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Issued October 1959

SOIL SURVEY

Lancaster County Pennsylvania

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
PENNSYLVANIA STATE UNIVERSITY
COLLEGE of AGRICULTURE and EXPERIMENT STATION
and
PENNSYLVANIA SOIL CONSERVATION COMMISSION

HOW TO USE THE SOIL SURVEY REPORT

THIS SOIL SURVEY of Lancaster County will serve several groups of readers. It will help farmers in planning the kind of management that will protect their soils and provide good yields; assist engineers in selecting sites for roads, buildings, ponds, and other structures; and add to the soil scientists' fund of knowledge.

In making this survey, soil scientists walked over the fields and woodlands. They dug holes and examined surface soils and subsoils; measured slopes with a hand level; noticed differences in growth of crops, weeds, and brush; and, in fact, recorded all the things about the soils that they believed might affect their suitability for farming, engineering, forestry, and related uses.

The scientists plotted the boundaries of the soils on aerial photographs. Then cartographers prepared from the photographs the detailed soil map in the back of this report. Fields, woods, roads, and many other landmarks can be seen on the map.

Locating the soils

Use the index to map sheets to locate areas on the large map. The index is a small map of the county, on which numbered rectangles have been drawn to show where each sheet of the large map is located. When the correct sheet of the large map is found, it will be seen that boundaries of the soils are outlined and that there is a special symbol for each kind of soil. All areas marked with the same symbol are the same kind of soil, wherever they appear on the map. Suppose, for example, an area located on the map has a symbol CdB2. The legend for the detailed map shows that this symbol identifies Chester silt loam, 3 to 6 percent slopes, moderately eroded. The Cd part of the symbol stands for the Chester silt loam soil type. The B part of the symbol is given to all the soils in the 3 to 6 percent slope range. The 2 indicates the degree of erosion, in this case, moderate. This soil, and all the others mapped in the county, are described in the section, Descriptions of the Soils.

Finding information

Few readers will be interested in all sections of the soil report, for it has special sections for different groups. The introductory part, which describes the climate and physiography and gives some statistics on agriculture, will be of interest mainly to those not familiar with the county.

Farmers and those who work with farmers can learn about the soils from the sections, Descriptions of the Soils, Capability Groups, and Productivity Ratings. In this way they first identify the soils on their farms and then learn how these soils can be managed and what yields can be expected. The soils are grouped by capability units; that is, groups of soils that need similar management and respond in about the same way. For example, Chester silt loam, 3 to 6 percent slopes, moderately eroded, is in capability unit IIe–4. The management this soil needs will be described under the heading Capability unit IIe–4 in the section, Capability Groups.

Engineers will want to refer to the section, Engineering Properties of Soils. Tables in that section show the depth to bedrock, the texture of soil layers, drainage, and other characteristics of the soils that affect engineering.

Soil scientists will find information about how the soils were formed and how they were classified in the section, Formation and Classification of Soils. Detailed information on samples of a few soils is given in the section, Analyses of Selected Soils.

Soils terms that may be unfamiliar to some readers are defined in the Glossary.

Fieldwork for this survey was completed in 1956. Unless otherwise indicated, all statements in the report refer to conditions in the county at that time. The soil survey was made as part of the technical assistance furnished by the Soil Conservation Service to the Lancaster County Soil Conservation District.

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Series 1956. No. 4

Issued October 1959

SOIL SURVEY OF LANCASTER COUNTY, PENNSYLVANIA

Report by JOHN B. CAREY. Soils surveyed by R. K. CRAVER, in charge, and T. C. BASS, ROBERT CRUIKSHANK, I. L. MARTIN, B. J. PATTON, J. D. SHEETZ, JOHN SYKORA, D. C. TAYLOR, PAUL J. ZWERMAN, and others, Soil Conservation Service, United States Department of Agriculture

Correlation by A. J. BAUR, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service, in cooperation with Pennsylvania State University College of Agriculture and Experiment Station and Pennsylvania Department of Agriculture Soil Conservation Commission

General Nature of the Area

Lancaster County is one of the largest counties in Pennsylvania. Its total land area is 945 square miles, or 604,800 acres. It also includes 18,560 acres of water. In 1950, the population was 234,717. The county is in the southeastern part of the State. York County lies to the west, Dauphin and Lebanon Counties to the northwest, Berks County to the northeast, and Chester County to the east. On the south, Lancaster County borders on the State of Maryland. The city of Lancaster, in the west-central part of the county, is the county seat. Harrisburg, the capital of Pennsylvania, is 35 miles from the city of Lancaster (fig. 1).

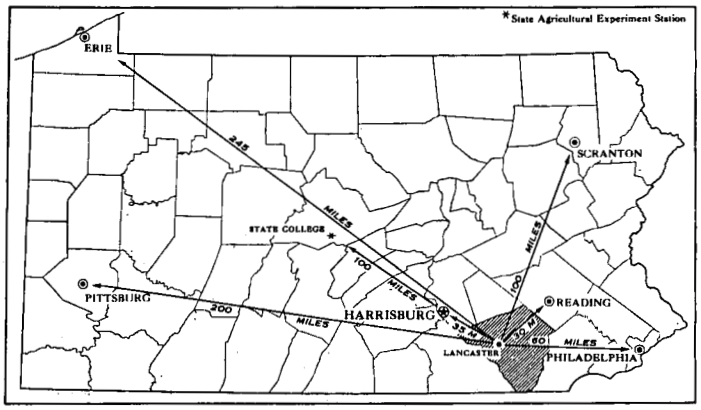

Figure 1.—Location of Lancaster County in Pennsylvania.

Settlement of the area that is now Lancaster County began about 1709. The city of Lancaster was founded in 1718 under the name of Hickorytown. Its name was changed to Lancaster in 1728. Lancaster County was established in 1729. Before that time, the area had been part of Chester County.

The early settlers were of several different nationalities. The earliest, apparently, were Swiss colonists who settled near Willow Street in 1709. In 1728, Welsh colonists settled near Churchtown, English at Columbia, and Scotch and Irish in the southern and northwestern parts of the county. Germans, mostly from the middle and upper Rhineland, began to settle in the central part of the county about 1740 (*5*).[1]

[1] Italic numbers in parentheses refer to Literature Cited, p. 132.

At present, more than half the population of the county is rural, and four-fifths of the land is in farms. Lancaster, with a population of 63,774, is the largest city and the county seat. Other principal towns and their populations are Adamstown, 1,000; Akron, 1,028; Christiana, 1,043; Columbia, 11,993; Denver, 1,658; East Petersburg, 1,268; Elizabethtown, 5,083; Ephrata, 7,027; Florin, 1,319; Lititz, 5,568; Manheim, 4,246; Marietta, 2,442; Millersville, 2,551; Mount Joy, 3,006; Mountville, 1,064; New Holland, 2,602; Quarryville, 1,187; Strasburg, 1,109; and Terre Hill, 1,000.

Physiography

Lancaster County is in the Piedmont province, which is part of the Appalachian Highlands physiographic division (*4*). This province consists of a wide strip southeast of the Appalachian Mountains and northwest of the Coastal Plain. The northern and central parts of the county are in the Piedmont Lowlands, and the southern part is in the Piedmont Uplands.

The Piedmont Lowlands

In the Piedmont Lowlands, the altitude and topography vary considerably. In Lancaster County, these lowlands are underlain by Cocalico shale, Triassic formations, and various kinds of limestone.

Most of the streams draining the Piedmont Lowlands have cut into the surface about 150 feet. Conestoga Creek, with its tributaries, Muddy Creek, Cocalico Creek, and Little Conestoga Creek, drains the northeastern and north-central part of the county. Chickies Creek drains the lowlands in the northwestern part of the county. Both systems enter the Susquehanna River along the western boundary of Lancaster County.

In this county, the Piedmont Lowlands consists of two areas that differ in relief—the Triassic Lowland and the Lancaster-Frederick Lowland.

THE TRIASSIC LOWLAND

Most, though not all, of the northern part of the Piedmont Lowlands overlies soft Triassic rock. This area is typical of the Triassic Lowland. The rock consists of red sandstone and shale, interbedded in some places with light-gray or yellow sandstone. The Triassic formations have been reinforced and made

more resistant to weathering by intrusive sheets of diabase or ironstone. These harder rocks make up the ironstone ridges in these areas.

Some of the more resistant Triassic rock—hard red conglomerate and pebbly sandstone—forms a belt of rough ridges that extends from Adamstown to a point north of Blainsport and from there westward to Penryn. Furnace Ridge, Black Oak Ridge, and Laurel Ridge are part of this belt. The maximum elevation is 1,260 feet.

The rest of the northern Piedmont Lowland between the Triassic Lowland and the Lancaster-Frederick Lowland overlies Cocalico shale. These areas are more rolling, but they appear as ridges when viewed from the adjacent limestone lowlands, which are 150 to 200 feet lower. The ridge that includes Akron, Kissel Hill, and Sporting Hill reaches elevations of 450 to 550 feet.

THE LANCASTER-FREDERICK LOWLAND

The Lancaster-Frederick Lowland consists of two parts: one is known locally as the Lancaster-York-Hanover Valley, and the other as the Quarryville-Chester Valley.

The Lancaster-York-Hanover Valley is a rolling plain, which is about 20 miles wide near the city of Lancaster and narrower elsewhere. The elevation ranges from 300 to 400 feet. The underlying rocks are limestone and dolomite. The areas underlain by the purer and more soluable limestone have an undulating surface containing many sinkholes; they have an indistinct drainage pattern, with few small streams and almost no wet areas. The areas underlain by impure limestone have broad, well-rounded, even slopes and few sinkholes.

The Quarryville-Chester Valley extends northeastward from a point south of Mine Ridge to the Triassic Lowland.

The Piedmont Uplands

Most of the southern half of Lancaster County is in the Piedmont Uplands. In addition, a strip of the uplands extends from Columbia along Chickies and Chestnut Hills and the hill near Fruitville to a point north of Lancaster, and another strip—the Welsh Mountains—extends into the county from the east. The uplands are characterized by deep valleys and by abrupt hills that have gently sloping ridgetops. The elevation ranges from 600 to 900 feet in most places.

The upland south of the Quarryville-Chester Valley overlies metamorphic rocks, mostly schist. The upland north of the valley is underlain by quartzite and phyllite. In the vicinity of Mine Ridge, the rock is gneiss. The Chickies and Chestnut Hills and the hill near Fruitville are composed of quartzite and phyllite. The Welsh Mountains consist of quartzite and metamorphosed igneous rock. The highest elevations are about 1,100 feet. They occur in the areas that overlie quartzite in the Welsh Mountains.

The Piedmont Uplands in this county are drained by Octoraro Creek, Pequea Creek, and several smaller streams. Pequea Creek crosses the south-central part of the county and flows into the Susquehanna River. Octoraro Creek runs along the southeastern boundary of the county, and its western tributaries drain the southern part of the county.

The Susquehanna River valley

The Susquehanna River forms the western boundary of Lancaster County. It has a broad valley along most of its course between Columbia and Falmouth. In this area a series of distinct terraces has been formed. South of Columbia a steep-sided narrow valley has been cut through the Piedmont Uplands.

Geology

Geology has had a direct and conspicious influence on the formation of the soils of Lancaster County. Three kinds of rocks—sedimentary, igneous, and metamorphic—underlie the soils.

Sedimentary rocks.—Sedimentary rocks are formed from sediments derived from the breaking down of older rocks or the accumulation of organic or inorganic debris from plant and animal life. The sedimentary rocks in Lancaster County were laid down in old seas or lakes. They came from deposits of gravels, sands, and silts and some lime in the form of precipitated calcium carbonate and small animal shells.

Sedimentary rocks cover the northern three-fourths of Lancaster County. They consist of red and gray Triassic sandstone, shale, and conglomerate, Cocalico shale, and limestone. About half of the county is underlain by limestone, which occurs in a wide belt across the middle of the county (*11*).

Igneous rocks.—Igneous rocks are formed by the solidification of melted rock material from within the earth. The largest formation of igneous rocks in Lancaster County were derived from molten rock forced into cracks in sedimentary formations or between layers of sedimentary rocks. Only small areas are exposed at the surface. They consist of diabase, granite, granite gneiss, and quartz diorite in the northern part of the county, serpentine in the south along the Maryland line, and gabbro in the Welsh Mountains in the eastern part of the county.

Metamorphic rocks.—Metamorphic rocks are formed by the alteration of existing sedimentary or igneous rocks by high pressure, high temperature, or chemical action. In Lancaster County, molten diabase that was forced through the red Triassic shale and sandstone baked them to a hard slate with a dark bluish-black color. As the distance from the dike or sill of diabase increases, the color of the slate grades from bluish-black to purple to red. Other metamorphic rocks in the county are gneiss and metagabbro, which are in the Mine Ridge section (*2, 7, 8, 9, 10, 12*).

In table 1, the major geological formations of the county are named and described, and the well-drained residual soils that developed from each kind of rock are listed.

TABLE 1.—*Major geologic formations and the well-drained residual soils that developed from each (8)*

Geologic system	Geologic formation[1]	Description of rocks	Well-drained residual soils		
			Deep[2]	Moderately deep[2]	Shallow[2]
Triassic	Youngest diabase	Black to gray crystalline feldspar and augite, with magnetite, apatite, and quartz.	Montalto	Montalto	
	Gettysburg shale	Soft red shale and sandstone; some beds of conglomerate.	Penn	Penn	Penn.
	Elizabeth Furnace conglomerate member of Gettysburg shale.	Heavy conglomerate and hard sandstone	Lewisberry		
	Metamorphosed Gettysburg shale.	Red shale, baked to bluish-black or purple slate or porcelainite by the heat of diabase intrusions.		Brecknock	Brecknock.
	New Oxford formation	Light-gray to grayish-yellow crumbly sandstone; some thin beds of red shales.	Lansdale	Lansdale	Steinsburg.
Ordovician	Conestoga limestone	Thin-bedded blue limestone with dark partings and mica-schist in middle part. Lower part is thicker beds of pure granular limestone containing grains of quartz.	Conestoga	Hollinger	Hollinger.
		Graphitic layers in Conestoga limestone	Letort	Pequea	Pequea.
	Cocalico shale	Dark-colored shale	Bedington	Berks	Berks.
	Beekmantown limestone	Light-blue pure limestone and finely laminated magnesium limestone.	Duffield, Hagerstown		
Cambrian	Conococheague limestone	Interbedded dark and light pure limestone and magnesium limestone; some dolomite and sandy limestone.	Duffield, Hagerstown		
	Elbrook limestone	Finely laminated impure limestone and marble	Duffield, Hagerstown		
	Ledger dolomite	Massive-bedded light-gray to white crystalline dolomite.	Hagerstown		
	Kinzers formation	Dark shale below blue-banded limestone and white-spotted marble.	Hagerstown		
	Vintage dolomite	Dark-blue dolomite; impure white marble at the base.	Hagerstown		
	Antietam quartzite	Gray quartzite, rust spotted and containing fossil molds.	Edgemont		
	Harpers phyllite	Light-gray phyllite and dark-banded slate	Whiteford	Cardiff	Cardiff.
	Chickies quartzite	Massive white quartzite and quartz schist; conglomerate at base.	Edgemont		
Pre-Cambrian	Wissahickon formation, including Peters Creek schist.	Albite-chlorite schist and oligoclase-mica schist	Elioak, Chester	Glenelg	Manor.
	Baltimore gneiss	Graphitic banded gneiss	Chester	Glenelg	Manor.
	Igneous rocks	Gabbro	Neshaminy		
	Oldest rocks	Serpentine	Neshaminy		

[1] Names are those used by the U. S. Geological Survey.
[2] Deep = more than 36 inches over bedrock; moderately deep = 20 to 36 inches over bedrock; shallow = less than 20 inches over bedrock.

Climate

Lancaster County is in a humid, temperate region. The climate is a modified continental type. The rainfall is about 40 inches annually. It is usually dependable and is distributed fairly evenly through the year.

Data on the normal monthly, seasonal, and annual temperature and precipitation have been compiled from records of the United States Weather Bureau at the Lancaster Pumping Station and are given in table 2. The Lancaster Pumping Station is the only one in the county that has complete weather records, but partial records are available from Weather Bureau stations at Ephrata and at Holtwood. Ephrata, at an elevation of 465 feet, is higher than Lancaster. The average temperature is about the same, but the annual precipitation and the snowfall are 1 or 2 inches higher. Holtwood, at an elevation of 187 feet, is lower than Lancaster. The temperature is about 2° higher than at Lancaster, but the annual precipitation is only about 36 inches.

The average length of the growing season at Lancaster is 160 days. At the higher elevations, the growing season is a little shorter. The average date of the last frost in spring is April 30, but frost has occurred as late as May 27. The average date of the first frost in autumn is October 7, but frost has occurred as early as September 11.

The temperature goes below freezing 100 days a year or less. Below-zero temperatures occur in only about 1 winter in 4. The average depth of frost pene-

TABLE 2.—*Temperature and precipitation at Lancaster Pumping Station, Lancaster County, Pa.*

[Elevation, 255 feet]

Month	Temperature[1]			Precipitation[2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1922)	Wettest year (1933)	Average snowfall
	°F.	°F.	°F.	*Inches*	*Inches*	*Inches*	*Inches*
December	33.1	73	−7	3.12	1.05	2.74	4.6
January	30.4	73	−27	3.16	2.76	1.85	8.6
February	31.1	78	−12	2.61	1.47	2.53	8.5
Winter	31.5	78	−27	8.89	5.28	7.12	21.7
March	40.1	80	3	3.45	4.09	6.13	6.7
April	49.8	94	11	3.45	1.28	5.07	2.3
May	61.3	98	28	3.54	2.88	4.86	0
Spring	50.4	98	3	10.44	8.25	16.06	9.0
June	70.2	103	33	4.01	3.50	2.66	0
July	74.0	104	42	4.37	3.47	9.13	0
August	72.2	107	39	4.30	2.05	13.94	0
Summer	72.1	107	33	12.68	9.02	25.73	0
September	65.4	98	27	3.32	.42	4.52	0
October	53.8	93	19	3.13	2.68	2.16	.1
November	43.3	81	5	2.71	.62	.63	.5
Fall	54.2	98	5	9.16	3.72	7.31	.6
Year	52.1	107	−27	41.17	26.27	56.22	31.3

[1] Average temperature based on a 54-year record, through 1955; highest and lowest temperatures, on a 25-year record, through 1930.
[2] Average precipitation based on a 68-year record, through 1955; wettest and driest years based on a 58-year record, in the period 1893-1955; snowfall, based on a 27-year record, through 1930.

tration is 12 inches. Fields are covered with snow about one-third of the winter.

During the summer, about 17 days have temperatures of 90°F. or higher. Temperatures of over 100°F. occur about 1 day a year. Between July and September, there are occasional periods, 4 to 7 days long, of uncomfortably hot and humid weather with only very light winds. Periods of drought are sometimes long enough to damage crops.

Vegetation

The original vegetation of Lancaster County was nearly all forest. This forest consisted of chestnut, locust, walnut, maple, white oak, and hickory trees. Small areas, called barrens, were covered with scrub oak or grass.

All of the original forest is gone. In 1948, forest covered 109,462 acres, or 17.6 percent of the county, but even this had been cut over once or more (*13*). Most of the woodland is along the northern edges of the county and in the Welsh Mountains in the northeast. A little woodland is found in the southern part of the county in farm woodlots. Woods are almost entirely absent from the limestone soils in the center of the county. Some townships in this area have almost no woodland left, and even the field boundaries have been cleared of trees and shrubs. The scene is one of continuous fields and pastures almost as far as the eye can see.

Generally speaking, the least productive soils of the county are wooded. Some small farm woodlots are on better soils.

The predominant natural vegetation of this county is a deciduous hardwood forest of the type known either as the mixed oak or oak-hickory type. There are several subdivisions of this type.

White oak-black oak-red oak forest.—This kind of forest occupies well-drained, fertile and moderately fertile soils. White oak, black oak, and red oak are the dominant trees. The rest of the stand consists of hickory, yellow-poplar, red maple, and blackgum.

White oak forest.—Almost pure stands of white oak occupy well-drained, fertile and moderately fertile soils. Other less important trees are black oak, yellow-poplar, shagbark hickory, and mockernut hickory.

Red oak forest.—Red oak grows in almost pure stands on well-drained, moderately fertile soils, particularly on north-facing slopes. Other trees in these stands are black oak, scarlet oak, chestnut oak, and yellow-poplar.

Scarlet oak-black oak forest.—Forests predominantly of scarlet oak and black oak occupy the well-drained, less fertile soils on dry ridges and upper slopes. Other trees in the stand are hickory, pitch pine, chestnut oak, ash, and white oak.

Chestnut oak forest.—Chestnut oak occurs in almost pure stands on droughty, rocky, shallow soils of the ridges. Scarlet oak, pitch pine, Virginia pine, and red maple also occur in the stand.

Yellow-poplar forest.—Pure stands of yellow-poplar have developed on fertile or moderately fertile, moist soils after clear cutting of woodland or abandoning of farmland. This is a temporary forest type. Under natural conditions it will be replaced by the more moisture-tolerant species of oak and other trees.

Each of the forest types has an understory of smaller trees and shrubs. The density of the understory depends on the kind of overstory and its density. The most common species of smaller trees and shrubs are dogwood, gray birch, bear oak, sassafras, blue beech, hophornbeam, witch-hazel, serviceberry, spice bush, blackhaw, laurel, and viburnums.

A ground cover of small herbaceous plants such as ferns, crowfoot, partridgeberry, teaberry, and mayapple is common. In the more open stands or near the edge of woods, the common plants are honeysuckle, greenbrier, blackberry, dewberry, poison ivy, and other species.

Abandoned fields return rather quickly to forest vegetation if there is any soil left. Fields near woods or fence rows that supply seed are the first to grow up. The trees with light seeds that are easily carried by the wind volunteer first. In most places these are yellow-poplar, ash, elm, locust, and cedar. In some areas ailanthus is common. Shrubs and plants whose seeds are commonly eaten by animals come in rapidly and provide a ground cover. Some of the less fertile

soils on extremely dry sites grow up to broomsedge, povertygrass, and eastern redcedar. Less fertile soils on wet sites commonly are covered by swamp rose, broomsedge, povertygrass, and eastern redcedar.

Water Supply

Most of the water for farms comes from shallow dug wells or from springs that issue from the rock formations. The water from springs or wells in the limestone formations is hard, but water from the sandstone or shale is soft.

Wells or springs supply water to most of the towns. Some of the larger towns have filtration plants and use water from surface streams. Conestoga Creek, Little Chickies Creek, Rife Run, and the Susquehanna River are sources of municipal water supplies. A few homes, particularly in areas of limestone bedrock, depend on rainwater caught and stored in cisterns (*7, 8*).

Transportation

Lancaster County is fairly close to several large centers of population and is connected to each of them by railroad and by all-weather highways. Harrisburg is 37 miles away; Philadelphia, 65 miles; Baltimore, 75 miles; Washington, D. C., 112 miles; and New York City, 158 miles.

The main east-west highway through the county is United States Highway No. 30, which connects the city of Lancaster with Philadelphia and York. United States Highway No. 230 branches from No. 30 near Lancaster and leads northwest to Harrisburg. United States Highway No. 222 enters the county from the north, passes through Lancaster city, and continues south into Maryland. United States Highway No. 322, which connects Philadelphia and Harrisburg, traverses the northeastern part of the county and passes through Ephrata. The Pennsylvania Turnpike runs along the northern edge of the county. This toll road can be entered from United States Highway No. 222, northeast of Reamstown, and from State Highway No. 72, north of Elstonville.

