53							100	100	100
Lodi loam, porous substratum	A1	0-2						100	100	99	97
	A2	2-8						100	100	99	97
	B1	8-13						100	100	99	97
	B21	13-19							100	100	99
	B22	19-41								100	100
	B3	41-52									100
	C	52-106							100	100	99
Masada fine sandy loam	O2	3/4-0									100
	A1	0-2									100
	A2	2-9					100	99	99	99	99
	B1	9-15									100
	B21	15-22									100
	B22	22-37									100
	B3	37-88									100
	C	88-109									100
Montevallo silt loam	O2	1/4-0									100
	A1	0-1						100	98	94	79
	A2	1-7						100	98	93	76
	C	7-21				100	98	96	88	71	52
Muskingum fine sandy loam	O2	3/4-0									100
	A1	0-2					100	99	94	92	92
	A2	2-8						100	92	87	86
	B	8-15					100	98	95	93	92
	C	15-23				100	97	95	93	92	89

APPENDIX

Table 3.--Coarse Fragment Data. (Continued).

Soil Type	Hor-izon	Depth (Inches)	Percent Passing						
			Inches					Milli-meters	
			10.0	3.0	2.0	1.5	1.0	.75	.375	4.76	2.0
Muskingum very fine sandy loam	O2	1/2-0									100
	A1	0-1					100	97	84	75	68
	A2	1-9					100	97	95	94	93
	B	9-17			100	97	93	89	84	81	74
	C	17-28			100	96	84	73	61	55	51
Pedlar very rocky silt loam (1)	Ap	0-5					100	100	97	96	95
	B	5-12				100	99	98	97	97	90
	C1	12-24					100	99	99	97	90
	C2	24-36							100	100	97
Pedlar very rocky silt loam (2)	Ap	0-7				100	98	98	96	92	90
	C	7-14						100	93	85	73
Pedlar very rocky silt loam (3)	Ap	0-8			100	93	86	85	73	62	52
Ramsey silt loam	O2	1/2-0									100
	A1	0-1				100	99	95	88	79	67
	A2	1-6					100	99	95	88	76
	C	6-16				100	92	88	79	71	60
Ramsey silt loam, moderately deep (1)	O2	1/2-0									100
	A1	0-1						100	97	92	83
	A2	1-6					100	99	98	96	92
	B	6-13				100	96	92	86	79	67
	C	13-34				100	95	88	76	66	53
Ramsey silt loam, moderately deep (2)	A1	0-1					100	99	95	91	84
	A2	1-6					100	98	96	94	89
	B	6-9				100	98	98	93	90	83
	C	9-26				100	98	96	90	82	68
Ramsey stony loam	A1	0-2					100	100	98	94	88
	A2	2-7						100	99	95	88
	C	7-18			100	97	96	92	83	73	60
Robertsville silt loam	Ap	0-9								100	100
	B21	9-37								100	99
	B22	37-48									100
	B23	48-51									100
	B3	51-66									100
Swaim silty clay loam (1)	Ap1	0-2									100
	Ap2	2-11									100
	B21	11-23									100
	B22	23-43									100
	Bb	43-72									100
Swaim silty clay loam (2)	Ap	0-6						100	100	100	97
	B1	6-10							100	100	97
	B21	10-18									100
	B22g	18-36									100
	C	36-44							100	100	97
	D	44-50					100	88	61	45	29
Taft silt loam	Ap	0-9							100	100	99
	B1	9-14							100	100	93
	B2	14-33									100
	B2m	33-39					100	97	95	92	91
	C	39-60					100	96	87	81	72
Teas silt loam	Ap1	0-3						100	98	91	76
	Ap2	3-7						100	92	83	68
	C	7-14			100	91	88	78	62	51	42

APPENDIX

Table 3.--Coarse Fragment Data. (Continued).

Soil Type	Horizon	Depth (Inches)	Percent Passing							
			Inches						Millimeters	
			10.0	3.0	2.0	1.5	1.0	.75	.375	4.76	2.0
Ungers silt loam	Ap	0-6						100	99	99	96
	B	6-21					100	98	98	98	97
	C	21-36					100	98	93	93	90
Weaver loam (1)	1	0-9									100
	2	9-21									100
	3	21-56									100
Weaver loam (2)	1	0-9									100
	2	9-21									100
	3	21-56							100	100	98
Weaver loam (3)	1	0-6							100	99	96
	2	6-11							100	99	96
	3	11-16								100	100
	4	16-33									100
	5	33-38						100	99	94	83
	6	38-52									100
	7	52-57									100
	8	57-82						100	98	93	77
Weaver loam (4)	1	0-8						100	100	99	93
	2	8-14						100	100	99	93
	3	14-36								100	87
	4	36-54								100	100
Wellston loam (1)	O2	1-0									100
	A1	0-1					100	97	79	65	59
	A2	1-5					100	99	98	97	95
	B1	5-8						100	99	98	96
	B2	8-19						100	100	97	87
	B3	19-23						100	98	96	85
	C	23-27					100	99	96	92	77
Wellston loam (2)	A1	0-1					100	98	96	92	90
	A2	1-7						100	95	91	90
	B1	7-10					100	97	95	94	93
	B2	10-20									100
	B3	20-23									100
	C	23-52							100	98	97
Westmoreland silt loam	A1	0-2							100	96	89
	A2	2-8						100	98	94	85
	B	8-12							100	96	86
	C1	12-24						100	96	90	74
	C2	24-36				100	97	91	67	44	31
Wickham loam (1)	Ap	0-10						100	99	99	99
	B1	10-15									100
	B2	15-28									100
	B3	28-38									100
	C1	38-50									100
	C2	50-78									100
Wickham loam (2)	Ap	0-11									100
	B2	11-29									100
	B3	29-50									100
	C	50-71									100

1 Not included in summation of exchangeable cations.
2 Summation of exchangeable cations.
3 N.R. indicates that this determination was not made on this horizon.
4 Determinations not run on all horizons.
5 See Appendix, Table 3 for coarse fragment data run at V.P.I.
6 Insufficient material passing No. 4 sieve for moisture-density test.
7 NP indicates non-plastic.
* Proposed soil series.
** Indicates the soil portion of this horizon.
*** Indicates the rock portion of this horizon which was ground and analyzed.