A network of improved State and county roads radiate from the city of Lancaster and connect the numerous towns of the county. Macadam county and township roads reach practically all homes in the county.

Railroad transportation for passengers and freight is provided by the main line of the Pennsylvania Railroad, which runs northwest-southeast through the county. Branches of the Pennsylvania connect with Quarryville and Columbia. The Reading Railroad carries freight out of the county to the northeast from Columbia and to the north from Manheim.

Trucking companies furnish motor freight service to all points. Passenger bus service from the city of Lancaster to various towns is available through the Greyhound Lines and the Edwards Lines. Local passenger service is provided by the Conestoga Transportation Company.

Industry

Over 600 industrial plants are located in the county, and they employ more than 45,000 workers. The products include boats, furniture, linoleum, radio and television parts, silk and rayon goods, boots and shoes, watches, asbestos, cork products, chocolate, hardware specialties, toys, clothes, cigars, meat, and crushed limestone. The largest stockyards and cattle market east of Chicago are located in Lancaster.

The largest number of industries is in the central and northern parts of the county, which are also the most productive agricultural sections.

Farm, Home, and Community Improvements

Consolidated rural public schools provide modern educational facilities for children throughout the county. The city of Lancaster has a public high school, 2 junior high schools, 16 grade schools, a parochial high school, and 5 parochial grade schools.

The State Teachers' College at Millersville is more than 100 years old; it is the oldest in Pennsylvania. Franklin and Marshall College and the associated Seminary are in the city of Lancaster. Elizabethtown College is located at Elizabethtown. Linden Hall, a school for girls, is located in Lititz.

There are 78 churches in the city of Lancaster. Many more are in various towns and communities throughout the county.

Three hospitals are in the city of Lancaster, and one is in Ephrata. Several other hospitals are located elsewhere in the county.

Lancaster has 8 public parks and 13 supervised playgrounds.

Electric power was available to 86.6 percent of the farms in Lancaster County in 1954, according to the agricultural census, and running water to 88.4 percent. Telephones were in 70.8 percent of the farm homes, television sets in 33.4 percent, and freezers in 51.5 percent. More than half of the farm homes had central heating.

Agriculture

The Indians of Lancaster County were its first farmers. They raised maize, beans, peas, and squash. Later they planted corn, potatoes, and tobacco. They also collected wild fruit and other plants for food. Continuous cropping to corn and beans would exhaust a patch of soil within 25 years, and the Indians would then move to another area.

The early white settlers also farmed their soils continuously, without applying manure or fertilizer, then abandoned them. The worn-out fields were left to grow up in weeds and brush until their natural productivity was somewhat restored. By 1750, the effect of these farming methods had greatly reduced the productivity of the cleared soils.

Neither lime nor fertilizer was generally used in the earlier days of farming. By 1750, the value of lime was recognized. Most farms had kilns for burning limestone. The commercial lime industry did not

develop until after 1840. The use of fertilizers did not become general until after 1840. Guano was used at first; after 1860 it was replaced by superphosphates. Bone dust or ground bone was used about 1848 (*6*). The use of commercial fertilizers became common by about 1860.

Soil Conservation

In 1935 a project for demonstrating erosion control and good land use on individual farms was established in the West Branch Octoraro Creek Watershed. This project was carried out through agreements between individual farmers and the Soil Conservation Service of the United States Department of Agriculture. The Soil Conservation Service made a conservation plan for each farm, based on the capability of the land. The Federal Government helped the farmers to initiate the recommended conservation practices by furnishing technicians, labor, trees, and shrubs. Seed, lime, and fertilizer were furnished for areas that were taken out of cultivation and retired to hay and pasture. Conservation measures were installed rapidly, to show others the advantages of this new way of farming.

In 1937 the farmers who were developing farm conservation plans banded together to form a Soil Conservation Association. This was the first farmer-backed organization for soil conservation in Lancaster County.

Through the efforts of the Soil Conservation Association, a part of Lancaster County became a Soil Conservation District in September 1938. The original District contained the following townships: Conestoga, Pequea, Drumore, East Drumore, Martic, Colerain, Little Britain, Fulton, Providence, Strasburg, Paradise, Bart, Sadsbury, Eden, and West Lampeter. Conservation work in the district was directed and coordinated by the District Board of Supervisors.

An erosion survey was made by the Soil Conservation Service in the Conestoga and Pequea Creek watersheds in 1938. This survey showed the type of soils, the degree of slope, and the amount and kind of erosion that had taken place. It revealed that, in these two watersheds, only 19.9 percent of the acreage had lost less than one-fourth of its original surface soil. From one-fourth to one-half of the surface soil was gone from 43.9 percent of the acreage, and from one-half to three-fourths was gone from 26.1 percent. More than three-fourths of the surface soil and, in some places, most of the subsoil had been removed from 3.6 percent of the acreage. Soil material had recently been deposited over 6.5 percent of the acreage (*3*).

At first, cooperating farms were widely scattered through the District. During the next 10 years, new cooperators joined these early demonstration farms. A survey in 1946 showed that the farmers who had adopted the most conservation practices produced 18 bushels more of corn, 15 bushels more of barley, and 3 bushels more of wheat per acre than those farmers who had installed only a few conservation practices. The conservation farmers were consistently producing more on fewer acres, and they had higher gross incomes.

By February 1950, interest in soil conservation was so general in the county that the County Commissioners declared the entire county a Soil Conservation District.

To coordinate the work of the various agencies represented in the county, the Lancaster County Soil Conservation District has made cooperative agreements with the following agencies: The Pennsylvania State University, the Soil Conservation Service of the United States Department of Agriculture, the Pennsylvania Game Commission, the Pennsylvania Department of Forests and Waters, the Pennsylvania Fish Commission, and the Pennsylvania Department of Highways. Other State and Federal agencies—the Agricultural Extension Service, the Agricultural Conservation Program Service, the Farm Credit Administration, the Farmers' Home Administration—and vocational agriculture departments cooperate on an informal basis. Commercial firms dealing in farm equipment also cooperate with the District informally.

More than 1,400 farmers are now cooperators with the District. Their farms comprise more than one-third of the acreage of Lancaster County.

Farms of the County

About 82 percent of the area of Lancaster County is in farms. There were 7,951 farms in the county in 1954, and the average size was 62.7 acres. The United States agricultural census in 1954 classified them by size as follows:

Size of farm:	*Number*
Less than 10 acres	1,371
10 to 29 acres	1,292
30 to 49 acres	1,042
50 to 69 acres	1,229
70 to 99 acres	1,432
100 to 139 acres	987
140 to 179 acres	315
180 acres or more	283

Types of farms.—On most of these farms some kind of livestock is raised. There were 1,570 dairy farms and 1,170 poultry farms in the county in 1954. Livestock other than dairy cattle or poultry were the main source of income on 1,120 farms. There were 1,915 general farms, of which 65 depended primarily on crops, 680 depended primarily on livestock, and 1,170 combined crops and livestock. Field crops were the source of income for 676 farms, vegetables for 65 farms, and fruits and nuts for 60 farms. The other 1,366 farms in the county were not classified by source of income.

Land use.—Of the 498,206 acres of land in farms in 1954, 72.8 percent, or 362,393 acres, was cropland. Woods covered 8.8 percent or 43,866 acres, and cleared pasture covered 13.4 percent, or 66,747 acres. Additional pasture was gained by using 17,299 acres of cropland and 6,822 acres of the woodland. Only 8,350 acres of cropland was idle during that year. The other 5.0 percent of the farmland, 25,200 acres, was in roads, building sites, wasteland, and other land. Only 3,342 acres, or less than 1 percent of the farmland, was irrigated.

Tenure.—According to the 1954 census, full owners operated 5,352 or 67.3 percent of the farms; part

owners operated 668, or 8.4 percent, of the farms; managers operated 28, or 0.4 percent, of the farms; and tenants operated 1,903, or 23.9 percent of the farms. Most of the tenants were share tenants or croppers.

Farm employment.—In 1954, 3,655 of the farm operators were employed away from their farms, but only 1,770 made more income from their other jobs than they did from farming. Extra workers were hired on 2,817 farms. On 1,617 of these farms, regular workers were hired for 150 days or more. Seasonal workers, who worked less than 150 days, were hired on 1,511 farms. Some farmers hired both regular and seasonal workers.

Farm power and mechanical equipment.—There were 12,248 tractors in use on 6,042 farms in the county in 1954, 9,049 automobiles on 6,112 farms, and 3,760 motortrucks on 3,132 farms. Milking machines were used on 2,551 farms, grain combines on 1,617 farms, and pickup hay balers on 1,752 farms.

Crops

The acreage of the principal crops in Lancaster County in 1954 was as follows:

	Acres
Corn	102,872
For grain	81,652
Wheat threshed or combined	61,721
Oats threshed or combined	11,397
Barley threshed or combined	17,548
Rye threshed or combined	799
Other grains and mixtures threshed or combined	606
Tobacco	26,420
All hay	94,909
Soybeans	2,810
Irish potatoes	5,765
Sweetpotatoes	59
Other field crops	96
Vegetables for sale	10,958

Grain.—Corn is the principal crop in Lancaster County. Most of the corn grown in 1954 was used for grain. Wheat is the most important of the smaller grains. Considerable acreages of barley and rye are also grown.

Tobacco.—Tobacco has been an important crop for many years. The Pennsylvania broadleaf type, used for cigar fillers, binders, and wrappers, was developed largely through experiments in Lancaster County.

The soil-depleting characteristics of this crop were recognized early, and it was planted on the most fertile soils. Tobacco is now one of the most liberally fertilized crops in the county. Usually it follows corn in the rotation and is in turn followed by wheat or barley, and the field is then seeded down to hay for 1 or 2 years.

Hay and forage crops.—Hay and forage are important in Lancaster County, because they help support the highly profitable livestock industry. Mixed legume hay is the most common forage crop. The acreage of hay and forage crops grown in 1954 was as follows:

	Acres
Hay—	
Timothy and clover	65,885
Alfalfa	22,065
Small grains cut for hay	1,110
Other	1,526
Grass silage	4,323

Red clover for seed was grown on 816 acres in 1954.

Vegetables.—Lancaster County farms are within short distances of several large cities besides the city of Lancaster. Nearly 11,000 acres of vegetables were raised for sale in 1954. The kinds of vegetables most extensively grown for sale were the following:

	Acres
Tomatoes	4,770
Sweet corn	1,790
Green limabeans	1,382
Green peas	1,314
Snapbeans	383
Asparagus	243
Squash	234
Cabbage	160
Carrots	144
Spinach	32
Beets (table)	13
Cucumbers	12
Lettuce and romaine	12
Other vegetables	469

Strawberries for sale were grown on 128 acres, and raspberries on 61 acres.

Orchard fruits and grapes.—The number of fruit trees and grapevines of bearing age in the county in 1954 were reported as follows:

	Number
Apple trees	38,040
Peach trees	49,367
Cherry trees	13,924
Pear trees	3,688
Plum and prune trees	1,510
Grapevines	3,210

These figures do not include the trees and vines on farms that had less than 20 trees or vines.

Livestock

The principal farming enterprises in the county depend on livestock. It is the chief source of farm income. The volume of business at the stockyards ranges from $60 million to $93 million annually. The census of livestock in Lancaster County in 1954 was as follows:

	Number
Cattle and calves	146,848
Horses and mules	7,853
Swine	41,195
Sheep and lambs	11,689
Chickens 4 months old and over	2,825,047
Turkeys raised during the year	236,466
Ducks raised during the year	159,694

Of the cattle and calves, 58,267 were milk cows.

Soil Associations

The soils of Lancaster County can be shown in a general way by reference to 12 soil associations. A soil association is a more or less characteristic pattern of soils that occupies an area large enough to be shown on a small-scale map. Figure 2 shows the general distribution of these soil associations in the county.

Lewisberry-Penn association

The main residual soils in this association are members of the Lewisberry, Penn, Readington, and Croton series. Brecknock and Lehigh soils also occur. Birdsboro soils developed on stream terraces. Rowland,

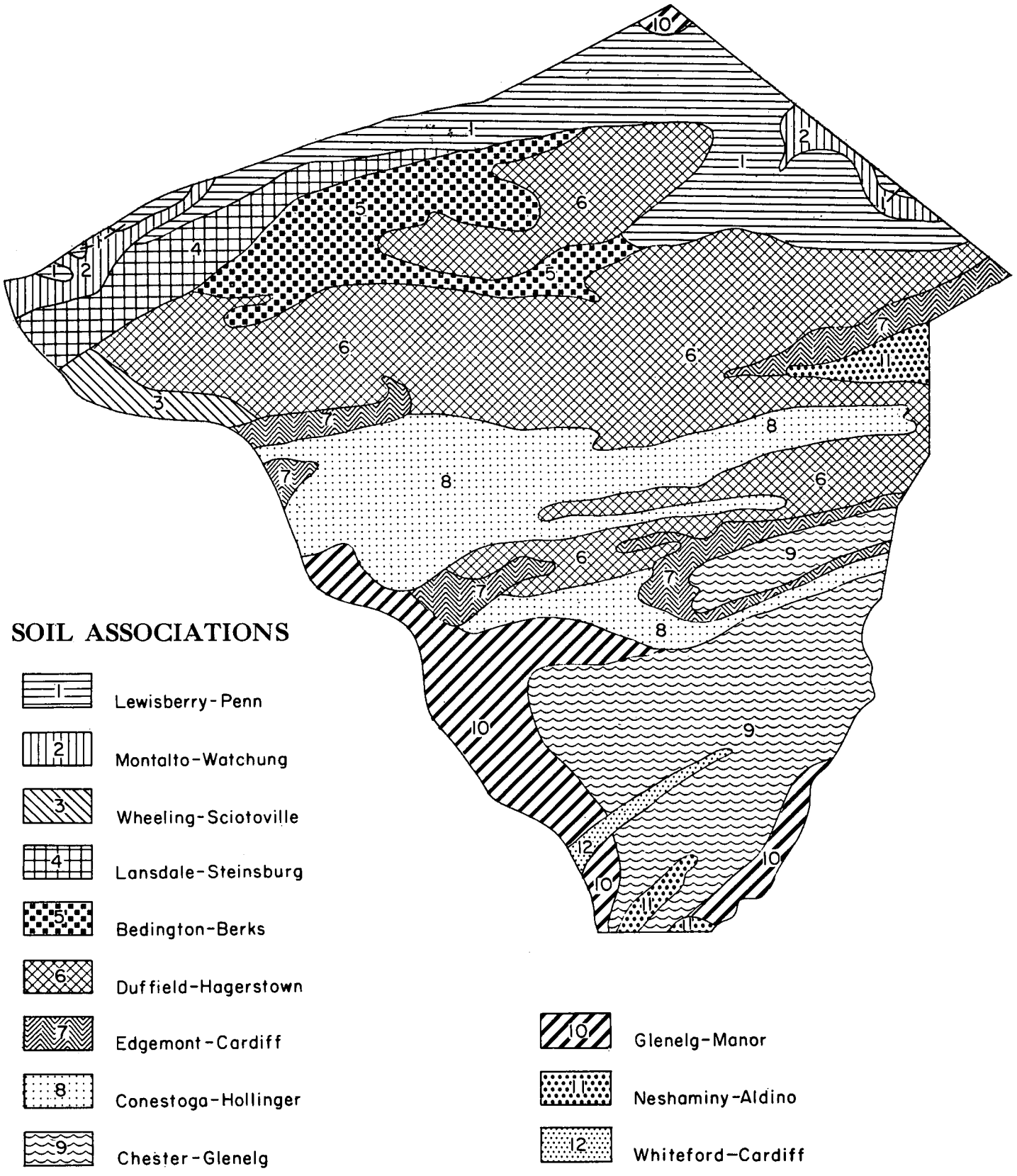

Figure 2.—**Soil associations in Lancaster County.**

Bermudian, and Bowmansville soils developed on the flood plains. The parent material of all of these soils was derived from Gettysburg shale, Elizabeth Furnace conglomerate, and other Triassic formations. The soils are deep to shallow and are well drained to poorly drained.

This association is located in the Triassic Lowland of the Piedmont physiographic province. It occurs mostly on gently rolling or undulating lowlands flanked by ridges that run northeast and southwest.

These areas are generally rural. General farming, with tobacco and vegetable crops as part of the rotation, is the most common enterprise. Dairy or beef cattle are the principal livestock.

Montalto-Watchung association

The residual soils in this association are members of the Montalto and Watchung series. They developed from diabase or ironstone in the Triassic Lowland. Most of the association is rolling or hilly, but some is gently sloping and some is steep. The smaller areas are on ridgetops, and the larger areas are on dissected topography. The soils are deep, and the drainage ranges from good to poor.

This is not an extensive association. The largest part of it is in woodland. Smaller areas are cultivated or are used for urban development.

Wheeling-Sciotoville association

This association contains the Wheeling and Sciotoville soils of the terraces and the Huntington, Lindside, and Melvin soils of the flood plains. It occurs in the Lancaster-Frederick Lowland, along the Susquehanna River. The original sediments were washed from areas of acid and calcareous rocks.

The topography is gently sloping, undulating, and rolling. It is a little steeper where streams have cut across the terraces. The soils are deep and are well drained to poorly drained.

This has been a general farming area, but it is becoming urbanized as a result of the growth of the town of Marietta. Tobacco and vegetable crops are important in the farming economy. Dairy and beef cattle are the common livestock.

Lansdale-Steinsburg association

The residual soils in this association are of the Lansdale, Steinsburg, Readington, Croton, Brecknock, and Lehigh series. Small areas of Penn soils occur in some places. Birdsboro soils occur on the terraces, and Rowland, Bermudian, and Bowmansville soils on the flood plains.

This association is located in the Triassic Lowland of the Piedmont physiographic province. The soils developed from yellow and brown sandstone and shale of the New Oxford formation or from alluvium derived from the Triassic formations. The topography is rolling to hilly. The soils are moderately deep to shallow. They are well drained to poorly drained. General farming, with dairying as the main farm enterprise, is common.

Bedington-Berks association

The residual soils in this association belong to the Bedington, Berks, and Blairton series. Rowland and Bermudian soils occur on the flood plains. These soils formed from acid Cocalico shale and the alluvium derived from it. They occur between the Triassic Lowland and the Lancaster-Frederick Lowland. The topography is mostly rolling. It is characterized by well-rounded, short, smooth slopes, but in some places streams have cut into the uplands and formed narrow, steep-sided valleys. The soils range from shallow to deep. They are well drained to poorly drained.

This association is rural. There are few centers of population and very little industry. General farming is practiced. Tobacco and vegetables are included in crop rotations. Dairy cattle are the most common livestock.

Duffield-Hagerstown association

The residual limestone soils in this association are of the Duffield, Hagerstown, and Lawrence series. The colluvial-alluvial soils are the Huntington local alluvium soils and the Lindside local alluvium soils. On the terraces, the soils are of the Elk, Wheeling, and Sciotoville series; on the flood plains, the soils are of the Huntington, Lindside, and Melvin series. A few small areas of Montalto soils are included in this association.

This association occurs in the Lancaster-Frederick Lowland of the Piedmont physiographic province. The residual soils developed on the Beekmantown, Elbrook, and Conococheague limestones, the Ledger and Vintage dolomites, and the Kinzers formation. The Montalto soils developed on diabase intrusions. The colluvial-alluvial soils, the terrace soils, and the flood plain soils developed from material that originated in the limestone and dolomite areas.

The topography is mostly undulating to rolling. It is characterized by broad, gently rolling slopes, level to undulating lowlands, and stream-cut valleys with steep sides (*10*). The soils are deep and well drained to poorly drained.

This is a rural area, but it contains part of the city of Lancaster, some other major centers of population, and many smaller settlements. Much of the industry of the county is concentrated in this area. Farming is of a general type. Tobacco is the major cash crop. Beef cattle are the most common livestock.

Edgemont-Cardiff association

The residual soils in this association belong to the Edgemont, Whiteford, and Cardiff series. They developed in the Piedmont Uplands from Antietam quartzite, Harpers phyllite, Chickies quartzite, and Hellam conglomerates. Small areas of Montalto soils, formed from diabase, are included.

The topography is rolling to very hilly. It is characterized by rather narrow, steep-sided ridges or hills that rise above the surrounding uplands. The soils range from deep to shallow. They are well drained.

Much of the area is wooded, but part-time farming is common. Some sections are being developed as residential areas.

Conestoga-Hollinger association

The residual soils of this association belong to the Conestoga, Hollinger, Letort, and Pequea series, and

the colluvial-alluvial soils belong to the Lindside series. Small areas of Duffield, Hagerstown, and Murrill soils are included.

The soils in this association developed from micaceous and graphitic Conestoga limestone in the Lancaster-Frederick Lowland of the Piedmont province. The topography is undulating to rolling. It is characterized by broad, gently rolling slopes. Near the larger streams, the slopes are rather steep. The soils are deep and well drained to somewhat poorly drained.

Several centers of population, including most of the city of Lancaster, are located in this association. There is a fair amount of industry. General farming is the chief type. Tobacco and vegetables are important crops, and dairy or beef cattle are the principal livestock.

Chester-Glenelg association

The residual soils on the uplands in this association are of the Chester, Glenelg, Elioak, Manor, and Glenville series. The Congaree, Chewacla, and Wehadkee soils are on the flood plains. Small areas of Cardiff and Whiteford soils are included.

These soils occur in the Piedmont Uplands. The residual soils developed from Wissahickon schist, Peters Creek schist, and Baltimore gneiss or, less commonly, from quartz monzonite, gabbro, or granodiorite. The flood-plain soils in the association developed from alluvium that originated in areas underlain by these geologic formations. The areas are rolling to hilly and well dissected. Between the streams are wide, flat hills or ridges with rather steep sides. Most of the soils are deep to moderately deep, but smaller areas of shallow soils are included. They are well drained to moderately well drained.

This association is predominantly rural. It has few centers of population and very little industry. General farming is common (fig. 3). Dairy cattle are the principal livestock.

Glenelg-Manor association

The residual soils of the uplands in this association belong to the Glenelg, Manor, Chester, Elioak, and Glenville series. The flood-plain soils are of the Congaree, Chewacla, and Wehadkee series.

Figure 3.—**Landscape typical of the Chester-Glenelg association of soils. The field on the left is farmed in contour strips protected by four diversion terraces. An old gully with drop structures is used as an outlet.**

This association is in the Piedmont Uplands, on a well-dissected upland of ridges and steep-sided valleys. The residual soils developed from Wissahickon schist and Peters Creek schist. The flood-plain soils developed from alluvium derived from the same kinds of rock. The topography is rolling to very steep. Most of the soils are moderately deep to shallow, but smaller areas of deep soils are included. They are well drained to moderately well drained.

These are rural areas, with very few centers of population and no industry. Dairy cattle are the chief livestock raised. General farming is common.

Neshaminy-Aldino association

The residual soils in this association are of the Neshaminy, Aldino, and Glenville series. Small areas of Chester, Glenelg, and Manor soils are included. The Congaree, Chewacla, and Wehadkee soils are on the flood plains.

This association occurs on gabbro and granodiorite near Cambridge and on serpentine near the Maryland line. The flood-plain soils developed on materials washed from the same kinds of rock. The serpentine areas are known as "the barrens." The topography is gently sloping to rolling. The gabbro and granodiorite areas are more dissected. The soils range from deep and well drained to shallow and poorly drained.

These areas are rural. They have few population centers and no industry. General farming is the most common type. Dairy cattle are the chief livestock.

Whiteford-Cardiff association

The residual soils in this area belong to the Whiteford and Cardiff series. Some small areas of Chester, Manor, Elioak, Glenelg, and Glenville soils are included.

These soils occur in the Piedmont Uplands. They developed from Peach Bottom slate and Cardiff conglomerate. The topography is rolling to hilly or steep. The soils range from deep to shallow. They are well drained to moderately well drained.

This association is rural. It has few centers of population and no industry. General farming is the most common type. Dairy cattle are the chief livestock.

Soil Survey Methods and Definitions

The scientist who makes a soil survey examines soils in the field, classifies the soils in accordance with facts that he observes, and maps their boundaries on an aerial photograph or other map.

FIELD STUDY.—The soil surveyor bores or digs many holes to see what the soils are like. The holes are not spaced in a regular pattern but are located according to the lay of the land. Usually they are not more than a quarter of a mile apart and sometimes they are much closer. In most soils such a boring or hole reveals several distinct layers, called horizons, which collectively are known as the soil profile. Each layer is studied to see how it differs from others in the profile and to learn the things about this soil that influence its capacity to support plant growth.

Color is usually related to the amount of organic matter. The darker the surface soil, as a rule, the more organic matter it contains. Streaks and spots of gray, yellow, and brown in the lower layers generally indicate poor drainage and poor aeration.

Texture, or the amount of sand, silt, and clay, is determined by the way the soil feels when rubbed between the fingers and key soils are later checked by laboratory analysis. Texture determines how well the soil retains moisture, plant nutrients, and fertilizer, and whether it is easy or difficult to cultivate.

Structure, which is the way the individual soil particles are arranged in larger aggregates and the amount of pore space between aggregates, gives us clues to the ease or difficulty with which the soil is penetrated by plant roots and by moisture.

Consistence, or the tendency of the soil to crumble or to stick together, indicates whether it is easy or difficult to keep the soil open and porous under cultivation.

Other characteristics observed in the course of the field study and considered in classifying the soil include the following: The depth of the soil over bedrock or compact layers; the presence of gravel or stones in amounts that will interfere with cultivation; the steepness and pattern of slopes; the degree of erosion; the nature of the underlying rocks or other parent material from which the soil has developed; and acidity or alkalinity of the soil as measured by chemical tests.

CLASSIFICATION.—On the basis of the characteristics observed by the survey team or determined by laboratory tests, soils are classified into phases, types, and series. The soil type is the basic classification unit. A soil type may consist of several phases. Types that resemble each other in most of their characteristics are grouped into soil series.

Soil type.—Soils similar in kind, thickness, and arrangement of soil layers are classified as one soil type.

Soil phase.—Because of differences other than those of kind, thickness, and arrangement of layers, some soil types are divided into two or more phases. Slope variations, number of rock outcrops, degree of erosion, depth of soil over the substratum are examples of characteristics that suggest dividing a soil type into phases.

The soil phase (or the soil type if it has not been subdivided) is the unit shown on the soil map. It is the unit that has the narrowest range of characteristics. Use and management practices, therefore, can be specified more easily than for soil series or yet broader groups that contain more variation.

Soil series.—Two or more soil types that differ in surface texture but are otherwise similar in kind, thickness, and arrangement of soil layers, are normally designated as a soil series. In a given area, however, it frequently happens that a soil series is represented by only one soil type. Each series is named for a place near which the soil was first mapped.

As an example of soil classification, consider the Lansdale series of Lancaster County and adjacent counties. This series is made up of four soil types, all of which are subdivided into phases as follows:

Series	Type	Phase
Lansdale	Gravelly loam	0 to 3 percent slopes.
		3 to 8 percent slopes, moderately eroded.
		8 to 15 percent slopes, moderately eroded.
		8 to 15 percent slopes, severely eroded.
		15 to 25 percent slopes, moderately eroded.
		15 to 25 percent slopes, severely eroded.
		25 to 40 percent slopes.
	Loam	0 to 3 percent slopes.
		3 to 8 percent slopes.
		3 to 8 percent slopes, moderately eroded.
		8 to 15 percent slopes, moderately eroded.
		15 to 25 percent slopes.
	Sandy loam	0 to 3 percent slopes.
		3 to 8 percent slopes.
		3 to 8 percent slopes, moderately eroded.
		8 to 15 percent slopes.
	Stony sandy loam	0 to 8 percent slopes.
		8 to 15 percent slopes.
		15 to 25 percent slopes.
		25 to 35 percent slopes.

Miscellaneous land types.—Fresh stream deposits and gravelly stony material that have little true soil are not classified by types and series but are identified by descriptive names, such as Alluvial land or Riverwash.

Soil complex.—When two or more soils are so intricately associated in small areas that it is not practical to show them separately on the soil map, they are mapped together and called a soil complex. Certain areas of Penn and Lansdale loams and gravelly loams were mapped as complexes in this county.

Descriptions of the Soils

In this section the soil series of Lancaster County are described, and each of the soils in that series is then described in detail. The location and distribution of the individual soils is shown on the soil map in the back of this report. The approximate acreage and proportionate extent of each soil are given in table 3.

TABLE 3.—*Approximate acreage and proportionate extent of the soils mapped in Lancaster County, Pa.*

Soil	Area	Extent
	Acres	*Percent*
Aldino gravelly silt loam, 3 to 8 percent slopes, moderately eroded	654	0.1
Aldino gravelly silt loam, 8 to 15 percent slopes, moderately eroded	241	(1)
Aldino gravelly silt loam, 15 to 25 percent slopes, severely eroded	68	(1)
Aldino stony silt loam, 3 to 8 percent slopes	44	(1)
Aldino stony silt loam, 8 to 15 percent slopes	230	(1)
Aldino stony silt loam, 15 to 25 percent slopes	195	(1)
Alluvial land	835	.1
Bedington silt loam, 0 to 3 percent slopes	429	.1
Bedington silt loam, 3 to 8 percent slopes, moderately eroded	557	.1
Berks shaly silt loam, 0 to 3 percent slopes	80	(1)
Berks shaly silt loam, 3 to 8 percent slopes	38	(1)
Berks shaly silt loam, 3 to 8 percent slopes, moderately eroded	1,292	.2
Berks shaly silt loam, 8 to 15 percent slopes, moderately eroded	1,594	.3
Berks shaly silt loam, 8 to 15 percent slopes, severely eroded	395	.1
Berks shaly silt loam, 15 to 25 percent slopes	28	(1)
Berks shaly silt loam, 15 to 25 percent slopes, moderately eroded	2,311	.4
Berks shaly silt loam, 15 to 25 percent slopes, severely eroded	919	.2
Berks shaly silt loam, 25 to 35 percent slopes	315	.1
Berks shaly silt loam, 25 to 35 percent slopes, moderately eroded	1,635	.3
Berks shaly silt loam, 25 to 35 percent slopes, severely eroded	208	(1)
Berks silt loam, brown subsoil, 0 to 3 percent slopes	1,994	.3
Berks silt loam, brown subsoil, 3 to 8 percent slopes	906	.1
Berks silt loam, brown subsoil, 3 to 8 percent slopes, moderately eroded	13,647	2.3
Berks silt loam, brown subsoil, 3 to 8 percent slopes, severely eroded	24	(1)
Berks silt loam, brown subsoil, 8 to 15 percent slopes, moderately eroded	8,589	1.4
Berks silt loam, brown subsoil, 15 to 25 percent slopes, moderately eroded	2,668	0.4
Birdsboro silt loam, 0 to 3 percent slopes	251	(1)
Birdsboro silt loam, 3 to 6 percent slopes, moderately eroded	163	(1)
Blairton silt loam, 0 to 3 percent slopes	950	.2
Blairton silt loam, 3 to 8 percent slopes	240	(1)
Blairton silt loam, 3 to 8 percent slopes, moderately eroded	563	.1
Blairton silt loam, 8 to 15 percent slopes, moderately eroded	76	(1)
Bowmansville silt loam, 0 to 6 percent slopes	5,321	1.0
Brecknock silt loam, 0 to 3 percent slopes	105	(1)
Brecknock silt loam, 3 to 8 percent slopes, moderately eroded	437	.1
Brecknock silt loam, 8 to 15 percent slopes, moderately eroded	184	(1)
Brecknock slaty silt loam, 0 to 3 percent slopes	178	(1)
Brecknock slaty silt loam, 3 to 8 percent slopes	961	.2
Brecknock slaty silt loam, 3 to 8 percent slopes, moderately eroded	1,365	.2
Brecknock slaty silt loam, 8 to 15 percent slopes, moderately eroded	2,251	.4
Brecknock slaty silt loam, 15 to 25 percent slopes	52	(1)
Brecknock slaty silt loam, 15 to 25 percent slopes, moderately eroded	461	.1
Brecknock slaty silt loam, 25 to 35 percent slopes	26	(1)
Brecknock stony silt loam, 0 to 8 percent slopes	19	(1)
Brecknock stony silt loam, 8 to 15 percent slopes	22	(1)
Cardiff slaty silt loam, 0 to 3 percent slopes	51	(1)
Cardiff slaty silt loam, 3 to 8 percent slopes, moderately eroded	410	.1
Cardiff slaty silt loam, 8 to 15 percent slopes, moderately eroded	493	.1
Cardiff slaty silt loam, 15 to 25 percent slopes, moderately eroded	232	(1)
Cardiff slaty silt loam, 25 to 35 percent slopes	102	(1)
Chester channery sandy loam, 0 to 3 percent slopes	169	(1)
Chester channery sandy loam, 3 to 6 percent slopes	152	(1)

TABLE 3.—*Approximate acreage and proportionate extent of the soils mapped in Lancaster County, Pa.*—Cont.

Soil	Area	Extent
	Acres	*Percent*
Chester channery sandy loam, 3 to 6 percent slopes, moderately eroded	1,491	0.2
Chester channery sandy loam, 6 to 12 percent slopes	101	(1)
Chester channery sandy loam, 6 to 12 percent slopes, moderately eroded	719	.1
Chester loam, 0 to 3 percent slopes	896	.1
Chester loam, 3 to 6 percent slopes	341	.1
Chester loam, 3 to 6 percent slopes, moderately eroded	4,738	.8
Chester loam, 6 to 12 percent slopes	240	(1)
Chester loam, 6 to 12 percent slopes, moderately eroded	3,890	.6
Chester loam, 6 to 12 percent slopes, severely eroded	375	.1
Chester loam, 12 to 18 percent slopes	33	(1)
Chester loam, 12 to 18 percent slopes, moderately eroded	1,056	.2
Chester silt loam, 0 to 3 percent slopes	5,992	1.0
Chester silt loam, 3 to 6 percent slopes	3,733	.6
Chester silt loam, 3 to 6 percent slopes, moderately eroded	32,832	5.4
Chester silt loam, 3 to 6 percent slopes, severely eroded	404	.1
Chester silt loam, 6 to 12 percent slopes	3,976	.7
Chester silt loam, 6 to 12 percent slopes, moderately eroded	28,900	5.0
Chester silt loam, 6 to 12 percent slopes, severely eroded	3,173	.5
Chester silt loam, 12 to 18 percent slopes	950	.2
Chester silt loam, 12 to 18 percent slopes, moderately eroded	2,761	.5
Chester stony loam, 0 to 6 percent slopes	211	(1)
Chester stony loam, 6 to 12 percent slopes	397	.1
Chester stony loam, 12 to 18 percent slopes	193	(1)
Chester stony loam, 18 to 25 percent slopes	132	(1)
Chewacla silt loam, 0 to 3 percent slopes	5,668	1.0
Conestoga silt loam, 0 to 3 percent slopes	3,921	.6
Conestoga silt loam, 3 to 6 percent slopes	131	(1)
Conestoga silt loam, 3 to 6 percent slopes, moderately eroded	23,559	4.0
Conestoga silt loam, 3 to 6 percent slopes, severely eroded	332	.1
Conestoga silt loam, 6 to 12 percent slopes	78	(1)
Conestoga silt loam, 6 to 12 percent slopes, moderately eroded	6,730	1.1
Conestoga silt loam, 6 to 12 percent slopes, severely eroded	1,021	.2
Conestoga silt loam, 12 to 18 percent slopes, moderately eroded	346	.1
Conestoga silt loam, 12 to 18 percent slopes, severely eroded	186	(1)
Conestoga silt loam, 18 to 25 percent slopes, moderately eroded	176	(1)
Congaree silt loam, 0 to 3 percent slopes	266	(1)
Croton loam, 0 to 3 percent slopes	1,979	.3
Croton loam, 3 to 8 percent slopes, moderately eroded	1,245	.2
Croton loam, 8 to 15 percent slopes, moderately eroded	57	(1)
Croton silt loam, 0 to 3 percent slopes	687	.1
Croton silt loam, 3 to 6 percent slopes	313	.1
Croton silt loam, 3 to 6 percent slopes, moderately eroded	869	.1
Croton silt loam, 6 to 12 percent slopes, moderately eroded	169	(1)
Duffield gravelly silt loam, 0 to 3 percent slopes	336	.1
Duffield gravelly silt loam, 0 to 3 percent slopes, moderately eroded	915	.2
Duffield gravelly silt loam, 3 to 6 percent slopes	19	(1)
Duffield gravelly silt loam, 3 to 6 percent slopes, moderately eroded	3,526	.6
Duffield gravelly silt loam, 6 to 12 percent slopes, moderately eroded	1,441	0.2
Duffield gravelly silt loam, 6 to 12 percent slopes, severely eroded	23	(1)
Duffield gravelly silt loam, 12 to 18 percent slopes, moderately eroded	104	(1)
Duffield silt loam, 0 to 3 percent slopes	11,755	2.0
Duffield silt loam, 0 to 3 percent slopes, moderately eroded	38,413	6.4
Duffield silt loam, 3 to 6 percent slopes	959	.2
Duffield silt loam, 3 to 6 percent slopes, moderately eroded	68,728	11.5
Duffield silt loam, 3 to 6 percent slopes, severely eroded	245	(1)
Duffield silt loam, 6 to 12 percent slopes	94	(1)
Duffield silt loam, 6 to 12 percent slopes, moderately eroded	6,342	1.0
Duffield silt loam, 6 to 12 percent slopes, severely eroded	6,558	1.1
Duffield silt loam, 12 to 18 percent slopes	185	(1)
Duffield silt loam, 12 to 18 percent slopes, moderately eroded	586	.1
Duffield silt loam, 12 to 18 percent slopes, severely eroded	698	.1
Duffield silt loam, 18 to 30 percent slopes	503	.1
Edgemont channery loam, 0 to 3 percent slopes	495	.1
Edgemont channery loam, 3 to 8 percent slopes	535	.1
Edgemont channery loam, 3 to 8 percent slopes, moderately eroded	2,682	.4
Edgemont channery loam, 3 to 8 percent slopes, severely eroded	49	(1)
Edgemont channery loam, 8 to 15 percent slopes	410	.1
Edgemont channery loam, 8 to 15 percent slopes, moderately eroded	2,959	.5
Edgemont channery loam, 8 to 15 percent slopes, severely eroded	461	.1
Edgemont channery loam, 15 to 25 percent slopes	329	.1
Edgemont channery loam, 15 to 25 percent slopes, moderately eroded	500	.1
Edgemont channery loam, 15 to 25 percent slopes, severely eroded	420	.1
Edgemont channery loam, 25 to 35 percent slopes	36	(1)
Edgemont channery loam, 25 to 35 percent slopes, moderately eroded	242	(1)
Edgemont channery loam, 25 to 35 percent slopes, severely eroded	46	(1)
Edgemont channery silt loam, 0 to 3 percent slopes	72	(1)
Edgemont channery silt loam, 3 to 8 percent slopes	53	(1)
Edgemont channery silt loam, 3 to 8 percent slopes, moderately eroded	962	.2
Edgemont channery silt loam, 3 to 8 percent slopes, severely eroded	16	(1)
Edgemont channery silt loam, 8 to 15 percent slopes	87	(1)
Edgemont channery silt loam, 8 to 15 percent slopes, moderately eroded	736	.1
Edgemont channery silt loam, 8 to 15 percent slopes, severely eroded	147	(1)
Edgemont channery silt loam, 15 to 25 percent slopes	52	(1)
Edgemont channery silt loam, 15 to 25 percent slopes, moderately eroded	184	(1)
Edgemont channery silt loam, 15 to 25 percent slopes, severely eroded	30	(1)
Edgemont loam, 0 to 3 percent slopes	421	.1
Edgemont loam, 3 to 8 percent slopes	93	(1)
Edgemont loam, 3 to 8 percent slopes, moderately eroded	1,186	.2
Edgemont loam, 8 to 15 percent slopes	171	(1)

TABLE 3.—*Approximate acreage and proportionate extent of the soils mapped in Lancaster County, Pa.*—Cont.

Soil	Area	Extent
	Acres	*Percent*
Edgemont loam, 8 to 15 percent slopes, moderately eroded	475	0.1
Edgemont loam, 8 to 15 percent slopes, severely eroded	75	(1)
Edgemont loam, 15 to 25 percent slopes, moderately eroded	151	(1)
Edgemont loam, 15 to 25 percent slopes, severely eroded	49	(1)
Edgemont silt loam, moderately well drained variant, 0 to 3 percent slopes	78	(1)
Edgemont very stony loam, 0 to 8 percent slopes	2,751	.5
Edgemont very stony loam, 8 to 15 percent slopes	3,649	.6
Edgemont very stony loam, 15 to 25 percent slopes	2,366	.4
Edgemont very stony loam, 25 to 40 percent slopes	1,188	.2
Elioak silt loam, 0 to 3 percent slopes	72	(1)
Elioak silt loam, 3 to 6 percent slopes	130	(1)
Elioak silt loam, 3 to 6 percent slopes, moderately eroded	1,384	.2
Elioak silt loam, 6 to 12 percent slopes	90	(1)
Elioak silt loam, 6 to 12 percent slopes, moderately eroded	814	.1
Elioak silt loam, 6 to 12 percent slopes, severely eroded	134	(1)
Elioak silt loam, 12 to 18 percent slopes, moderately eroded	97	(1)
Elioak silt loam, 12 to 18 percent slopes, severely eroded	144	(1)
Elk gravelly silt loam, 0 to 3 percent slopes	445	.1
Elk gravelly silt loam, 3 to 6 percent slopes, moderately eroded	547	.1
Elk gravelly silt loam, 6 to 12 percent slopes, moderately eroded	112	(1)
Glenelg channery sandy loam, 6 to 12 percent slopes, severely eroded	380	.1
Glenelg channery sandy loam, 12 to 18 percent slopes, severely eroded	368	.1
Glenelg channery sandy loam, 18 to 25 percent slopes, severely eroded	169	(1)
Glenelg silt loam, 3 to 6 percent slopes, moderately eroded	123	(1)
Glenelg silt loam, 6 to 12 percent slopes, moderately eroded	589	.1
Glenelg silt loam, 6 to 12 percent slopes, severely eroded	928	.2
Glenelg silt loam, 12 to 18 percent slopes, moderately eroded	601	.1
Glenelg silt loam, 12 to 18 percent slopes, severely eroded	2,484	.4
Glenelg silt loam, 18 to 25 percent slopes	232	(1)
Glenelg silt loam, 18 to 25 percent slopes, moderately eroded	634	.1
Glenelg silt loam, 18 to 25 percent slopes, severely eroded	480	.1
Glenville silt loam, 0 to 3 percent slopes	4,013	.7
Glenville silt loam, 3 to 6 percent slopes	4,041	.7
Glenville silt loam, 3 to 6 percent slopes, moderately eroded	698	.1
Glenville silt loam, 6 to 12 percent slopes, moderately eroded	164	(1)
Hagerstown silt loam, 0 to 3 percent slopes	877	.1
Hagerstown silt loam, 0 to 3 percent slopes, moderately eroded	2,482	.4
Hagerstown silt loam, 3 to 6 percent slopes	124	(1)
Hagerstown silt loam, 3 to 6 percent slopes, moderately eroded	10,721	2.0
Hagerstown silt loam, 6 to 12 percent slopes, moderately eroded	2,726	.5
Hagerstown silt loam, 12 to 18 percent slopes, moderately eroded	403	.1
Hagerstown silt loam, 18 to 25 percent slopes, moderately eroded	238	(1)
Hollinger silt loam, 3 to 8 percent slopes, moderately eroded	51	(1)
Hollinger silt loam, 8 to 15 percent slopes, moderately eroded	381	.1
Hollinger silt loam, 15 to 25 percent slopes, moderately eroded	954	.2
Hollinger silt loam, 25 to 35 percent slopes	215	(1)
Huntington fine sandy loam, 0 to 3 percent slopes	80	(1)
Huntington silt loam, 0 to 3 percent slopes	4,283	.7
Huntington silt loam, local alluvium, 0 to 3 percent slopes	666	.1
Lansdale gravelly loam, 0 to 3 percent slopes	281	(1)
Lansdale gravelly loam, 3 to 8 percent slopes, moderately eroded	886	.1
Lansdale gravelly loam, 8 to 15 percent slopes, moderately eroded	541	.1
Lansdale gravelly loam, 8 to 15 percent slopes, severely eroded	141	(1)
Lansdale gravelly loam, 15 to 25 percent slopes, moderately eroded	463	.1
Lansdale gravelly loam, 15 to 25 percent slopes, severely eroded	789	.1
Lansdale gravelly loam, 25 to 40 percent slopes	211	(1)
Lansdale loam, 0 to 3 percent slopes	1,282	.2
Lansdale loam, 3 to 8 percent slopes	5,068	1.0
Lansdale loam, 3 to 8 percent slopes, moderately eroded	474	.1
Lansdale loam, 8 to 15 percent slopes, moderately eroded	2,098	.3
Lansdale loam, 15 to 25 percent slopes	270	(1)
Lansdale sandy loam, 0 to 3 percent slopes	60	(1)
Lansdale sandy loam, 3 to 8 percent slopes	21	(1)
Lansdale sandy loam, 3 to 8 percent slopes, moderately eroded	1,550	.3
Lansdale sandy loam, 8 to 15 percent slopes	1,818	.3
Lansdale stony sandy loam, 0 to 8 percent slopes	316	.1
Lansdale stony sandy loam, 8 to 15 percent slopes	80	(1)
Lansdale stony sandy loam, 15 to 25 percent slopes	105	(1)
Lansdale stony sandy loam, 25 to 35 percent slopes	50	(1)
Lawrence silt loam, 0 to 3 percent slopes	1,072	.2
Lawrence silt loam, 3 to 6 percent slopes, moderately eroded	60	(1)
Lehigh silt loam, 0 to 3 percent slopes	62	(1)
Lehigh silt loam, 3 to 8 percent slopes, moderately eroded	325	.1
Lehigh slaty silt loam, 3 to 8 percent slopes, moderately eroded	211	(1)
Lehigh slaty silt loam, 8 to 15 percent slopes, moderately eroded	499	.1
Lehigh slaty silt loam, 15 to 25 percent slopes, moderately eroded	18	(1)
Letort silt loam, 0 to 3 percent slopes	380	.1
Letort silt loam, 3 to 6 percent slopes, moderately eroded	7,157	1.2
Letort silt loam, 6 to 12 percent slopes, moderately eroded	5,644	1.0
Letort silt loam, 6 to 12 percent slopes, severely eroded	716	.1
Letort silt loam, 12 to 18 percent slopes, moderately eroded	316	.1
Letort silt loam, 18 to 25 percent slopes, moderately eroded	69	(1)
Lewisberry gravelly sandy loam, 0 to 3 percent slopes	148	(1)
Lewisberry gravelly sandy loam, 3 to 8 percent slopes, moderately eroded	1,606	.3
Lewisberry gravelly sandy loam, 8 to 15 percent slopes, moderately eroded	784	.1

TABLE 3.—*Approximate acreage and proportionate extent of the soils mapped in Lancaster County, Pa.*—Cont.

Soil	Area	Extent
	Acres	*Percent*
Lewisberry gravelly sandy loam, 15 to 25 percent slopes, moderately eroded	309	0.1
Lewisberry stony sandy loam, 0 to 8 percent slopes	1,762	.3
Lewisberry stony sandy loam, 8 to 15 percent slopes	4,090	.7
Lewisberry stony sandy loam, 15 to 25 percent slopes	4,188	.7
Lewisberry stony sandy loam, 25 to 40 percent slopes	5,533	1.0
Lindside silt loam, 0 to 3 percent slopes	8,398	1.4
Lindside silt loam, local alluvium, 0 to 3 percent slopes	10,135	1.7
Lindside silt loam, local alluvium, 3 to 6 percent slopes	1,078	.2
Manor channery loam, 3 to 8 percent slopes, moderately eroded	174	(1)
Manor channery loam, 8 to 15 percent slopes	238	(1)
Manor channery loam, 8 to 15 percent slopes, moderately eroded	1,095	.2
Manor channery loam, 15 to 25 percent slopes	186	(1)
Manor channery loam, 15 to 25 percent slopes, moderately eroded	1,642	.3
Manor channery silt loam, 3 to 8 percent slopes	226	(1)
Manor channery silt loam, 3 to 8 percent slopes, moderately eroded	1,301	.2
Manor channery silt loam, 3 to 8 percent slopes, severely eroded	107	(1)
Manor channery silt loam, 8 to 15 percent slopes	1,041	.2
Manor channery silt loam, 8 to 15 percent slopes, moderately eroded	3,984	.7
Manor channery silt loam, 8 to 15 percent slopes, severely eroded	1,490	.2
Manor channery silt loam, 15 to 25 percent slopes	2,107	.3
Manor channery silt loam, 15 to 25 percent slopes, moderately eroded	2,324	.4
Manor silt loam, 3 to 8 percent slopes, moderately eroded	380	.1
Manor silt loam, 8 to 15 percent slopes	126	(1)
Manor silt loam, 8 to 15 percent slopes, moderately eroded	1,445	.2
Manor silt loam, 8 to 15 percent slopes, severely eroded	218	(1)
Manor silt loam, 15 to 25 percent slopes	409	.1
Manor silt loam, 15 to 25 percent slopes, moderately eroded	1,523	.3
Manor soils, 15 to 25 percent slopes, severely eroded	5,539	1.0
Manor soils, 25 to 40 percent slopes	5,156	1.0
Manor soils, 25 to 40 percent slopes, moderately eroded	2,483	.4
Manor soils, 25 to 40 percent slopes, severely eroded	2,390	.4
Manor stony loam, 0 to 8 percent slopes	31	(1)
Manor stony loam, 8 to 15 percent slopes	149	(1)
Manor stony loam, 8 to 15 percent slopes, moderately eroded	70	(1)
Manor stony loam, 15 to 25 percent slopes	589	.1
Manor stony loam, 15 to 25 percent slopes, moderately eroded	428	.1
Manor stony loam, 25 to 40 percent slopes	7,890	1.3
Melvin silt loam, 0 to 3 percent slopes	1,741	.3
Montalto channery silt loam, 0 to 3 percent slopes	404	.1
Montalto channery silt loam, 3 to 8 percent slopes	66	(1)
Montalto channery silt loam, 3 to 8 percent slopes, moderately eroded	2,278	.4
Montalto channery silt loam, 8 to 15 percent slopes	32	(1)
Montalto channery silt loam, 8 to 15 percent slopes, moderately eroded	861	.1
Montalto channery silt loam, 15 to 25 percent slopes	11	(1)
Montalto channery silt loam, 15 to 25 percent slopes, moderately eroded	191	(1)
Montalto channery silt loam, 25 to 35 percent slopes	66	(1)
Montalto extremely stony silt loam, 0 to 8 percent slopes	638	.1
Montalto extremely stony silt loam, 8 to 15 percent slopes	1,270	.2
Montalto extremely stony silt loam, 15 to 25 percent slopes	823	.1
Montalto extremely stony silt loam, 25 to 35 percent slopes	70	(1)
Montalto very stony silt loam, 0 to 8 percent slopes	1,071	.2
Montalto very stony silt loam, 8 to 15 percent slopes	956	.2
Montalto very stony silt loam, 15 to 25 percent slopes	338	.1
Montalto very stony silt loam, 25 to 35 percent slopes	183	(1)
Murrill gravelly loam, 0 to 3 percent slopes	273	(1)
Murrill gravelly loam, 3 to 8 percent slopes	93	(1)
Murrill gravelly loam, 3 to 8 percent slopes, moderately eroded	2,012	.3
Murrill gravelly loam, 3 to 8 percent slopes, severely eroded	40	(1)
Murrill gravelly loam, 8 to 15 percent slopes	86	(1)
Murrill gravelly loam, 8 to 15 percent slopes, moderately eroded	835	.1
Murrill gravelly loam, 15 to 25 percent slopes, moderately eroded	24	(1)
Murrill loam, 0 to 3 percent slopes	82	(1)
Murrill loam, 3 to 8 percent slopes	36	(1)
Murrill loam, 3 to 8 percent slopes, moderately eroded	216	(1)
Murrill loam, 8 to 15 percent slopes, moderately eroded	17	(1)
Neshaminy silt loam, 0 to 3 percent slopes	218	(1)
Neshaminy silt loam, 3 to 6 percent slopes	44	(1)
Neshaminy silt loam, 3 to 6 percent slopes, moderately eroded	685	.1
Neshaminy silt loam, 6 to 12 percent slopes	17	(1)
Neshaminy silt loam, 6 to 12 percent slopes, moderately eroded	509	.1
Neshaminy silt loam, 6 to 12 percent slopes, severely eroded	20	(1)
Penn gravelly loam, 0 to 3 percent slopes	90	(1)
Penn gravelly loam, 3 to 8 percent slopes	32	(1)
Penn gravelly loam, 3 to 8 percent slopes, moderately eroded	3,274	.5
Penn gravelly loam, 3 to 8 percent slopes, severely eroded	37	(1)
Penn gravelly loam, 8 to 15 percent slopes	234	(1)
Penn gravelly loam, 8 to 15 percent slopes, moderately eroded	2,846	.5
Penn gravelly loam, 8 to 15 percent slopes, severely eroded	236	(1)
Penn gravelly loam, 15 to 25 percent slopes, moderately eroded	786	.1
Penn gravelly loam, 15 to 25 percent slopes, severely eroded	277	(1)
Penn gravelly silt loam, 0 to 3 percent slopes	454	.1
Penn gravelly silt loam, 3 to 8 percent slopes	67	(1)
Penn gravelly silt loam, 3 to 8 percent slopes, moderately eroded	3,696	.6
Penn gravelly silt loam, 3 to 8 percent slopes, severely eroded	202	(1)
Penn gravelly silt loam, 8 to 15 percent slopes	92	(1)
Penn gravelly silt loam, 8 to 15 percent slopes, moderately eroded	1,872	.3
Penn gravelly silt loam, 8 to 15 percent slopes, severely eroded	406	.1

TABLE 3.—*Approximate acreage and proportionate extent of the soils mapped in Lancaster County, Pa.*—Cont.

Soil	Area	Extent
	Acres	*Percent*
Penn gravelly silt loam, 15 to 25 percent slopes	11	(1)
Penn gravelly silt loam, 15 to 25 percent slopes, moderately eroded	459	.1
Penn gravelly silt loam, 15 to 25 percent slopes, severely eroded	77	(1)
Penn loam, 0 to 3 percent slopes	967	.2
Penn loam, 3 to 8 percent slopes, moderately eroded	3,616	.6
Penn loam, 3 to 8 percent slopes, severely eroded	22	(1)
Penn loam, 8 to 15 percent slopes, moderately eroded	718	.1
Penn loam, 8 to 15 percent slopes, severely eroded	38	(1)
Penn silt loam, 0 to 3 percent slopes	327	.1
Penn silt loam, 0 to 3 percent slopes, moderately eroded	652	.1
Penn silt loam, 3 to 8 percent slopes	82	(1)
Penn silt loam, 3 to 8 percent slopes, moderately eroded	4,423	.7
Penn silt loam, 8 to 15 percent slopes	17	(1)
Penn silt loam, 8 to 15 percent slopes, moderately eroded	882	.1
Penn silt loam, 8 to 15 percent slopes, severely eroded	186	(1)
Penn soils, 25 to 35 percent slopes, moderately eroded	97	(1)
Penn soils, 25 to 35 percent slopes, severely eroded	91	(1)
Penn stony silt loam, 0 to 8 percent slopes	1,036	.2
Penn stony silt loam, 8 to 15 percent slopes	1,326	.2
Penn stony silt loam, 8 to 15 percent slopes, moderately eroded	692	.1
Penn stony silt loam, 15 to 25 percent slopes	818	.1
Penn stony silt loam, 15 to 25 percent slopes, moderately eroded	223	(1)
Penn stony silt loam, 25 to 35 percent slopes	144	(1)
Penn-Lansdale gravelly loams, 0 to 3 percent slopes	73	(1)
Penn-Lansdale gravelly loams, 3 to 8 percent slopes, moderately eroded	1,188	.2
Penn-Lansdale gravelly loams, 8 to 15 percent slopes, moderately eroded	704	.1
Penn-Lansdale gravelly loams, 15 to 25 percent slopes, moderately eroded	256	(1)
Penn-Lansdale loams, 0 to 3 percent slopes	322	.1
Penn-Lansdale loams, 3 to 8 percent slopes, moderately eroded	1,911	.3
Penn-Lansdale loams, 8 to 15 percent slopes	310	.1
Penn-Lansdale loams, 8 to 15 percent slopes, moderately eroded	548	.1
Pequea silt loam, 3 to 8 percent slopes, moderately eroded	224	(1)
Pequea silt loam, 8 to 15 percent slopes, moderately eroded	1,373	0.2
Pequea silt loam, 15 to 25 percent slopes, moderately eroded	2,130	.4
Pequea silt loam, 15 to 25 percent slopes, severely eroded	699	.1
Pequea silt loam, 25 to 35 percent slopes, moderately eroded	3,249	.5
Pequea silt loam, 25 to 35 percent slopes, severely eroded	106	(1)
Readington loam, 0 to 3 percent slopes	1,892	.3
Readington loam, 3 to 8 percent slopes	799	.1
Readington loam, 3 to 8 percent slopes, moderately eroded	1,119	.2
Readington loam, 8 to 15 percent slopes, moderately eroded	184	(1)
Riverwash	86	(1)
Rowland and Bermudian silt loams, 0 to 3 percent slopes	2,277	.4
Sciotoville silt loam, 0 to 3 percent slopes	414	.1
Sciotoville silt loam, 3 to 6 percent slopes	85	(1)
Steinsburg gravelly loam, 8 to 15 percent slopes, severely eroded	64	(1)
Steinsburg gravelly loam, 15 to 25 percent slopes, severely eroded	56	(1)
Steinsburg gravelly loam, 25 to 35 percent slopes	120	(1)
Watchung silt loam, 0 to 3 percent slopes	576	.1
Watchung silt loam, 3 to 8 percent slopes	676	.1
Watchung silt loam, 3 to 8 percent slopes, moderately eroded	459	.1
Watchung very stony silt loam, 0 to 8 percent slopes	1,170	.2
Wehadkee silt loam, 0 to 3 percent slopes	3,469	.6
Wheeling silt loam, 0 to 3 percent slopes	1,168	.2
Wheeling silt loam, 3 to 6 percent slopes, moderately eroded	1,236	.2
Wheeling silt loam, 6 to 12 percent slopes, moderately eroded	914	.2
Wheeling silt loam, 12 to 18 percent slopes	14	(1)
Wheeling silt loam, 12 to 18 percent slopes, moderately eroded	145	(1)
Whiteford slaty silt loam, 3 to 8 percent slopes, moderately eroded	139	(1)
Whiteford slaty silt loam, 8 to 15 percent slopes, moderately eroded	219	(1)
Whiteford slaty silt loam, 15 to 25 percent slopes, moderately eroded	164	(1)
Made land, Mine, and Pits	689	.1
Total land area	604,800	100.0
Water	18,560	
Total area of county	623,360	

[1] Less than 0.1 percent.

Aldino Series

The Aldino soils are moderately well drained to poorly drained shallow soils that developed from serpentine. They are low in natural fertility and low in moisture-holding capacity. The native vegetation was probably a mixed forest of Virginia pine, pitch pine, redcedar, white oak, blackjack oak, and other trees. Idle fields now have open stands of broomsedge, povertygrass, and lichens and overstories of redcedar, blackjack oak, and a little aspen.

These soils are located in the extreme southern part of the county, in an area locally known as "the barrens." They are associated with the deep, well-drained Neshaminy soils. Chester and Manor soils occur nearby.

Included with the Aldino gravelly silt loams are small areas of silt loam. The Aldino stony silt loams are very shallow and stony and have many exposures of bedrock.

Aldino gravelly silt loam, 3 to 8 percent slopes, moderately eroded (AaB2).—The following profile was observed in an idle area that is less eroded than other areas of this soil.

0 to 5 inches, gray-brown to dark-brown friable silt loam; a few faint, fine mottles of slightly lighter and darker shades; weak medium blocky structure.
5 to 9 inches, yellowish-brown to light yellowish-brown friable silt loam; faintly mottled with lighter and darker shades of brown; moderate thin platy structure.
9 to 11 inches, yellowish-brown to dark yellowish-brown friable heavy silt loam; common, faint, fine mottles of brown; moderate medium blocky structure.
11 to 24 inches, strong-brown firm heavy silt loam; a few distinct, medium mottles of black and pale brown; moderate thick platy structure.
24 inches +, pale-yellow weathered serpentine bedrock; fairly solid.

Runoff is slow to medium, and the erosion hazard is slight. A few acres of moderately eroded Aldino soils on slopes of less than 3 percent are included in this unit.

Use and management (Capability unit IIIe–7).—Only 33 percent of this soil is in crops. About 15 percent is in pasture, 27 percent is in woods and 25 percent is idle. This soil is best suited to pasture, but it can be used for rotation crops. The principal management problems result from low natural fertility, poor drainage, and lack of organic matter.

Aldino gravelly silt loam, 8 to 15 percent slopes, moderately eroded (AaC2).—This soil is shallower than Aldino gravelly silt loam, 3 to 8 percent slopes, moderately eroded. Up to three-fourths of the original surface soil has been removed by erosion. Some fields have a few shallow gullies. Subsoil has been mixed with the remnants of the surface soil, and the resulting plow layer is harder to work than the original plow layer. Some very small areas have lost all of their original surface soil. Runoff is medium to rapid. There is a moderate hazard of further erosion.

Use and management (Capability unit IIIe–7).—About 39 percent of this soil is in crops, 40 percent is in pasture, and 12 percent is in woods; 8 percent is idle. This soil is best used for hay or pasture. It can be cultivated if intensive conservation practices are applied. The principal management problems result from poor drainage, shallowness, erodibility, and low fertility.

Aldino gravelly silt loam, 15 to 25 percent slopes, severely eroded (AaD3).—This soil is shallower than Aldino gravelly silt loam, 3 to 8 percent slopes, moderately eroded. Sheet erosion and gully erosion have removed more than three-fourths of the original surface layer. The loss of the surface soil has seriously reduced productivity. The subsoil is at the surface or is mixed with the remaining surface soil. Runoff is rapid to very rapid, and the hazard of further erosion is high to very high.

Use and management (Capability unit VIIe–2).—Only 7 percent of this soil is in crops; 51 percent is in pasture, 28 percent is in woods, and 13 percent is idle. This soil has been so severely eroded that it is no longer suitable for even occasional cultivation. It is best suited to forest, but trees grow slowly. It could provide shelter for wildlife. The chief management problems result from past erosion, low natural fertility, and the danger of continued erosion.

Aldino stony silt loam, 3 to 8 percent slopes (AbB).—This soil is like Aldino gravelly silt loam, 3 to 8 percent slopes, moderately eroded, except that the stones and the rock outcrops are larger and more numerous and the soil is less eroded. Shallow gullies are fairly common. There is a slight hazard of further erosion. Drainage is moderately good to poor. Runoff is slow to medium.

Use and management (Capability unit VIIw–1).—About 49 percent of this soil is in woods, 37 percent is in pasture, and 8 percent is idle. Only 6 percent is used for crops. The best way to use this soil is to grow trees. The problems of management result from wetness, stoniness, and the hazard of erosion.

Aldino stony silt loam, 8 to 15 percent slopes (AbC).—Many areas of this soil have a few shallow gullies. Some very small areas are severely or very severely eroded. Runoff is medium to rapid.

Use and management (Capability unit VIIw–1).—Only 8 percent of this soil is in crops, 24 percent is in pasture, and 35 percent is in woods; 33 percent is idle. This soil is unsuitable for agriculture because it is wet and stony and because there is a moderate hazard of further erosion. It is only fairly well suited to trees.

Aldino stony silt loam, 15 to 25 percent slopes (AbD).—Some small areas of this soil are moderately eroded, and some are very severely eroded. Most fields have a few shallow gullies, and some have many. Runoff is rapid to very rapid.

Use and management (Capability unit VIIw–1).—About 48 percent of this soil is in pasture, 32 percent is in woods, and 12 percent is in crops; 7 percent is idle. This soil is unsuitable for farming because it is stony and wet and because the erosion hazard is high to very high. It is suitable only for trees or for wildlife.

Alluvial Land

Alluvial land (Ac).—These somewhat poorly drained to very poorly drained alluvial soils are located on level or nearly level areas along streams. They range from homogeneous dark-colored silt loam to stratified sands, silts and clays. Many areas are changed so often by floods that the soils have not developed distinct profile characteristics. The parent material is of mixed origin.

These soils are flooded very frequently. Some stream gouging occurs, and bank erosion is common. The rooting depth is generally limited by the high water table.

The native plants vary from grasses, sedges, and rushes to open stands of willow, ash, birch, and cherry trees.

Use and management (Capability unit VIw–1).—Some areas of these soils are cultivated, but most areas are best suited to pasture or to wildlife. Poor drainage and frequent floods make these soils unsuitable for cultivation.

Bedington Series

These are deep, well-drained, acid soils that are underlain by shale. The natural fertility is moderate. The moisture-holding capacity is moderate to high. The forest under which these soils developed consisted of oaks and hickories. The parent material was Cocalico shale, which weathers rather rapidly and forms a deep soil on flat areas where erosion is not active.

These soils occur primarily on level to gently sloping ridgetops and benches in the northern part of the county. They are associated with the well-drained, moderately deep to shallow Berks soils and the moderately well drained to somewhat poorly drained Blairton soils.

Bedington silt loam, 0 to 3 percent slopes (BaA).—A profile in a cultivated area follows.

0 to 10 inches, dark yellowish-brown friable silt loam; moderate fine granular structure.
10 to 12 inches, strong-brown friable silt loam; moderate thin to medium platy structure.
12 to 36 inches, strong-brown friable heavy silt loam; moderate medium blocky structure; 10 percent shale fragments.
36 to 38 inches, red heavy silt loam; moderate fine angular blocky structure; about 50 percent shale fragments.
38 inches +, olive-colored weathered shale coated with soil material.

This soil is on ridgetops and benches that are only slightly eroded. It is deeper than the Berks soils and more yellowish brown in the subsoil. It holds moisture better than the Berks soils. Runoff is slow or very slow.

Use and management (Capability unit I–2).—Very little of this soil is idle or in woods. About 69 percent is used for cultivated crops, and 30 percent for pasture. This soil is well suited to rotation crops if the fertility and the supply of organic matter are maintained. It has few management problems, but it is not important agriculturally because the areas are so small.

Bedington silt loam, 3 to 8 percent slopes, moderately eroded (BaB2).—This soil is similar to, but somewhat shallower than, Bedington silt loam, 0 to 3 percent slopes. It has lost up to three-fourths of the original surface soil through erosion. Some areas have a few shallow gullies. The present plow layer is slightly harder to manage and absorbs less water than the original plow layer because subsoil has been mixed with the remnants of the surface soil.

Most of this soil is located on upper slopes or benches. Runoff is slow to medium. Erosion has resulted from the concentration of surface water from higher areas.

Use and management (Capability unit IIe–4).—About 89 percent of this soil is used for crops, and 11 percent for pasture. This soil is suitable for rotation crops if simple conservation practices are applied. The management needs are to prevent or control erosion, to maintain the organic-matter content, and to improve fertility.

Berks Series

These are moderately deep to shallow, well-drained, acid soils that overlie dark-gray shale. Their natural fertility is low. The moisture-holding capacity is low, and crops on these soils are first to show the effect of drought. The native forest was composed of oaks and hickories.

The Berks soils are underlain by Cocalico shale or Martinsburg shale, which are acid and low in plant nutrients. The bedrock shows signs of weathering to considerable depths. Soil has penetrated deeply into the weathered parent material. Clay coatings occur on the underlying shale to depths of 5 or more feet.

Flat fragments of shale have formed an erosion pavement on the surface of most of these soils. As moving water carries away the fine particles, the shale fragments are left behind. The shingled effect of this concentration of shale tends to protect the underlying soil from splash erosion and to reduce further soil losses.

The brown-subsoil phases are deeper and have a thicker subsoil than other soils in this series. The shaly silt loams occur on the steeper slopes and over harder shales.

Berks soils occur in the northern part of Lancaster County. They are associated with the deep, well drained Bedington soils and the moderately well drained Blairton soils. They are near soils that developed from Triassic materials and limestone.

Berks shaly silt loam, 0 to 3 percent slopes (BbA).—Runoff from this soil is slow to very slow. A typical profile in a cultivated field follows.

0 to 8 inches, dark-brown friable shaly silt loam; weak fine granular structure; 10 to 30 percent shale fragments.
8 to 18 inches, yellowish-brown to strong-brown friable heavy silt loam; weak fine to medium subangular blocky structure; 35 to 50 percent shale fragments.
18 to 24 inches, strong-brown friable heavy silt loam; weak medium subangular blocky structure; 60 to 80 percent shale fragments.
24 inches +, very dark grayish-brown shale fragments, grading rapidly into fairly solid shale that is somewhat weathered and broken by frost action.

Use and management (Capability unit IIe–5).—Nearly all of this soil is used for crops. It is fairly well suited to rotation crops if simple conservation practices are used. The problems of management are to maintain the supply of organic matter, and to conserve moisture.

Berks shaly silt loam, 3 to 8 percent slopes (BbB).—Some areas of this soil have lost as much as one-fourth of their original surface soil by sheet erosion, but generally erosion has not been serious. Runoff is slow to medium, and the erosion hazard is slight. Many of the areas are on ridgetops or upper slopes, where surface water does not concentrate enough to cause serious erosion.

Use and management (Capability unit IIe–5).—Almost all of this soil is used for crops. It is suitable for rotation crops, but simple conservation measures should be practiced. The chief hazards are loss of moisture through runoff and loss of organic matter through cultivation. Lime and fertilizer are needed.

Berks shaly silt loam, 3 to 8 percent slopes, moderately eroded (BbB2).—This soil is like Berks shaly silt loam, 0 to 3 percent slopes, except that it has lost from one-fourth to three-fourths of its surface soil through erosion. A few shallow gullies have formed in some places. Several very small areas are severely eroded. Runoff is medium to slow.

Use and management (Capability unit IIe–5).—About 88 percent of this soil is in crops, 3 percent is in pasture, and 4 percent is in woods; 5 percent is idle. This soil is suitable for rotation crops if intensive conservation measures are applied. Further erosion would seriously affect its productivity. Other management problems are the maintenance of the organic-matter content and the control and conservation of surface water. In some areas a long rotation is needed.

Berks shaly silt loam, 8 to 15 percent slopes, moderately eroded (BbC2).—The profile of this soil is similar to that of Berks shaly silt loam, 0 to 3 percent slopes, except that erosion has removed one-fourth to three-fourths of the surface soil. Some areas have a few shallow gullies. Runoff is medium to rapid.

Use and management (Capability unit IIIe–6).—About 82 percent of this soil is in crops, 12 percent is in pasture, and 4 percent is in woods; 2 percent is idle. This soil is fairly well suited to crops in long rotations if intensive conservation measures are applied. The chief management problems are to prevent or control erosion, conserve moisture, and increase the organic-matter content. Further erosion would seriously reduce the productivity.

Berks shaly silt loam, 8 to 15 percent slopes, severely eroded (BbC3).—This soil is similar to Berks shaly silt loam, 0 to 3 percent slopes, except that three-fourths or more of its surface soil has been lost through erosion. In some places the soil is now so shallow that it holds hardly any moisture. Most areas have many shallow gullies. Runoff is medium to rapid. Runoff water from nearby slopes tends to converge on these areas. A few small areas of the brown-subsoil phases of Berks silt loam are included in this unit.

Use and management (Capability unit IVe–4).—About 65 percent of this soil is used for crops, and 34 percent for pasture. This soil is best suited to permanent hay. It can be cultivated occasionally in a very long rotation if intensively managed to prevent erosion and maintain the supply of organic matter. Lack of moisture limits its use.

Berks shaly silt loam, 15 to 25 percent slopes (BbD).—This soil is like Berks shaly silt loam, 0 to 3 percent slopes, but it is shallower and contains more shale fragments. Runoff is rapid to very rapid. Some of the surface soil has been lost, but most areas are not seriously eroded. The soil occurs on ridgetops or on short slopes where runoff has not accumulated enough to cause serious erosion.

Use and management (Capability unit IVe–4).—Most of this soil is in woods. The protective cover of trees has prevented serious erosion. If cleared, this soil would be best suited to permanent hay or pasture. It could be cultivated occasionally if the rotations were very long and if intensive conservation measures were applied. If cultivated it would be likely to erode and to lose moisture and organic matter. Tractors could not be used safely in some areas.

Berks shaly silt loam, 15 to 25 percent slopes, moderately eroded (BbD2).—This soil is like Berks shaly silt loam, 0 to 3 percent slopes, except that erosion has removed the finer silt and clay materials and made the profile shallower and more shaly. One-fourth to three-fourths of the original surface soil has been lost. A few shallow gullies occur in some places. Runoff is rapid to very rapid.

Use and management (Capability unit IVe–4).—About 63 percent of this soil is in crops, 11 percent is in pasture, and 13 percent is in woods; 12 percent is idle. This soil is shallow and rather droughty. It is suited to hay or pasture, but the erosion hazard limits its use. It can be cultivated occasionally if intensive conservation practices are applied. The problems of managing this soil are to control erosion, conserve moisture, improve fertility, and increase the organic-matter content.

Berks shaly silt loam, 15 to 25 percent slopes, severely eroded (BbD3).—This soil is like Berks shaly silt loam, 0 to 3 percent slopes, except that three-fourths or more of the surface soil has been lost through erosion. The loss of the finer materials makes this soil more shaly and decreases its capacity to hold moisture. Sheet erosion has been severe, and many shallow gullies occur. The hazard of further erosion is high. Runoff is rapid to very rapid, and surface water from nearby uplands converges on these areas. Included in the mapping unit are some small areas of Berks silt loam, brown subsoil, which is similar to this soil and needs the same management.

Use and management (Capability unit VIIe–3).—Nearly all of this soil is used for crops, although it is so eroded that crop production is no longer economical. It is better suited to timber or to plants that provide food and cover for wildlife. Management is needed that will conserve moisture, fertility, and organic matter.

Berks shaly silt loam, 25 to 35 percent slopes (BbE).—This soil is like Berks shaly silt loam, 0 to 3 percent slopes, but it is not so deep and it contains more fragments of shale. It tends to be droughty. Slight erosion has removed one-fourth or less of the surface soil. Runoff is very rapid, but most of the soil has been protected by trees or grass. Erosion damage would have been more extensive under cultivation.

Most of this soil occurs near stream valleys where abrupt changes of slope are common. A few areas of the brown-subsoil phases of Berks silt loam have been included in the mapping unit.

Use and management (Capability unit VIe–3).—Nearly all of this soil is in woods. It is best suited to woods or to pasture. If kept under a permanent cover of trees or grass, it is not likely to erode seriously. If it is cultivated, there is a constant danger of erosion. The steep slopes make it difficult to operate farm equipment safely.

Berks shaly silt loam, 25 to 35 percent slopes, moderately eroded (BbE2).—This soil is like Berks shaly silt loam, 0 to 3 percent slopes, except that it is shallower and more shaly. It has lost from one-fourth to three-fourths of its surface soil, and a few shallow gullies have formed. Runoff is very rapid.

This soil occurs where streams have cut into the uplands and formed rather steep-sided narrow valleys. A few small areas of the brown-subsoil phases of Berks silt loam are included in this unit.

Use and management (Capability unit VIe–3).—About 27 percent of this soil is in crops, 39 percent is in woods, and 20 percent is in pasture; 14 percent is idle. This soil is best suited to woodland. It may be used for pasture if it is already cleared, but to clear any more of it would not be economical. It is not suitable for cultivation because of the difficulty of conserving moisture, the danger of further erosion, and the hazards of operating farm machinery on the steep slopes.

Berks shaly silt loam, 25 to 35 percent slopes, severely eroded (BbE3).—This soil is like Berks shaly silt loam, 0 to 3 percent slopes, except that it is shallower. It has lost at least three-fourths of its surface soil. Some areas have many shallow gullies, and several areas have deep gullies. Runoff is rapid to very rapid. Most of this soil is near stream valleys. Included are some small areas of the brown-subsoil phases of Berks silt loam; these areas are managed in the same way as the rest of the unit.

Use and management (Capability unit VIIe–3).—About 33 percent of this soil is in crops, 56 percent is in pasture, and 11 percent is idle. Erosion has so severely damaged this soil that it is no longer suitable for crops, hay, or pasture. It is not safe to operate farm machinery on these steep slopes, and further erosion is a serious hazard. The most intensive uses to which this soil is suited are woodland and shelter for wildlife.

Berks silt loam, brown subsoil, 0 to 3 percent slopes (BcA).—This soil is deeper than the Berks shaly silt loams. It has a well developed subsoil, which contains fewer fragments than that of the Berks shaly silt loams. To a depth of more than 5 feet, the yellowish-red to strong-brown color of the subsoil shows in clay coatings on the surface of the weathered shale fragments. A profile typical of a cultivated area of this soil on the level or nearly level ridgetops and benches follows.

0 to 10 inches, dark-brown friable silt loam; weak fine granular structure; about 20 percent shale fragments; a few white quartz fragments.
10 to 30 inches, yellowish-red friable silty clay; moderate medium blocky structure; 30 to 60 percent shale fragments.
30 inches +, olive-colored shale; partly weathered; fragments coated with yellowish-red clay and traces of silt to depth of 5 feet.

Runoff is slow to very slow, and there is little or no hazard of erosion. Less than one-fourth of the surface soil has been washed away.

Use and management (Capability unit IIe–5).—About 95 percent of this soil is in crops, 3 percent is in woods, and 1 percent is in pasture. This is a good soil for crops because it has no serious management problems. The fertility could be improved and the organic-matter content increased. Simple conservation practices are needed on slopes of more than 2 percent.

Berks silt loam, brown subsoil, 3 to 8 percent slopes (BcB).—This soil is like Berks silt loam, brown subsoil, 0 to 3 percent slopes. Runoff is slow to medium, and the erosion hazard is slight.

Use and management (Capability unit IIe–5).—About 75 percent of this soil is in crops, and 24 percent is in woods. Rotation crops can be grown if simple conservation measures are practiced. The management needs are to control erosion, improve fertility, maintain the organic-matter content, and conserve moisture.

Berks silt loam, brown subsoil, 3 to 8 percent slopes, moderately eroded (BcB2).—This soil is similar to Berks silt loam, brown subsoil, 0 to 3 percent slopes. Up to three-fourths of the surface soil has been lost through sheet erosion, and some fields have a few shallow gullies. Surface water concentrates on these slopes; consequently there is a moderate erosion hazard.

Use and management (Capability unit IIe–5).—About 94 percent of this soil is in crops, 4 percent is in pasture, and 1 percent is in woods. This soil is suitable for rotation crops if conservation practices are intensively applied. The chief hazards are erosion, loss of organic matter, and loss of moisture.

Berks silt loam, brown subsoil, 3 to 8 percent slopes, severely eroded (BcB3).—This soil is similar to, but slightly shallower than, Berks silt loam, brown subsoil, 0 to 3 percent slopes. At least three-fourths of the surface soil has been lost through sheet erosion. Some areas have many shallow gullies, but others have only a few. Surface water from nearby uplands concentrates on most of these areas; consequently there is a moderate hazard of further erosion. Runoff is slow to medium.

Use and management (Capability unit IVe–4).—Most of this soil is in crops. The best long-term use for this soil is permanent hay. It can be used for crops if rotations are long and if intensive conservation measures are practiced. The management problems result from damage from past erosion, the hazard of further erosion, loss of moisture through runoff, depletion of the organic-matter supply, and declining fertility.

Berks silt loam, brown subsoil, 8 to 15 percent slopes, moderately eroded (BcC2).—This soil is like Berks silt loam, brown subsoil, 0 to 3 percent slopes, except that up to three-fourths of the surface soil has been lost through erosion. The remaining surface soil has been mixed with subsoil. The resulting plow layer is finer in texture and absorbs less water than the original surface soil. Runoff is medium to rapid.

Some of this soil has been only slightly eroded; less than one-fourth of the surface soil has been lost. Small areas of Bedington soils are included in this unit. These included soils are small in area, and they need the same management as the rest of the unit.

Use and management (Capability unit IIIe–6).—Most of this soil is used for crops. Rotation crops can be grown if conservation practices are intensively applied. The use of these areas is limited by erosion, loss of moisture, loss of organic matter, and low natural fertility.

Berks silt loam, brown subsoil, 15 to 25 percent slopes, moderately eroded (BcD2).—This soil is like Berks silt loam, brown subsoil, 0 to 3 percent slopes, except that sheet and gully erosion have removed as much as three-fourths of the surface soil. Runoff is rapid to very rapid. Small areas of Bedington soil are included in this mapping unit.

Use and management (Capability unit IVe–4).—About 74 percent of this soil is in crops, 6 percent is in pasture, and 18 percent is in woods. This soil is best suited to hay or pasture. Cultivated crops can be grown in very long rotations if intensive conservation practices are applied. The chief hazards are erosion, loss of moisture, and low natural fertility. Operating farm equipment is difficult because of the steep slopes.

Bermudian Series

The Bermudian series consists of deep, well-drained soils on flood plains. They are located in a band that crosses the northern part of the county, connecting Bainbridge, Elizabethtown, Mastersonville, Hopeland, Denver, Ephrata, and Terre Hill. These soils formed from sediments washed from adjacent Penn and Lansdale soils and deposited on the first bottoms of streams during floods. The native forest consisted of ash, maple, elm, walnut, locust, oak, and hickory trees.

The natural fertility of these soils is moderate to low, but it has been improved by lime, fertilizer, and manure washed from nearby cultivated fields. The moisture-holding capacity is high.

In Lancaster County, the areas of Bermudian soils are so small and so intricately mingled with areas of Rowland soils that the two series are not separated on the map. The only mapping unit in this county that contains Bermudian soils is Rowland and Bermudian silt loams, 0 to 3 percent slopes. It is described under the Rowland series. The Bowmansville soils are located on the same flood plains.

Birdsboro Series

These are deep, well-drained, moderately fertile soils derived from alluvium that originated in the Triassic Lowland. They developed under a forest of oaks and hickories. The moisture-holding capacity is high to medium.

These soils occur in the northern part of the county, on terraces just above the flood plains of Conewago, Cocalico, and Muddy Creeks. The slopes are slightly convex. Most of the areas are rather small patches in bends of the stream or where streams join. These soils are relatively young and have a weakly developed subsoil, but they are older and have a better developed subsoil than the soils on the flood plains.

The alluvium from which these soils formed was deposited when the streams either were at a higher elevation than they are now or carried more water than they do now. The material was washed from red and yellow Triassic sandstone and red shale.

The associated soils on the uplands are of the Penn, Lewisberry, Lansdale, Steinsburg, Readington, and Croton series. The associated soils on the flood plains are of the Bowmansville, Rowland, and Bermudian series.

Birdsboro silt loam, 0 to 3 percent slopes (BdA).—A typical profile in a pasture follows.

0 to 9 inches, dark reddish-brown friable silt loam; weak fine subangular blocky structure.
9 to 36 inches, reddish-brown loose sandy loam to friable heavy silt loam; weak medium subangular blocky structure tending to platiness.
36 inches +, weak-red to dark reddish-brown loose loamy sand or loam; weak medium subangular blocky structure.

This soil occurs on level or nearly level first benches above the flood plains of the larger streams that drain the area underlain by Triassic rocks. Runoff is slow to very slow. In most places erosion is not a problem. Where surface water and small streams from the adjoining uplands cut across the terraces, some erosion has taken place. Less than one-fourth of the original surface soil has been lost.

Use and management (Capability unit I–2).—About 66 percent of this soil is in crops, and 33 percent is in woods and pasture. This soil is suited to rotation crops. It has only slight hazards and limitations. The chief management problems are to maintain the organic-matter content and to preserve the soil structure.

Birdsboro silt loam, 3 to 6 percent slopes, moderately eroded (BdB2).—This soil is shallower than Birdsboro silt loam, 0 to 3 percent slopes, but the profiles of the two soils are similar. Some fields have a few shallow gullies. The colors range from red to reddish brown or dark reddish brown, as the color of the parent material ranges from red to yellowish brown. The surface drainage is slow to medium. The erosion hazard is slight.

Some areas in this unit have slopes steeper than 6 percent. Some areas less eroded than is typical of this soil have been included in the mapping unit.

Use and management (Capability unit IIe–4).—About 84 percent of this soil is in crops, and the rest is in pasture or woods. This soil can be used for rotation crops if managed so as to prevent or control erosion, conserve moisture, and maintain the supply of organic matter.

Blairton Series

These are moderately well drained to somewhat poorly drained soils that are underlain by partly weathered, acid, Cocalico shale and partly by soil material washed from higher slopes. They are moderately fertile. Their moisture-holding capacity is high. The native forest consisted of oaks, hickories, and other hardwoods.

These soils are located in the northern part of the county. They occur at the foot of slopes or in pockets or flats on ridgetops. They also occur at the heads of streams, where the water table is high.

They are associated with the deep, well-drained Bedington soils and the shallow to moderately deep Berks soils.

Blairton silt loam, 0 to 3 percent slopes (BeA).—A typical profile observed in a hay field follows.

0 to 11 inches, grayish-brown to dark grayish-brown very friable silt loam; weak medium crumb structure.
11 to 15 inches, light brownish-gray to yellowish-brown friable silt loam; moderate medium blocky structure.
15 to 24 inches, light-gray friable silty clay; many medium mottles of yellowish brown; moderate medium to fine blocky structure.
24 inches +, gray to yellowish-red weathered shaly silt loam; structureless.

In places where material washed from higher slopes has accumulated, the soil is deeper and the lower layers of the subsoil range in texture from clay loam to shaly silt loam.

Runoff is slow to very slow. Less than one-fourth of the original surface soil has been lost through erosion. Some areas have recent deposits of soil material.

Use and management (Capability unit IIw–1).—The better drained areas of this soil—about 40 percent—are in crops, and the others are in pasture. Fields

with moderately good drainage can be used for rotation crops. Fields that are too wet to cultivate and that cannot economically be drained should be used for pasture. It is not practical to drain large areas for cultivation because this soil is only moderately fertile and does not produce enough to pay the cost of drainage.

Blairton silt loam, 3 to 8 percent slopes (BeB).—This soil occurs on short slopes, benches, or sloping areas that have been protected from erosion. The surface soil appears to be better drained than that of Blairton silt loam, 0 to 3 percent slopes, but the subsoil is waterlogged. Less than one-fourth of the surface soil has been lost through erosion, and the hazard of further erosion is slight. The profile is somewhat shallower than that of Blairton silt loam, 0 to 3 percent slopes. Runoff is slow to medium.

Use and management (Capability unit IIw–1).—About 43 percent of this soil is in crops, and 57 percent is in pasture. Drainage and intensive conservation practices are needed to make this soil suitable for rotation crops. The spots that are most poorly drained and those that are not practical to drain artificially are better suited to pasture. Other management problems are to preserve the soil structure and to control erosion.

Blairton silt loam, 3 to 8 percent slopes, moderately eroded (BeB2).—This soil is similar to Blairton silt loam, 0 to 3 percent slopes, but its profile is slightly thinner and it has lost up to three-fourths of its surface soil through erosion. The plow layer is a mixture of original surface soil and subsoil and is finer textured and more difficult to work than the original surface soil.

This soil normally occurs on longer slopes or in places where surface water concentrates. Surface drainage is slow to medium, but the water that runs down from higher slopes is likely to cause erosion.

Use and management (Capability unit IIIe–7).—Only 9 percent of this soil is used for crops; the rest is used for pasture. If drained and intensively conserved, this soil is fairly well suited to rotation crops. The wettest spots and those that are impractical to drain should be used for pasture. Beside drainage, the management problems include controlling erosion and maintaining the structure of the soil.

Blairton silt loam, 8 to 15 percent slopes, moderately eroded (BeC2).—This soil has lost up to three-fourths of its original surface soil by erosion. Some fields have a few shallow gullies. The profile is thinner than that of Blairton silt loam, 0 to 3 percent slopes; otherwise it is similar.

This soil occurs on midslopes where considerable erosion has taken place. Runoff is medium to rapid. A few areas are on slopes steeper than 15 percent and have very rapid runoff.

Use and management (Capability unit IIIe–7).—Most of this soil is used for pasture. Pasture is the best use for these areas, but limited cultivation is possible if a long rotation is used and intensive conservation practices are applied. The chief management problems are to prevent or control erosion, to remove excess water, and to maintain the organic-matter content.

Bowmansville Series

These are deep, somewhat poorly drained to poorly drained, alluvial soils of moderate natural fertility. The parent material consisted of sand, silt, and clay deposited by floods. These sediments came from soils developed on the Triassic formations and soils developed over Cocalico shale. The Bowmansville soils occur in the northern part of the county along streams that drain the Triassic Lowland. They lie next to the streams, on the floors of rather narrow valleys. Surface drainage is slow or very slow. The frequent floods leave water in pockets and depressions.

The Rowland and Bermudian soils of the flood plains are closely associated with the Bowmansville soils. Nearby upland soils are the Penn, Lewisberry, Lansdale, Steinsberg, Readington, and Croton soils, which overlie Triassic formations, and the Bedington, Berks, and Blairton soils, which overlie Cocalico shale.

Bowmansville silt loam, 0 to 6 percent slopes (BfA).—The following profile was observed in a pasture.

0 to 10 inches, very dusky red friable silt loam; moderate fine crumb structure.
10 to 16 inches, dusky-red to weak-red friable silt loam; moderate very fine subangular blocky structure.
16 to 42 inches, weak-red to yellowish-red layered fine sandy loam to sandy clay loam mottled with distinct fine streaks of light reddish brown, reddish gray, or pinkish gray; consistence varies with texture.
42 inches +, dark-gray to strong-brown sandy clay loam; many medium, faint, reddish-brown mottles.

This soil occurs on level or nearly level areas along streams. Runoff is slow or very slow. Internal drainage is slow, and the water table is high. Erosion is not a problem, except for some stream gouging and bank erosion. No more than one-fourth of the surface soil has been lost in any place. Materials deposited during the less severe floods tend to add to the depth of the soil.

Use and management (Capability unit VIw–1).—About 55 percent of this soil is in pasture, 14 percent is in crops, and 14 percent is in woods; 17 percent is idle. Drainage is the chief management problem. If this soil is drained, it is best suited to pasture.

Brecknock Series

The Brecknock soils are well-drained, moderately deep to shallow soils on metamorphosed sandstone and shale. Their natural fertility is low, and their moisture-holding capacity is high. The native vegetation was a forest of oaks and hickories. Scattered stands of yellow-poplar grew on the better sites.

The underlying Triassic rocks were altered by heat and pressure when molten diabase was forced up through them. The red shales were baked to hard porcelainite or slate ranging in color from dark blue near the point of contact through purple to dark red near the unaltered Triassic shales. The color of the parent material affects the color of the soil developed from it. The metamorphosed rocks are harder than the unchanged sandstones and shales, and consequently they weather more slowly.

The largest areas of Brecknock soils occur in the extreme northeastern and northwestern parts of the

county, where the Triassic formations were intruded by large masses of diabase. Smaller areas are found where small dikes or sills of diabase occur in the Triassic Lowland. Brecknock soils usually are on the upper slopes of ridges topped by Montalto soils, which formed from the diabase. The soils on the lower slopes are the moderately well drained to somewhat poorly drained Lehigh soils, which formed from metamorphosed sandstone and shale. Below these are the poorly drained Croton soils, which developed from the unaltered Triassic parent materials. Soils of the Penn, Lewisberry, Lansdale, Montalto, and Steinsburg series, or their less well drained associates, are commonly located nearby.

Brecknock silt loam, 0 to 3 percent slopes (BgA).—This soil occurs on gentle slopes and flats where the bedrock is 30 to 40 inches below the surface. A typical profile follows.

0 to 7 inches, gray to very dark grayish-brown friable silt loam; weak fine granular structure.
7 to 24 inches, dark-gray to very dark grayish-brown heavy silt loam; moderate medium blocky structure.
24 inches +, dark-brown silt loam; tends toward platy structure; mixture of soil and shale fragments; fragments make up 20 to 60 percent of the substratum.

Use and management (Capability unit IIe–4).—About 98 percent of this soil is in crops, and 2 percent is in pasture. This soil is suitable for rotation crops. The rotation should be long and should include a large proportion of hay crops. The principal management needs are to increase fertility, build up the organic-matter content, and prevent erosion.

Brecknock silt loam, 3 to 8 percent slopes, moderately eroded (BgB2).—This is the most extensive phase of Brecknock silt loam in this county. It is like Brecknock silt loam, 0 to 3 percent slopes, except that up to three-fourths of the surface soil has been lost through erosion. Most of the loss was caused by sheet erosion, but shallow gullies are common. Runoff is slow to medium. This soil is 18 to 36 inches deep over bedrock.

Use and management (Capability unit IIe–4). Nearly all of this soil is in crops. It is suitable for rotation crops if it is protected against further erosion. The rotation should be long. Severely eroded spots should be farmed less intensively or with special care to control erosion. Besides controlling erosion, the principal management needs are improving fertility and increasing the organic-matter content.

Brecknock silt loam, 8 to 15 percent slopes, moderately eroded (BgC2).—This soil is like Brecknock silt loam, 0 to 3 percent slopes, but it is shallower and contains more fragments of rock. From one-fourth to three-fourths of the surface soil has been lost, and the remainder has been mixed with subsoil. The result is a plow layer that absorbs less moisture and is less easily worked than the original. Runoff is medium to rapid, and erosion is a serious hazard, especially on the steeper parts. This soil is more droughty than the uneroded Brecknock silt loams.

Use and management (Capabilitiy unit IIIe–5).—Almost all of this soil is used for crops, although it is better suited to permanent pasture or hay. It should be cultivated only occasionally, and intensive conservation measures should be used. The principal management needs are to improve fertility, increase the supply of organic matter, conserve moisture, and control erosion.

Brecknock slaty silt loam, 0 to 3 percent slopes (BhA).—Most of this soil occurs on level to nearly level ridgetops or benches. Runoff is slow to very slow. A typical profile in a wooded area is as follows.

0 to 3 inches, black to very dark brown very friable silt loam; weak fine granular structure.
3 to 10 inches, very dark gray friable silt loam; weak thin platy structure.
10 to 16 inches, dark-gray friable silt loam; weak fine to medium subangular blocky structure.
16 to 19 inches, grayish-brown friable to firm silty clay loam; moderate to weak medium subangular blocky structure.
19 to 27 inches, dark-brown firm silty clay loam; weak medium blocky structure.
27 to 35 inches, dark-brown firm silt loam; weak medium blocky, breaking to weak medium platy, structure.
35 to 40 inches, dark-brown firm silt loam; weak to moderate medium platy structure.
40 inches +, weathered and partly weathered slate.

This soil is darker colored or more bluish near the diabase intrusions and lighter colored and more reddish near the unaltered Triassic rocks. Generally this soil is shallower than the Brecknock silt loams and contains more fragments of slate and porcelainite. The subsoil is 40 to 60 percent rock fragments. This soil is slightly eroded in places.

Use and management (Capability unit IIe–4).—About 95 percent of this soil is cultivated, 3 percent is in woods, and 1 percent is in pasture. It is suitable for rotation crops if simple conservation practices are used. The principal management needs are to increase fertility and maintain the organic-matter content. Some areas need protection against concentrations of runoff water. In most places little erosion has occurred.

Brecknock slaty silt loam, 3 to 8 percent slopes (BhB).—This soil is like Brecknock slaty silty loam, 0 to 3 percent slopes, but about one-fourth of the surface soil has been lost through erosion. Runoff is slow to medium.

Use and management (Capability unit IIe–4).—About 70 percent of this soil is used for crops, and 29 percent is in woods. This soil is suited to rotation crops if the rotation is fairly long and if simple conservation practices are used. The principal management needs are to control erosion, conserve moisture, and increase the supply of organic matter.

Brecknock slaty silt loam, 3 to 8 percent slopes, moderately eroded (BhB2).—This soil is like Brecknock slaty silt loam, 0 to 3 percent slopes, except that one-fourth to three-fourths of the surface soil has been removed by erosion. Subsoil has been mixed with the remaining surface soil, and the present plow layer is finer in texture, lighter in color, and more difficult to work than the original surface soil. It absorbs less water and supplies less moisture to plants. Runoff is slow to medium.

Use and management (Capability unit IIe–4).—About 91 percent of this soil is used for crops, 2 percent for pasture, and 3 percent for woods; 2 percent is idle. Rotation crops can be grown if conservation practices are applied to control erosion, maintain the organic-matter content, and conserve moisture. The most severely eroded areas should be farmed less

intensively than the rest or placed under special management.

Brecknock slaty silt loam, 8 to 15 percent slopes, moderately eroded (BhC2).—This soil has lost from one-fourth to three-fourths of its surface soil through erosion; otherwise, it is like Brecknock slaty silt loam, 0 to 3 percent slopes. Some fields have a few shallow gullies. The mixing of subsoil with the remaining surface soil has made the plow layer less absorbent. This soil occurs on long slopes where runoff is moderate to rapid; consequently there is a moderate hazard of further erosion.

Use and management (Capability unit IIIe–5).—About 90 percent of this soil is used for crops, 8 percent for woods, and the rest for pasture. Most areas are suitable for rotation crops if the rotation is long and if intensive conservation measures are used to control or prevent erosion, maintain the level of organic matter, and improve the fertility. Some fields are better suited to perennial hay. Severely eroded spots should be managed with special care.

Brecknock slaty silt loam, 15 to 25 percent slopes (BhD).—This soil is like Brecknock slaty silt loam, 0 to 3 percent slopes, but it is shallower and contains more fragments of slate. Some areas are slightly eroded, but no more than one-fourth of the surface soil has been removed. The protective cover of trees or grass has prevented more serious erosion. Runoff is rapid to very rapid.

Use and management (Capability unit IVe–3).—This soil is best suited to hay, but it can be cultivated occasionally if intensive conservation measures are practiced. The erosion hazard is high if this soil is cropped. Moisture should be conserved as much as possible. Some farm equipment cannot be operated safely on these slopes.

Brecknock slaty silt loam, 15 to 25 percent slopes, moderately eroded (BhD2).—This soil contains more slaty fragments than Brecknock slaty silt loam, 0 to 3 percent slopes. It has lost one-fourth to three-fourths of its surface soil. Runoff is rapid to very rapid.

Use and management (Capability unit IVe–3).—About 67 percent of this soil is in crops, 25 percent is in woods, and 4 percent is in pasture; 4 percent is idle. This soil is best suited to hay or pasture. A few fields can be cultivated occasionally. The management problems are the control of erosion, the conservation of moisture, and the safe operation of farm equipment on these steep slopes. Erosion will become very severe if not controlled.

Brecknock slaty silt loam, 25 to 35 percent slopes (BhE).—This soil is like Brecknock slaty silty loam, 0 to 3 percent slopes, but it is only 18 to 24 inches deep over bedrock. Runoff is very rapid.

Use and management (Capability unit VIe–2).—About 46 percent of this soil is in woods, 39 percent is in pasture, and 15 percent is idle. The best use for this soil is long-term pasture. The principal management problems are to prevent erosion and conserve moisture. Some farm equipment cannot be used safely on these steep slopes.

Brecknock stony silt loam, 0 to 8 percent slopes (BkA).—This soil is like the Brecknock slaty silt loams, except that it contains many boulders, flagstones, and rounded stones of metamorphosed shale and sandstone. In size and quantity the surface stones range from scattered boulders to numerous large stones that cover 15 percent of the surface. The rock fragments are larger than those in Brecknock slaty silt loam. Most of this soil is near points of contact between the diabase and the Triassic rock. In these spots the metamorphosed rocks are harder and more resistant to weathering than the rest of the Triassic rock.

Most of this soil is protected by a forest cover and is not eroded. A few small areas of eroded soil are included in the mapping unit. Runoff is slow or very slow.

Use and management (Capability unit VIIe–3).—Only 3 percent of this soil is used for crops. About 94 percent is in woods, and 2 percent is in pasture. This soil is too stony to be suitable for crops, and most of it is too stony to be used for pasture. It is not fertile enough to pay for removing the stones. Areas that are now producing satisfactory pasture may be kept in pasture. Woodland should not be cleared. Cropland should be retired to pasture or forest. Small odd areas can be planted to shrubs that will provide food and cover for wildlife.

Brecknock stony silt loam, 8 to 15 percent slopes (BkC).—This soil is like Brecknock stony silt loam, 0 to 8 percent slopes. Erosion has not been a serious problem on this soil. No more than one-fourth of the surface soil has been lost through erosion. A few steeper or more eroded areas are included. Runoff is medium to rapid. The erosion hazard is moderate. The fertility is low.

Use and management (Capability unit VIIe–3).—Forest covers 98 percent of this soil. A few acres is in crops, and a few in pasture. This soil is too stony to be suitable for crops and should be kept in forest.

Cardiff Series

These well-drained, moderately deep to shallow, acid soils developed under a hardwood forest. They are low in moisture-holding capacity and low in fertility.

The parent rocks were Harpers phyllite and Peach Bottom slate. Harpers phyllite is a greenish-gray to dark-gray sandy rock that contains some dark slate. Peach Bottom slate is a hard, purplish-black roofing slate.

These soils occupy small areas on low ridges and rolling hills. They occur near New Holland, near Columbia, and between Peach Bottom Station and Kirkwood. They are associated with the deep, well-drained Whiteford soils, which developed on the same kinds of rock.

Cardiff slaty silt loam, 0 to 3 percent slopes (CaA).—A typical profile in a cropped area follows.

0 to 8 inches, dark-brown slaty silt loam; moderate medium granular structure.
8 to 17 inches, dark-brown to brown silt loam; moderate medium subangular blocky structure; 30 to 40 percent slate fragments.
17 to 28 inches, brown to yellowish-brown slaty silt loam; coarse blocky structure; with depth, the percentage of slate fragments increases from 40 to more than 90 percent.
28 inches +, partly weathered but rather solid slate or phyllite.

Runoff is slow to very slow. Erosion has not been a problem. No more than one-fourth of the surface soil has been lost through sheet erosion. The natural fertility is low, and the water-holding capacity is low. This soil is shallow.

Use and management (Capability unit IIe–5).—Most of this soil—93 percent—is in crops. It is suitable for cultivation. The principal management problem is to maintain the supply of organic matter. Simple measures are needed to control erosion.

Cardiff slaty silt loam, 3 to 8 percent slopes, moderately eroded (CaB2).—This soil is like Cardiff slaty silt loam, 0 to 3 percent slopes, except that it is shallower and droughtier, contains more shale, and is more eroded. From one-fourth to three-fourths of the surface soil has been removed by sheet erosion. A few shallow gullies occur in some fields. Runoff is slow to medium.

Use and management (Capability unit IIe–5).—Most of this soil is used for crops, but a few small areas are wooded. This soil needs protection against erosion, loss of moisture, and loss of organic matter. It should be kept in hay half the time. Conservation practices should include controlling and diverting surface water.

Cardiff slaty silt loam, 8 to 15 percent slopes, moderately eroded (CaC2).—This soil is like Cardiff slaty silt loam, 0 to 3 percent slopes, except that it has lost from one-fourth to three-fourths of its surface soil through sheet erosion. The silt and clay in the soil erodes most rapidly, leaving many shale and slate fragments on the surface. Material from the subsoil, which is lighter colored and slightly finer textured than the surface soil, has been mixed into the plow layer during cultivation. Some areas have a few shallow gullies. Small areas are only slightly eroded, and a few very small areas are severely eroded. Runoff is medium to rapid.

Use and management (Capability unit IIIe–6).—About 94 percent of this soil is used for crops. Very small acreages are in pasture or woods. Erosion is rather serious if not controlled. The low moisture-holding capacity, the small supply of organic matter, and the low natural fertility further limit the usefulness of the soil. Long rotations can be used to add organic matter. Contour stripcropping and terracing the longer slopes will help to reduce runoff, control erosion, and conserve moisture.

Cardiff slaty silt loam, 15 to 25 percent slopes, moderately eroded (CaD2).—This soil is similar to Cardiff slaty silt loam, 0 to 3 percent slopes, but it is shallower and has lost up to three-fourths of its original surface soil. Some areas have many gullies that have cut into the subsoil. Runoff is rapid to very rapid. A few acres of severely eroded soil have been included in this mapping unit.

Use and management (Capability unit IVe–4).—About 82 percent of this soil is used for crops, 3 percent is used for pasture, and 10 percent is used for woods. This soil is not suitable for clean-tilled crops. It should be kept permanently in hay. If it is cultivated, a long rotation and intensive conservation measures are needed. The problems of management include the safe operation of farm equipment, the control of erosion, the conservation of moisture, and the maintenance of the organic-matter content.

Cardiff slaty silt loam, 25 to 35 percent slopes (CaE).—This soil is like Cardiff slaty silt loam, 0 to 3 percent slopes, but the profile is shallower. This soil occurs on narrow ridges and near the edges of the higher slopes that are underlain by quartzite. Runoff is very rapid.

Use and management (Capability unit VIe–3).—Most of this soil is under forest. It should be kept permanently covered by vegetation. It can be used for pasture or for timber or to provide food and cover for wildlife. The principal management problems are to control erosion and conserve moisture.

Chester Series

The Chester soils are deep, well drained, and productive. They are easily worked, but they must be protected from erosion (fig. 4). Their moisture-holding capacity is high.

These soils are underlain by a variety of metamorphic and igneous rocks. In some places the parent rock was a rather coarse-grained gneiss, and in others a lustrous, bluish-gray or greenish-gray slaty rock. Both formations contain a high percentage of mica. These rocks weather rapidly, forming soil materials 3 to 10 feet deep. The Chester soils that developed from the harder rocks, such as gneiss and granodiorite, are a little shallower and contain more stones.

These soils occur on level to moderately sloping ridgetops and low hills. The most extensive areas are in the southern third of the county; small areas are in the extreme northern part. These soils are closely associated with the Manor, Glenelg, and Glenville soils. The Congaree, Chewacla, and Wehadkee soils of the flood plains are usually located nearby.

Chester channery sandy loam, 0 to 3 percent slopes (CbA).—This soil is commonly located on broad ridgetops or flats. It is deep and well drained. Runoff is slow to very slow. A typical profile follows.

0 to 9 inches, dark-brown to dark grayish-brown very friable sandy loam; granular or very fine subangular blocky structure.
9 to 16 inches, dark-brown to brown friable to very friable silt loam; moderate thin platy to moderate very fine subangular blocky structure.
16 to 36 inches, brown to strong-brown friable to firm silt loam to heavy silt loam; moderate blocky structure.
36 to 42 inches, reddish-yellow, loamy, weathered and disintegrated rock; very friable to loose; somewhat platy structure.
42 inches +, unweathered bedrock of coarse-grained gneiss or lustrous, bluish-gray or greenish-gray slate.

Some of this unit has lost as much as one-fourth of the original surface soil through sheet erosion.

Use and management (Capability unit IIe–6).—About 87 percent of this soil is in crops, 8 percent is in forest, and 4 percent is idle. This soil is well suited to most crops in rotations. It has no serious problems of management. It needs management that will prevent erosion on long slopes, maintain the organic-matter content, and conserve moisture.

Chester channery sandy loam, 3 to 6 percent slopes (CbB).—This soil is like Chester channery sandy loam, 0 to 3 percent slopes, but it is not quite so deep. It is

Figure 4.—Contour stripcropping on Chester soils. Grassed waterway crosses strip at right.

slightly eroded. Less than one-fourth of the original surface soil has been lost. Runoff is slow to medium.

Use and management (Capability unit IIe–6).—About 87 percent of this soil is in woods, 6 percent is in crops, and 6 percent is idle land. This soil is suitable for rotation crops if simple conservation practices are used. There is a slight hazard of erosion. Management should be planned to prevent erosion, conserve moisture, and maintain the organic-matter content of the soil.

Chester channery sandy loam, 3 to 6 percent slopes, moderately eroded (CbB2).—Most of this soil is located near ridgetops or on benches. It is like Chester channery sandy loam, 3 to 6 percent slopes, except that it has lost from one-fourth to three-fourths of its original surface soil through sheet erosion. Some areas have a few shallow gullies. Included in the mapping unit are areas that are severely eroded and have many shallow gullies.

The plow layer of this soil is somewhat finer textured than is typical of Chester channery sandy loam, because subsoil has been mixed with the remainder of the original surface soil. This finer textured layer absorbs less moisture than the original surface soil and tends to seal over quickly; consequently, there is more runoff and more risk of erosion. Runoff is slow to medium.

Use and management (Capability unit IIe–6).—About 97 percent of this soil is in crops, and 2 percent is in pasture. The crop rotation should be long, and intensive conservation measures should be practiced. The most severely eroded areas need special protection against further erosion. All areas need some erosion-control practices, conservation of moisture, and additions of organic matter to the soil.

Chester channery sandy loam, 6 to 12 percent slopes (CbC).—This soil is like Chester channery sandy loam, 0 to 3 percent slopes, but shallower. Runoff is medium to rapid, and there is some hazard of erosion. Little erosion has occurred, but some areas have lost up to one-fourth of their surface soil through sheet erosion.

Use and management (Capability unit IIIe–8).—Nearly all of this soil is in forest. Only 3 percent is in pasture. This soil could be used for crops in a long rotation if conservation practices were intensively applied. The chief hazards are erosion, loss of moisture, and loss of organic matter.

Chester channery sandy loam, 6 to 12 percent slopes, moderately eroded (CbC2).—This soil is like Chester channery sandy loam, 0 to 3 percent slopes, except that it is not so deep. Runoff is medium, but most areas are on long slopes where enough water concentrates to cause erosion. Sheet erosion has removed

up to three-fourths of the surface soil, and some fields have a few shallow gullies. The plow layer is a mixture of original surface soil and subsoil.

Use and management (Capability unit IIIe–8).—About 78 percent of this soil is in crops, 13 percent is in pasture, 5 percent is idle, and 1 percent is in woods. Rotation crops can be grown if intensive conservation practices are used. The problems of managing this soil include controlling or preventing erosion, conserving moisture, and increasing the organic-matter content of the soil.

Chester loam, 3 to 6 percent slopes (CcB).—The following is a typical profile in a cultivated field.

0 to 9 inches, brown to dark-brown very friable loam; moderate to weak thin platy structure.
9 to 12 inches, yellowish-brown firm silt loam; moderate medium to fine blocky structure.
12 to 27 inches, strong-brown firm loam; moderate very fine blocky structure.
27 to 30 inches, darker strong-brown loose loamy sand.
30 inches +, weathered parent material over fairly solid bedrock.

Erosion is generally slight on this soil, but some areas have lost up to one-fourth of their surface soil through sheet erosion. Runoff is slow. The hazard of further erosion is slight. This soil normally occurs near the top of ridges or on benches.

Use and management (Capability unit IIe–4).—About 88 percent of this soil is in woods, 6 percent is in crops, and 3 percent is in pasture; 2 percent is idle. Rotation crops can be grown if simple conservation practices are used. The problems of management are slight, but most areas should be protected from erosion. Conservation of moisture and maintenance of the organic-matter content are also needed.

Chester loam, 0 to 3 percent slopes (CcA).—This soil normally occurs on the tops of broad ridges or benches, where erosion is very slight. Except that it is deeper, it is like Chester loam, 3 to 6 percent slopes. Some areas have lost up to one-fourth of their original surface soil. Runoff is very slow, and there is little or no hazard of further erosion. A few severely eroded spots, too small to separate on the map, are included in this unit.

Use and management (Capability unit I–2).—About 80 percent of this soil is in crops, 12 percent is in pasture, and 6 percent is in woods. This soil is excellent for rotations of general farm crops and for truck crops. It is easy to manage. Conservation of moisture, control of erosion on long slopes, and maintenance of the organic-matter content are the chief requirements.

Chester loam, 3 to 6 percent slopes, moderately eroded (CcB2).—This soil is like Chester loam, 3 to 6 percent slopes, except that it has lost up to three-fourths of its surface soil by sheet erosion. Some areas have a few shallow gullies. Other small areas are more severely eroded and have many shallow gullies. Runoff is slow, but some water from higher slopes concentrates on these areas.

Use and management (Capability unit IIe–4).—About 84 percent of this soil is in crops, 7 percent is in pasture, and 3 percent is in woods. Rotation crops can be grown if conservation measures are intensively applied. The management problems include the prevention or control of further erosion, the conservation of moisture, and the maintenance of the organic-matter content.

Chester loam, 6 to 12 percent slopes (CcC).—This soil is like Chester loam, 3 to 6 percent slopes, except that it is shallower. Runoff is medium. Less than one-fourth of the surface soil has been lost through erosion. Most of this soil is located on fairly short slopes, where surface water does not collect. No serious erosion has taken place because the soil is protected by forest.

Use and management (Capability unit IIIe–5).—About 93 percent of this soil is in forest, 4 percent is in pasture, and only 2 percent is in crops. Erosion is a constant danger if this soil is cultivated. Crops should be grown only in a long rotation and under intensive conservation practices. The chief hazards are erosion, loss of moisture, and loss of organic matter.

Chester loam, 6 to 12 percent slopes, moderately eroded (CcC2).—This soil is shallower than Chester loam, 3 to 6 percent slopes, and it has lost up to three-fourths of its original surface soil through sheet erosion. Some areas have a few shallow gullies. The loss of surface soil and the mixing of the remainder with subsoil in the plow layer reduces the soil's capacity to absorb water. Runoff is medium. These soils are likely to erode further because they are located on long slopes or in places where surface water from higher slopes converges.

Use and management (Capability unit IIIe–5).—About 83 percent of this soil is used for crops, about 7 percent for pasture, and 5 percent for woods. General farm crops can be grown in a long rotation, if conservation practices are intensively applied. The problems of managing this soil are preventing and controlling erosion, conserving moisture, and maintaining the organic-matter content.

Chester loam, 6 to 12 percent slopes, severely eroded (CcC3).—Before it was eroded, this soil was similar to Chester loam, 3 to 6 percent slopes. At least three-quarters of the surface soil has been removed by sheet erosion. Most areas have a few shallow gullies, and some areas have many gullies. A few spots are very severely eroded. The plow layer is composed of subsoil mixed with the remaining surface soil and crop residues. It is not so productive or so easy to manage as the original surface soil. Runoff is medium, and the hazard of further erosion is moderate. This soil occurs on long slopes, where enough surface water concentrates to cause erosion.

Use and management (Capability unit IVe–3).—About 89 percent of this soil is in crops, 1 percent is in pasture, and 1 percent is in forest; 8 percent is idle. The best use for this soil is permanent hay or pasture. Cultivated crops can be grown in a very long rotation and under intensive conservation practices. The chief problems in managing this soil are controlling or preventing erosion, conserving moisture, and maintaining the organic-matter content.

Chester loam, 12 to 18 percent slopes (CcD).—This soil has a shallower profile than Chester loam, 3 to 6 percent slopes. Runoff is rapid, and erosion has removed as much as one-fourth of the surface soil from some areas. This soil occurs on the sides of ridges.

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Use and management (Capability unit IVe–3).—Practically all of this soil is in forest. If it is cleared, it should be used for hay or pasture. Cultivated crops can be grown in a very long rotation if intensive conservation measures are practiced. The management problems include controlling or preventing erosion, operating farm equipment safely and efficiently, and conserving moisture.

Chester loam, 12 to 18 percent slopes, moderately eroded (CcD2).—This soil is shallower than Chester loam, 3 to 6 percent slopes. Erosion has removed up to three-fourths of its surface soil. Some areas have a few shallow gullies. Some small areas have many gullies, and some are severely eroded. Runoff is rapid. Water concentrates on long slopes and causes erosion.

Use and management (Capability unit IVe–3).—About 78 percent of the area is in crops, 13 percent is in forest, and 1 percent is in pasture; 7 percent is idle. This soil is best suited to hay or pasture. Rotation crops can be grown if the rotation is very long and if intensive conservation practices are applied. The problems of managing this soil include control and prevention of erosion, safe operation of farm equipment, and conservation of moisture.

Chester silt loam, 0 to 3 percent slopes (CdA).—This soil is generally deeper than other soils of the Chester series, and it does not contain coarse fragments like those common in other Chester soils. Fragments of the parent rock are small and few. Except that it is slightly finer textured throughout, this soil is similar to other Chester soils. A profile observed in a wooded area follows.

0 to 4 inches, dark-brown very friable silt loam; weak fine granular structure.
4 to 11 inches, yellowish-red to strong-brown very friable silt loam; weak fine granular and very weak platy structure.
11 to 18 inches, yellowish-red to strong-brown friable heavy silt loam; weak fine to medium subangular blocky structure.
18 to 27 inches, yellowish-red friable silty clay loam; moderate medium subangular blocky structure.
27 to 32 inches, yellowish-red to red firm silty clay loam; moderate medium blocky structure.
32 to 38 inches, red friable silt loam; weak medium blocky structure.
38 to 50 inches, dark-red friable loam.
50 inches +, soft weathered micaceous parent material that grades into firm rock at greater depths.

The yellow and red colors in the profile vary.

This soil erodes easily because the fine particles of mica are easily detached and transported in surface water; however, the level or nearly level topography has reduced the hazard of erosion.

Use and management (Capability unit I–2).—About 84 percent of this soil is in crops, 8 percent is in woods, and 4 percent is in pasture or is idle. This soil is well suited to crops. The major problem of management is the maintenance of the organic-matter content. Erosion is a problem on slopes of more than 2 percent.

Chester silt loam, 3 to 6 percent slopes (CdB).—This soil is like Chester silt loam, 0 to 3 percent slopes. Runoff is slow to medium. Erosion has not yet been serious.

Use and management (Capability unit IIe–4).—About 40 percent of this soil is used for crops, and the rest is woodland. If this soil is cultivated, simple conservation practices are needed to prevent erosion and to maintain the supply of organic matter.

Chester silt loam, 3 to 6 percent slopes, moderately eroded (CdB2).—This soil is like Chester silt loam, 0 to 3 percent slopes, except that it has lost from one-fourth to three-fourths of its surface soil. Sheet erosion has been moderate to severe. A few shallow gullies have formed in some places. The clayey subsoil has been plowed up and mixed with remnants of the surface soil. The resulting finer textured surface layer absorbs less water; consequently, more water runs off and there is more risk of erosion. Runoff is slow to medium. In some areas the soil contains fragments of the parent rock.

Use and management (Capability unit IIe–4).—Most of this soil is used for rotation crops. Conservation practices are needed that will divert surface water, control erosion, and prevent loss of moisture and loss of organic matter.

Chester silt loam, 3 to 6 percent slopes, severely eroded (CdB3).—This soil originally had a profile like that of Chester silt loam, 0 to 3 percent slopes, but it has lost at least 75 percent of its surface soil. Many shallow gullies and some deep ones have formed. Because of loss of surface soil, the plow layer puddles easily and is difficult to work. It absorbs less water than the original surface soil and, consequently, loses more water through runoff. Runoff is slow to medium. The hazard of further erosion is serious.

Use and management (Capability unit IVe–3).—About 92 percent of this soil is used for crops, and 7 percent is used for pasture. Erosion control is the first requirement for successful management of this soil. Long-term hay is the best use for it. Cultivated crops should be grown only in a very long rotation and under intensive conservation practices. Other management needs are the conservation of moisture and the addition of organic matter.

Chester silt loam, 6 to 12 percent slopes (CdC).—This soil is like Chester silt loam, 0 to 3 percent slopes, but its profile is about 12 inches shallower. Runoff is medium to rapid, but erosion has generally not been a problem.

Use and management (Capability unit IIIe–5).—This soil is almost entirely in forest. If cultivated, it would need to be protected against erosion, loss of organic matter, and loss of moisture.

Chester silt loam, 6 to 12 percent slopes, moderately eroded (CdC2).—This soil is like Chester silt loam, 0 to 3 percent slopes, except that it has lost from one-fourth to three-fourths of its original surface soil and has, in some places, a few shallow gullies. This soil is shallower than the more gently sloping Chester silt loams. The plow layer is finer textured, lighter colored, and less absorbent than the original surface soil, because subsoil has been mixed into it. Runoff is medium to rapid.

Use and management (Capability unit IIIe–5).—More than 90 percent of this soil is used for crops, and most of the remainder is used for pasture. Management problems include controlling erosion, maintaining the organic-matter content, and conserving moisture. To maintain productivity, hay crops should

be grown half of the time. All tillage should be on the contour, and cultivated crops and close-growing hay or winter grains should be planted in alternate strips.

Chester silt loam, 6 to 12 percent slopes, severely eroded (CdC3).—This soil is similar to Chester silt loam, 0 to 3 percent slopes, but erosion has removed at least three-fourths of the original surface soil. Some areas have many shallow gullies, and some have deep gullies. Subsoil is mixed with the remainder of the original surface soil; consequently, the plow layer is lighter colored and finer textured than the original surface soil. Runoff is medium to rapid.

Use and management (Capability unit IVe–3).—About 88 percent of this soil is in crops, and the rest is in pasture or is idle. This soil is best suited to the production of forage crops. Its use is limited by the slopes, the damage done by past erosion, and the lack of organic matter.

Chester silt loam, 12 to 18 percent slopes (CdD).—This soil is 12 to 15 inches shallower than Chester silt loam, 0 to 3 percent slopes. The erosion hazard would be high if the soil were cultivated. Under forest cover, erosion is not generally a problem. Runoff is rapid to very rapid.

Use and management (Capability unit IVe–3).—About 98 percent of this soil is in trees. If this soil were cleared, it would be best suited to long-term hay. It might be used for crops in a long rotation if intensive conservation measures were used.

Chester silt loam, 12 to 18 percent slopes, moderately eroded (CdD2).—This soil is like Chester silt loam, 0 to 3 percent slopes, but it is shallower and has lost from one-fourth to three-fourths of its surface soil through sheet erosion. The remaining surface soil has been mixed with subsoil. The resulting plow layer is lighter colored, finer textured, and less absorptive than the original surface soil and more likely to puddle when wet. Some areas have a few shallow gullies. The rapid to very rapid runoff causes serious erosion on unprotected croplands.

Use and management (Capability unit IVe–3).—About 66 percent of this soil is used for crops, 30 percent for pasture, and 3 percent for woods. To maintain productivity, the rotation should be very long or the soil should be used continuously for hay. Management needs include the prevention or control of erosion, the conservation of moisture, and the maintenance of the organic-matter content. Safe operation of farm equipment is difficult.

Chester stony loam, 0 to 6 percent slopes (CeA).—This soil is like Chester loam, 3 to 6 percent slopes, except that about 25 percent of it consists of fragments of the parent rock, which are scattered throughout the profile. Large stones and boulders cover 3 to 15 percent of the surface and make tillage impractical. This soil is somewhat shallower than the nonstony Chester loams. Erosion is slight in most places because the soil is protected by its forest cover. This soil is acid (pH 5.0 to 6.5).

Use and management (Capability unit VIs–1).—About 85 percent of this soil is in woods, 8 percent is in crops, and 2 percent is in pasture; 4 percent is idle. This soil is too stony to be used for crops unless large quantities of stones are removed. It is best suited to the production of timber. Cleared areas may be used for pasture.

Chester stony loam, 6 to 12 percent slopes (CeC).—This soil is similar to Chester stony loam, 0 to 6 percent slopes, but it is shallower. Erosion is generally slight where the soil is protected by forest.

Use and management (Capability unit VIs–1).—About 58 percent of this soil is in forest, 33 percent is in crops, and 9 percent is in pasture. This soil is not suitable for crops because it is so stony. It is best suited to woods, but cleared areas may be used for pasture. Good pasture and woodland management practices are generally enough to maintain this soil.

Chester stony loam, 12 to 18 percent slopes (CeD).—This soil is like Chester stony loam, 0 to 6 percent slopes, but it is shallower and more stony. Erosion is slight where the soil is protected by forest.

Use and management (Capability unit VIIe–2).—About 45 percent of this soil is used for crops, 52 percent for forest, and 2 percent for pasture. This soil is too steep and stony to be good cropland. It is best suited to the production of trees for timber or for cover for wildlife. Good woodland management practices are needed. Some areas may need to be replanted to trees or other vegetation.

Chester stony loam, 18 to 25 percent slopes (CeE).—This soil is shallower than Chester stony loam, 0 to 6 percent slopes, and it contains more and larger stones. Erosion is generally slight in areas that are left in forest.

Use and management (Capability unit VIIe–2).—About 69 percent of this soil is in woods, 23 percent is in pasture, and 4 percent is in crops; 4 percent is idle. These steep, stony slopes are best suited to the production of trees for timber or for shelter and food for wildlife. Good forest management practices are needed to protect the soil. Some fields should be replanted to trees or other vegetation.

Chewacla Series

These are moderately well drained to somewhat poorly drained alluvial soils. They are moderately fertile and have a high moisture-holding capacity. The accumulated sand, silt, and clay from which they formed were deposited during high water or floods. Most areas developed under a cover of oak, ash, elm, and other hardwood trees, but a few small areas were under grass.

These soils occur in the southern part of the county. They occupy the first bottoms in narrow valleys that are frequently flooded. The level or nearly level valley floors are flanked by rather steep slopes. Runoff is slow or very slow. The water table is high because water from the nearby uplands runs onto these areas.

These soils are associated with the well-drained Congaree and the poorly drained Wehadkee soils of the flood plains and with the Chester, Glenelg, Manor, and Glenville residual soils of the upland.

Chewacla silt loam, 0 to 3 percent slopes (CfA).—A profile observed in a pasture follows.

0 to 14 inches, dark-brown very friable silt loam; weak medium platy and fine subangular blocky structure.
14 to 16 inches, dark grayish-brown very friable silt loam; weak medium platy to fine subangular blocky structure.

16 to 20 inches, yellowish-brown to light olive-brown very friable silt loam; weak medium subangular blocky structure.
20 to 36 inches, yellowish-brown to light olive-brown very friable silt loam; weak medium to coarse subangular blocky structure; very faintly mottled with slightly lighter and darker colors.
36 to 42 inches, light olive-brown friable heavy silt loam; many distinct, strong-brown mottles; weak medium to coarse subangular blocky structure.

Flakes and particles of mica are common throughout the profile. The surface soil sparkles and feels greasy because of these mica flakes.

Erosion is not a problem if enough cover is on the ground during the flood season. Stream gouging and bank erosion occur when the water is high. Some erosion is caused by surface water that cuts across the flood plains from nearby uplands. During periods of high water, pastures and hayfields usually receive more material through deposition than they lose through erosion.

The frequent additions of soil material prevent the development of normal soil horizons. In some places the soil shows very little difference in color, texture, or structure to a depth of 3 feet or more.

Use and management (Capability unit IIw–3).—About 65 percent of this soil is in pasture, 17 percent is in woods, 14 percent is in crops, and the rest is idle. Because of the somewhat poor drainage and the danger of frequent floods, this soil is unsuitable for winter grain, root crops, alfalfa, or other plants that are easily damaged by excess water in the root zone.

Conestoga Series

These are deep, well-drained soils underlain by micaceous limestone. They are easily worked, highly productive, and high in moisture-holding capacity. The native vegetation was a forest of oaks, hickories, and poplars.

The Conestoga limestone from which these soils developed is made up of thin-bedded limestone, closely folded beds of dark graphitic shale or slate, and thicker beds of gray granular limestone containing mica and iron pyrite crystals. The topography is undulating to rolling. These soils are very easily eroded.

These soils occur mainly in a broad belt that crosses the county south of Lancaster. The northern boundary runs approximately along United States Highway No. 30 from Mountville to Leaman Place, and the southern boundary extends from Creswell to Rockhill and then to Willow Street and Strasburg. A narrow irregular band runs from the Susquehana River near Marticville to Hessdale, New Providence, and Quarryville, and east through the Chester Valley.

The associated soils belong to the Hollinger, Letort, Pequea, and Duffield series.

Conestoga silt loam, 0 to 3 percent slopes (CgA).—The following profile of this soil is in a forested area.

0 to 4 inches, dark-brown very friable silt loam; weak fine granular structure.
4 to 10 inches, yellowish-brown very friable silt loam; weak fine granular structure.
10 to 15 inches, strong-brown heavy friable silt loam; weak fine to medium subangular blocky structure.
15 to 29 inches, strong-brown fine silt loam; firm; moderate medium blocky structure.
29 to 34 inches, strong-brown to yellowish-brown friable silt loam; weak fine to medium blocky structure.
34 inches +, yellowish-brown highly weathered limestone; contains small fragments of calcareous schist and finely divided mica.

The substratum extends to a depth of at least 45 inches. The depth to bedrock is generally about 72 inches but may be more or less.

The weathered parent material feels greasy because of the finely divided mica. The color ranges from strong brown to olive brown where dark-colored minerals or graphite occur. Some very small areas of gravelly silt loam are included in this mapping unit.

This soil is very susceptible to erosion, but, because runoff is slow to very slow, erosion has not been a problem in most places. In some places there are a few shallow gullies.

Use and management (Capability unit IIe–3).—About 88 percent of this soil is used for crops, 8 percent for pasture, and 3 percent for forest. Some truck crops and orchard fruits are grown on this soil, but most of it is used for diversified farming. Most common is a 4-year rotation consisting of corn; tobacco or other cultivated crop; winter grain; and hay. Cover crops follow corn on about half of the farms.

This soil is suitable for cultivation, but simple conservation practices are needed to maintain the organic-matter content and control sheet erosion.

Conestoga silt loam, 3 to 6 percent slopes (CgB).—This soil is like Conestoga silt loam, 0 to 3 percent slopes. It is not seriously eroded. Less than one-fourth of the original surface soil has been lost. Runoff is slow to medium.

Use and management (Capability unit IIe–3).—About 47 percent of this soil is used for crops, 36 percent for pasture, and 17 percent for forest. This soil is suitable for rotation crops if simple conservation practices are used. The major problems are maintaining the organic-matter content, preventing erosion, and conserving moisture.

Conestoga silt loam, 3 to 6 percent slopes, moderately eroded (CgB2).—This soil is somewhat shallower than Conestoga silt loam, 0 to 3 percent slopes, and it has lost from one-fourth to three-fourths of its original surface soil through sheet erosion. The remaining surface soil has been mixed with subsoil to form a plow layer that is lighter colored and finer textured than the original. Some fields have a few shallow gullies. Further erosion would seriously impair the productivity of this soil. Runoff is slow to medium.

Use and management (Capability unit IIe–3).—About 95 percent of this soil is used for crops, 4 percent is used for pasture, and 1 percent is idle (fig. 5). The management problems are controlling erosion, conserving moisture, and maintaining the organic-matter content.

Conestoga silt loam, 3 to 6 percent slopes, severely eroded (CgB3).—This soil occurs on long slopes where enough runoff water has concentrated to do serious damage to the soil. It is like Conestoga silt loam, 0 to 3 percent slopes, but it is shallower and has lost at least three-fourths of its surface soil. The plow layer now consists almost entirely of subsoil material. It is finer textured and it absorbs and stores less moisture

Figure 5.—Tobacco being harvested on Conestoga silt loam, 3 to 6 percent slopes, moderately eroded. Cut tobacco plants are wilted in the sun, speared on a lath, and dried in the tobacco shed in right background.

than the original surface soil. Most fields have many shallow gullies. Runoff is slow to medium.

Use and management (Capability unit IVe–1).—About 99 percent of this soil is used for crops. Only 1 percent is used for pasture. Hay is the most suitable crop. Cultivated crops should be grown only occasionally, and intensive conservation measures should be applied.

Erosion is the major hazard. If it is not controlled, the productivity of this soil will be seriously impaired. Other management needs are the conservation of moisture and the addition of organic matter.

Conestoga silt loam, 6 to 12 percent slopes (CgC).—This soil is like Conestoga silt loam, 0 to 3 percent slopes, but somewhat shallower. Some fields have lost up to one-fourth of their surface soil through sheet erosion. Runoff is medium to rapid.

Use and management (Capability unit IIIe–3).—Forest occupies 80 percent of this soil, and 20 percent of the acreage is in crops. Erosion may become a serious problem if the wooded areas are cleared and cultivated. General crops can be grown in rotation if intensive conservation practices are used. Controlling erosion, conserving moisture, and maintaining the organic-matter content are the major problems of management.

Conestoga silt loam, 6 to 12 percent slopes, moderately eroded (CgC2).—The profile of this soil is not so well developed as that of Conestoga silt loam, 0 to 3 percent slopes. From one-fourth to three-fourths of the surface soil has been lost through moderate to severe sheet erosion. Some fields have a few shallow gullies. Runoff is medium to rapid. Rock outcrops in a few areas are shown on the soil map by rock outcrop symbols.

Use and management (Capability unit IIIe–3).—About 81 percent of this soil is used for crops and 8 percent for pasture; 5 percent is occupied by buildings and towns, and 2 percent is wooded. The rest is idle. This soil is suitable for rotation crops if intensive conservation practices are used. Problems of management include controlling erosion, conserving moisture, and restoring organic matter to the soil.

Conestoga silt loam, 6 to 12 percent slopes, severely eroded (CgC3).—Erosion has almost destroyed the productivity of this soil. All or most of the original surface soil has been lost through sheet erosion. Some fields have many shallow gullies and a few deep ones. The plow layer is composed of subsoil mixed with a little of the original surface soil and a little organic matter. It is more droughty, less absorptive, and poorer in tilth than the original surface soil. Runoff is medium to rapid.

Use and management (Capability unit IVe–1).—Nearly all of this soil is in crops. The severe erosion is the result of cultivating up and down the slopes.

This soil is now best suited to hay, but it can be cultivated occasionally. Erosion is the major hazard. Other management problems are conserving moisture and restoring organic matter.

Conestoga silt loam, 12 to 18 percent slopes, moderately eroded (CgD2).—This soil occurs on the sides and edges of rather narrow valleys that the major streams have cut in the uplands. It is like the other Conestoga silt loam soils, but it has lost from one-fourth to three-fourths of its original surface soil. A few shallow gullies occur in some fields. The present plow layer consists of subsoil mixed with small amounts of the original surface soil. It is not so absorptive or so easy to cultivate as the original surface soil. Runoff is rapid to very rapid.

Included in the mapping unit is one small area that is only slightly eroded.

Use and management (Capability unit IVe–1).—The slightly eroded area is all wooded. Of the moderately eroded acreage, 65 percent is cropland, 32 percent is pasture, and 3 percent is woodland. This soil is best suited to hay. It may be cultivated occasionally if intensive conservation measures are applied to prevent further erosion. Other hazards are loss of moisture and loss of organic matter.

Conestoga silt loam, 12 to 18 percent slopes, severely eroded (CgD3).—This soil is like Conestoga silt loam, 0 to 3 percent slopes, but it is shallower and more eroded. It has lost more than three-fourths of its original surface soil. Some fields have many shallow gullies. Some very small areas of very severely eroded soil are included. Runoff is rapid to very rapid.

Use and management (Capability unit VIe–1).—Nearly all of the very severely eroded acreage has been used for crops. About 64 percent is still used for crops, and 36 percent is idle. About 83 percent of the severely eroded acreage is in crops, 12 percent is in pasture, 2 percent is wooded, and 2 percent is idle.

This soil should be used for pasture or forest. Most of it has been cultivated too intensively and without regard to slope. Further erosion is a serious hazard. Other hazards are loss of moisture, loss of organic matter, and danger in operating farm equipment.

Conestoga silt loam, 18 to 25 percent slopes, moderately eroded (CgE2).—This soil is like the other Conestoga soils, but it is the shallowest of the series. Sheet erosion has removed up to three-fourths of the surface soil. Some shallow gullies have formed. The mixing of subsoil with surface soil in the plow layer makes the present surface layer finer textured, lighter colored, and more droughty than the original.

This soil occurs in steep or hilly places on the sides of stream-cut valleys. Runoff is rapid to very rapid. Some small areas are only slightly eroded, and a few small areas are severely eroded. Some areas, shown on the soil map by symbols, are stony or ledgy.

Use and management (Capability unit VIe–1).—About 23 percent of this soil is in crops; 26 percent is in pasture, and 46 percent is wooded. This soil is best suited to pasture. The slopes are so steep, that it is almost impossible to use farm machinery safely or efficiently.

Congaree Series

These are deep, well-drained, alluvial soils that occur on flood plains in the Piedmont Uplands in the southern part of the county. They developed from sediments washed from the schist and gneiss uplands. They are moderately fertile. Their moisture-holding capacity is moderately high. Some of these soils may have been in natural meadows, but most of them developed under a forest of oak, hickory, elm, ash, and poplar trees.

These soils are associated with the moderately well drained Chewacla and the poorly drained Wehadkee soils of the flood plains. Nearby upland soils are of the Chester, Elioak, Glenelg, Manor, and Glenville series.

Congaree silt loam, 0 to 3 percent slopes (CmA).—A profile of this soil is described as follows:

0 to 12 inches, brown silt loam; contains some mica flakes.
12 to 42 inches, yellowish-brown to light yellowish-brown silt loam.
42 inches +, light yellowish-brown sandy loam.

Most layers of this soil feel greasy because they contain so much mica.

This soil is not seriously eroded. Sometimes washouts occur during floods, but usually more material is deposited than is removed. This tends to keep the surface soil thick and well supplied with organic matter.

Use and management (Capability unit I–3).—This soil is suitable for cultivated crops, but, because it occurs in small areas and is likely to be flooded, it is more commonly used for pasture. Only 11 percent is cultivated, 81 percent is pastured, and 8 percent is wooded. There are few management problems other than those created by occasional flooding.

Croton Series

The Croton series consists of poorly drained upland soils. They formed partly from the underlying red and yellow Triassic sandstone, conglomerate, and shale and partly from colluvial material that was eroded from nearby slopes. They lie in natural depressions and drainageways, at the base of slopes, around stream heads, and in a few places on flats or slightly concave ridgetops. The native vegetation consisted of oaks and hickories, and other hardwood trees that grow on wet soils.

These soils have very slow internal drainage. A claypan or hardpan occurs at depths of 12 to 24 inches. The subsoil is waterlogged much of the time.

These soils are low in natural fertility and, because of lack of pore space, have low moisture-holding capacity.

These soils occur in a belt that crosses the northern part of the county, extending from Falmouth to Bainbridge then east to Elizabethtown, Mastersonville, Elstonville, Brickerville, Mt. Airy, Denver, Ephrata, and Terre Hill. They are associated with the moderately well drained Readington and the well drained Penn, Lewisberry, Lansdale, and Steinsburg soils on the uplands, and with the Bowmansville, Rowland, and Bermudian soils on the flood plains.

Croton loam, 0 to 3 percent slopes (ChA).—The following profile was observed in a cultivated field.

0 to 7 inches, dark reddish-gray very friable loam; moderate granular and fine subangular blocky structure.
7 to 12 inches, white to light brownish-gray coarse sandy loam; very firm or cemented in place, loose or friable when removed; moderate medium blocky, tending to prismatic, structure; blocks are coated with pinkish-gray or reddish-gray clay and silt.
12 to 20 inches, pinkish-gray and light-brown firm gritty clay loam mottled with reddish yellow and strong brown; compact; very slowly permeable; coarse prismatic, breaking to medium blocky, structure; largest peds or prisms coated with light reddish-brown clay.
20 to 42 inches, reddish-yellow and strong-brown firm clay loam; surface or peds mottled with pinkish gray and light brown; strong coarse prismatic structure; yellowish-red clay flows on surface of prisms.

The compact, dense hardpan or claypan between 12 and 20 inches is typical of the Croton soils. It may extend to 24 inches.

Runoff is slow or very slow. The little erosion that occurs is caused by the movement of water from the uplands across these areas. Pockets and depressions in the surface slow the movement of surface water.

This soil occurs in depressions, drainageways, and at the base of slopes where seep spots or springs occur. Some spots are wet because of surface water, but most are wet because of underground water.

Use and management (Capability unit IVw–1).—About 40 percent of this soil is in crops, 51 percent is in pasture, and 5 percent is in forest; 4 percent is idle. This soil is best suited to hay or pasture. Surplus water on the surface and in the soil is the major hazard to crops. Tilth is poor, and the root zone is limited by the presence of the hardpan. Surface drainage might improve yields. Diversion terraces, drainage terraces, bedding, and other means of improving drainage are needed if crops are grown.

Croton loam, 3 to 8 percent slopes, moderately eroded (ChB2).—This soil is like Croton loam, 0 to 3 percent slopes, except that it has lost from one-fourth to three-fourths of the original surface soil through sheet erosion. Some fields have a few shallow gullies. Some small areas are severely eroded. The tough subsoil is just under the plow layer in most places. In cultivated fields the plow layer is a mixture of surface soil and heavy clay subsoil and is very difficult to manage.

This poorly drained soil is in seep areas and around streamheads, drainageways, and surface depressions. They are associated with Penn and Lansdale soils. Runoff is slow to medium. Water does not stand on the surface, but the subsoil is wet most of the year.

Use and management (Capability unit IVw–1).—About 30 percent of this soil is in crops, 40 percent is in pasture, 16 percent is wooded, and 13 percent is idle. This soil is best suited to forage crops. The major problem is improving the drainage. Controlling erosion may also be a problem but a less difficult one than correcting poor drainage.

Croton loam, 8 to 15 percent slopes, moderately eroded (ChC2).—This soil was originally shallower than Croton loam, 0 to 3 percent slopes, and erosion has removed from one-fourth to three-fourths of the surface soil. The tough subsoil or pan layer is within a few inches of the plow layer. Some fields have a few shallow gullies. A few very small wooded areas are only slightly eroded. Runoff is medium to rapid.

Use and management (Capability unit IVe–5).—About 66 percent of this soil is in woods, and 33 percent is in pasture. Pasture is the most suitable long-time use. Controlling erosion is the major problem, and improving drainage the next most serious problem.

Croton silt loam, 0 to 3 percent slopes (CkA).—A profile of this soil in a pasture follows.

0 to 6 inches, dark grayish-brown friable silt loam plow layer; moderately thin platy structure.
6 to 12 inches, dark-gray friable silt loam distinctly mottled with fine yellowish-brown streaks; coarse platy and strong medium blocky structure.
12 to 36 inches, dark-gray to gray firm silty clay loam; prominently mottled with medium brownish-yellow and gray streaks; strong medium to coarse blocky structure.

The subsoil is hard when dry, and it cracks open revealing a strong blocky structure that is arranged in columns or prisms in the lower horizons. The subsoil is fine textured, compact, and very slowly permeable.

No more than one-fourth of the surface layer has been removed by sheet erosion. In some areas enough material washed from higher lying areas is deposited to maintain a dark silty surface layer that shows little evidence of poor drainage to depths of 12 to 18 inches.

This soil usually overlies Triassic shale, which contains silt or clay but very little sand. It commonly occurs where the water table is high or where water seeps out at the base of slopes, around drainageways, or in wet spots in fields. Some areas are in spots where water that accumulated in higher lying sandy soils moved down the slopes and came to the surface because it could not percolate through the subsoil.

Use and management (Capability unit IVw–1).—About 60 percent of this soil is used for crops, 23 percent is used for hay or pasture, 6 percent is wooded, and 10 percent is idle. This soil is best suited to hay or pasture. Surface drainage is needed to remove the excess water. The heavy clay subsoil makes drainage by tile very difficult.

Croton silt loam, 3 to 6 percent slopes (CkB).—This soil is like Croton silt loam, 0 to 3 percent slopes. It has better surface drainage, but the subsoil is very wet and fine textured. Runoff is slow to medium. Erosion is not a serious problem. No more than one-fourth of the original surface layer has been washed away. Some material is deposited on this soil.

Use and management (Capability unit IVw–1).—About 83 percent of this soil is in woods, 14 percent is in pasture, and 2 percent is in cultivated crops. This soil is best suited to grass. Surface drainage by terraces, diversions, and bedding improves yields if enough lime and fertilizer are used.

Croton silt loam, 3 to 6 percent slopes, moderately eroded (CkB2).—This soil has lost from one-fourth to three-fourths of its surface layer through sheet erosion; otherwise, it is like Croton silt loam, 0 to 3 percent slopes. Some spots are severely eroded. The loss of soil has reduced the depth of the root zone. The plow layer is difficult to manage because some of the fine-textured subsoil is mixed with the remaining surface soil. Runoff is slow to medium. The subsoil is waterlogged.

Use and management (Capability unit IVw–1).—About 42 percent of this soil is in crops, 40 percent is in pasture, and 8 percent is in woods; 7 percent is idle. Pasture is the most intensive long-term use to which this soil is suited. Controlling erosion and improving drainage are the major problems. Drainage terraces, diversions, and bedding can be used to improve surface drainage.

Croton silt loam, 6 to 12 percent slopes, moderately eroded (CkC2).—This soil occurs in drainageways or on seepy slopes. It is like Croton silt loam, 0 to 3 percent slopes, but shallower. Erosion has removed from one-fourth to three-fourths of the original surface soil. Some shallow gullies have formed. One very small area is severely eroded. Productivity is limited by the shallowness of the soil over the hardpan. Runoff is medium to rapid.

Use and management (Capability unit IVe–5).—Forest covers 86 percent of this soil, and pasture another 8 percent. The rest is in crops. Pasture is the most intensive long-term use to which this soil is suited. The main problems are controlling erosion and removing excess water.

Duffield Series

The Duffield series consists of deep, well-drained, highly productive soils that have high moisture-holding capacity. They formed under a forest of oak, hickory, yellow-poplar, and other hardwood trees. The parent rock was shaly or impure limestone of the Elbrook, Conococheague, Beekmantown, and Conestoga formations. These rocks weather by solution, leaving their impurities and weathered products to form a deep residual soil.

The underlying limestone contains many cracks, solution channels, and caves, which provide good internal drainage. Surface drainage is very slow to medium. Runoff flows mostly in shallow, poorly defined drainageways that lead to sinkholes or streams. Many small streams that originate over shale bedrock disappear into sinkholes or into the porous soil when they reach areas underlain by limestone. Rocky or ledgy areas are shown on the map by stone outcrop symbols.

Typical of these soils are sinkholes and depressions formed by the collapse of cave roofs. In wet weather these may hold enough water to drown crops, but permanent wet spots are uncommon.

Most of these soils are on low, well-rounded hills separated by undulating or very gently rolling valleys. Some small areas on stronger slopes are in narrow valleys. These soils occur across a broad belt in the north-central part of the country. The southern boundary of this belt extends from a point near Bainbridge and Marietta to Lancaster, then southeastward along the Lincoln Highway (United States Highway No. 30) to the eastern edge of the county. The northern boundary extends from Bainbridge to Rheems, Mount Joy, Lancaster Junction, Brownstown, Hinkletown, and Churchtown, then out of the county. A smaller area of Duffield soils occurs near Manheim, Lititz, Clay, Denver, and Ephrata. These two areas are separated by the Welsh Mountains and by the shale ridge that extends from just south of Manheim to Kissel Hill, Akron, and Ephrata. Another area of these soils is south of Lancaster.

The Duffield soils are associated with nearly all of the soils in the county, but principally with soils of the Lawrence, Lindside, Murrill, Huntington, and Melvin series.

These are among the most fertile and the most intensively farmed soils in the county. They produce excellent yields of corn and tobacco. A combination of crop and livestock farming is the usual practice. The livestock may be either beef or dairy cattle. Corn, tobacco and tomatoes are the major cultivated crops.

Duffield silt loam, 0 to 3 percent slopes (DbA).—This soil occurs on valley floors and on uplands away from the major streams and drainageways. The following profile was observed in a cornfield.

0 to 9 inches, dark grayish-brown to very dark grayish-brown friable silt loam; moderate medium to fine granular structure.
9 to 14 inches, yellowish-brown friable silt loam; medium subangular blocky structure.
14 to 28 inches, yellowish-brown friable silty clay loam; moderate medium subangular blocky structure.
28 to 43 inches +, strong-brown firm silt loam; moderate medium blocky structure.

The layer of strong-brown silt loam extends to a depth of at least 36 inches, and in places it extends to a depth of 60 inches or even more. The depth of the profile depends on the rate of weathering of the parent rock.

This soil is not seriously eroded, but some areas may have lost up to one-fourth of the original surface soil. Runoff is slow to very slow.

Use and management (Capability unit I–1).—Nearly all—92 percent—of this soil is used for crops, 6 percent is used for pasture, and 1 percent is used for forest. This soil is well suited to corn, tobacco, tomatoes, and other crops in rotations. The problems of management are few. Erosion can be controlled easily with simple conservation measures. On slopes of less than 2 percent, the major problem is to maintain the supply of organic matter.

Duffield silt loam, 0 to 3 percent slopes, moderately eroded (DbA2).—Sheet erosion has removed from one-fourth to three-fourths of the original surface layer from this soil. The plow layer is finer textured and somewhat lighter colored than that of Duffield silt loam, 0 to 3 percent slopes, because of the mixing of subsoil with the remaining surface soil. Some fields have a few shallow gullies. In areas where runoff has accumulated at the base of slopes or on long slopes, many shallow gullies have formed. The normal runoff is slow to very slow.

Use and management (Capability unit IIe–1).—About 96 percent of this soil is in crops, and the rest is in pasture or woods. This soil is suitable for general farm crops in rotation. The management problems are to maintain the supply of organic matter and to prevent further erosion.

Duffield silt loam, 3 to 6 percent slopes (DbB).—This soil is like Duffield silt loam, 0 to 3 percent slopes. Runoff is slow to medium, but little erosion has taken place because the soil occurs on ridgetops or short slopes where water does not accumulate. Sheet erosion has removed less than one-fourth of the original sur-

face soil. Some areas have been protected by grass or trees.

Use and management (Capability unit IIe–1).—About 64 percent of this soil is in crops, 28 percent is in woods, and the rest is in pasture. The major problems of management are to maintain the supply of organic matter and to prevent erosion. Simple conservation measures are needed.

Duffield silt loam, 3 to 6 percent slopes, moderately eroded (DbB2).—This is the most extensive soil of the Duffield series. It is like Duffield silt loam, 0 to 3 percent slopes, except that from 2 to 8 inches of the surface soil has been removed by sheet erosion. Part of the subsoil has been mixed into the plow layer, which is now lighter colored, finer textured, less absorptive, and more difficult to work than the original surface soil. Some fields have a few shallow gullies. Runoff is slow to medium.

Use and management (Capability unit IIe–1).—Except for 1 percent in pasture and 1 percent in building sites and road sites, this soil is all in crops. It is intensively farmed and highly productive. It is excellent for the production of general farm crops in rotation. Simple conservation measures are needed to control erosion, conserve moisture, and maintain a good supply of organic matter.

Duffield silt loam, 3 to 6 percent slopes, severely eroded (DbB3).—This soil was originally like Duffield silt loam, 0 to 3 percent slopes, but now more than three-fourths of the original surface soil is gone. Small knolls or short slopes from which sheet erosion has removed all of the surface soil are called "clay heads" because the tough, fine-textured subsoil is exposed. Some areas have a few shallow gullies, and others have many. The gullies have formed where runoff from steeper slopes accumulates and damages areas below. The plow layer is composed of subsoil mixed with a little surface soil and organic matter. This fine-texture surface seals quickly during rains; consequently, much of the water runs off.

Use and management (Capability unit IVe–1).—Most of this soil is cultivated, but some is better suited to hay or pasture. The shallower areas store less moisture than the rest of this soil and crops may be damaged by drought. Long rotations and intensive conservation practices are needed. The most severely eroded areas may need very intensive conservation measures to control erosion. Organic matter should be added.

Duffield silt loam, 6 to 12 percent slopes (DbC).—This soil is similar to Duffield silt loam, 0 to 3 percent slopes, but is shallower. Runoff is medium to rapid. Erosion has not been a problem, although some areas have lost up to one-fourth of the original surface soil. This soil occurs on the sides of low ridges and near streams throughout the limestone areas.

Use and management (Capability unit IIIe–1).—Only 33 percent of this soil is in crops. The rest is in forest. This soil is suited to rotation crops, but intensive conservation practices are needed to prevent erosion, maintain the supply of organic matter, and conserve moisture. Areas protected by grass or forest are not likely to erode.

Duffield silt loam, 6 to 12 percent slopes, moderately eroded (DbC2).—This soil is shallower than Duffield silt loam, 0 to 3 percent slopes, and it has lost up to three-fourths of its surface soil through sheet erosion. Some areas have a few shallow gullies. Runoff is medium to rapid. The plow layer is a mixture of subsoil and remnants of surface soil. It is lighter colored, finer textured, and more difficult to work than the original surface layer. During rains the surface seals over quickly; consequently, much of the rainwater runs off.

Use and management (Capability unit IIIe–1).—About 87 percent of this soil is in crops, 7 percent is in pasture, and 6 percent is used for other purposes. This soil is suitable for farming, but needs to be protected from erosion. A long rotation and intensive conservation practices are necessary to conserve water, increase the supply of organic matter, and maintain good structure in the surface soil. Crops on this soil show drought damage more quickly than crops on surrounding soils.

Duffield silt loam, 6 to 12 percent slopes, severely eroded (DbC3).—This soil is like Duffield silt loam, 0 to 3 percent slopes, except that it has lost at least three-fourths of its surface soil. Most fields have at least a few shallow gullies, and some have many. A few spots are very severely eroded. Runoff is medium to rapid.

Use and management (Capability unit IVe–1).—About 97 percent of this soil is cultivated, and 3 percent is in pasture. Erosion has greatly reduced the productivity of this soil. All of it is better suited to pasture than to crops. It can be cultivated occasionally if intensive measures are applied to prevent erosion, loss of organic matter, and loss of moisture. The very severely eroded spots need special care.

Duffield silt loam, 12 to 18 percent slopes (DbD).—This soil is shallower than Duffield silt loam, 0 to 3 percent slopes, but the profile is similar. Less than one-fourth of the surface soil has been lost through erosion. Runoff is rapid to very rapid.

Use and management (Capability unit IVe–1).—This soil is best suited to perennial hay, but it can be cultivated in a long rotation if intensive measures are applied to control erosion, build up the supply of organic matter, and divert water from long slopes.

Duffield silt loam, 12 to 18 percent slopes, moderately eroded (DbD2).—The profile of this soil was originally like that of Duffield silt loam, 0 to 3 percent slopes, but shallower. Runoff is rapid to very rapid. Erosion has removed from one-fourth to three-fourths of the surface soil, and the remainder is mixed with subsoil in the plow layer. This soil is more difficult to work, stores less moisture, and is less productive than before it was eroded. More water runs off because the surface seals over quickly during rains. Some fields have a few shallow gullies.

Use and management (Capability unit IVe–1).—About 61 percent of this soil is in crops, 34 percent is in pasture, and 4 percent is in woods. Much of the pasture was once cropland. Pasture is the best long-term use for this soil. A cultivated crop should be grown only occasionally, and then with intensive practices to prevent erosion and to conserve moisture and organic matter.

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Duffield silt loam, 12 to 18 percent slopes, severely eroded (DbD3).—Most of this soil is located on the sides of valleys near streams that have cut into the uplands. A few areas are on the sides of narrow ridges of more resistant rock. Before this soil was eroded, the profile was like that of other Duffield soils, but now at least three-fourths of the original surface soil is gone.

Severe erosion has exposed the finer-textured subsoil, which is more difficult to till and absorbs water less rapidly than the original surface soil. Most areas have a few shallow gullies, and some have many. Runoff is rapid to very rapid.

Use and management (Capability unit VIe–1).—Nearly all of this soil is cultivated, but it should be used for pasture or trees. It is droughty and erodible. Using farm equipment on these steep slopes is hazardous.

Duffield silt loam, 18 to 30 percent slopes (DbE).—This soil is shallower than Duffield silt loam, 0 to 3 percent slopes. In most places erosion has removed from one-fourth to three-fourths of the original surface soil. Some areas are more severely eroded, and some less. Runoff is rapid.

Use and management (Capability unit VIIe–1).—Only 10 percent of this soil is cultivated, 35 percent is pastured, and 55 percent is wooded. This soil is unsuitable for cultivation because of the steep slopes, the risk of erosion, and the danger in operating farm equipment. It should be retired to trees.

Duffield gravelly silt loam, 0 to 3 percent slopes (DaA).—Except for the concentration of quartz gravel on and near the surface, this soil is like Duffield silt loam, 0 to 3 percent slopes. The gravel was derived from veins of quartz in the limestone parent material. Runoff is slow to very slow. Less than one-fourth of the original surface soil has been removed by sheet erosion.

Use and management (Capability unit I–1).—This is one of the most fertile and intensively farmed soils in the county. It has few limitations or hazards in use. About 80 percent is cultivated, and 19 percent is in pasture. It is well suited to general farming, and it is an excellent producer of corn and tobacco. The major problems under intensive cultivation are maintaining the organic-matter content and keeping the soil in good tilth.

Duffield gravelly silt loam, 0 to 3 percent slopes, moderately eroded (DaA2).—This soil occurs on eroded knolls and in spots where surface water accumulates at the base of slopes and causes erosion. It is like Duffield gravelly silt loam, 0 to 3 percent slopes, but it has lost from one-fourth to three-fourths of its original surface soil. Runoff is slow to very slow.

Use and management (Capability unit IIe–1).—Nearly all of this soil is used for crops. It is well suited to rotation crops, but there is some danger of erosion and loss of organic matter. Simple conservation measures and a long rotation are some of the good farming practices needed to maintain productivity.

Duffield gravelly silt loam, 3 to 6 percent slopes (DaB).—This soil is like Duffield gravelly silt loam, 0 to 3 percent slopes. It has lost less than one-fourth of its surface soil. Erosion has not been a problem because the soil has been protected by vegetation and has not received concentrations of surface water. Runoff is slow to medium.

Use and management (Capability unit IIe–1).—About 50 percent of this soil is in forest, 38 percent is in pasture, and 11 percent is used for other purposes. It is well suited to rotation crops if simple conservation measures are used to guard against erosion and to maintain the supply of organic matter.

Duffield gravelly silt loam, 3 to 6 percent slopes, moderately eroded (DaB2).—This is the most extensive phase of Duffield gravelly silt loam. It is like Duffield gravelly silt loam, 0 to 3 percent slopes, except that it has lost from one-fourth to three-fourths of its surface soil through sheet erosion. Some fields have a few shallow gullies. The remaining surface soil has been mixed with subsoil in cultivation. The resulting plow layer is more cloddy, less absorbent, finer textured, and more difficult to cultivate than the original surface soil. Runoff is slow to medium.

Some small areas at the base of longer slopes have been severely eroded by concentrated surface water.

Use and management (Capability unit IIe–1).—About 96 percent of this soil is in crops, and 2 percent is in pasture. This soil is well suited to general crops in a long rotation if conservation practices are used to maintain the organic-matter content, prevent or control erosion, and conserve moisture.

Duffield gravelly silt loam, 6 to 12 percent slopes, moderately eroded (DaC2).—This is an extensive soil. It is like Duffield gravelly silt loam, 0 to 3 percent slopes, but shallower. Erosion has removed from one-fourth to three-fourths of the surface soil. A few areas have shallow gullies. The subsoil has been mixed into the remaining surface soil during cultivation. The resulting plow layer is lighter colored, finer textured, less absorbent, and more difficult to till than the original surface soil. Runoff is medium to rapid.

Use and management (Capability unit IIIe–1).—About 98 percent of this soil is cultivated, and only 1 percent is used for pasture. This soil is suitable for rotation crops, but the rotation should be long and intensive conservation measures are needed to control erosion, build up the supply of organic matter, and conserve moisture.

Duffield gravelly silt loam, 6 to 12 percent slopes, severely eroded (DaC3).—This soil occurs on short slopes near streams in the uplands. It is shallower that Duffield gravelly silt loam, 0 to 3 percent slopes. Erosion has removed at least three-fourths of the original surface soil, and most areas have many shallow gullies. The plow layer is a mixture of subsoil, surface soil, and organic matter. It is finer textured, lighter colored, and more difficult to work than the original surface soil.

Use and management (Capability unit IVe–1).—For long-term use, this soil is best suited to hay or pasture. Cultivated crops can be grown occasionally, but not more than once in 5 or 6 years. Intensive conservation practices are needed to prevent erosion and to conserve organic matter and moisture.

Duffield gravelly silt loam, 12 to 18 percent slopes, moderately eroded (DaD2).—This soil is like Duffield gravelly silt loam, 0 to 3 percent slopes, but shallower.

Erosion has further reduced the profile by removing from one-fourth to three-fourths of the original surface soil. Some fields have a few shallow gullies. The rapid to very rapid runoff creates a hazard of further erosion.

Use and management (Capability unit IVe–1).—About 86 percent of this soil is in crops, and 13 percent is in pasture. This soil is best suited to hay or pasture. It can be cultivated occasionally if intensive conservation practices are used to prevent erosion and to conserve organic matter and moisture.

Edgemont Series

These moderately deep to deep, well-drained, acid soils are underlain by quartzite. They have moderate to low natural fertility and moderate moisture-holding capacity. The native forest consisted of oak, hickory, and chestnut trees.

The Edgemont soils are underlain by very hard, mostly thick-bedded, light-colored, clear or bluish quartzite. The upper layers of these rock formations are thin-bedded, fine-grained quartzite and quartz schist. These rocks weather slowly. They form the backbones of the northeast-southwest ridges.

Three areas of these soils are located in the central part of the county. One is wedge-shaped; its base is centered along the river at Columbia, and the point extends almost to Rohrerstown. A wavy band runs from a point near Safe Harbor to Gap, passing through Conestoga, Bunker Hill, and Oak Hill, and north of Mine Ridge. A narrow band extends southward from this body to a point near Quarryville and then to Greentree. The third area is on the north side of the Welsh Mountains; it extends from Narvon northeastward to the county line.

Edgemont loam, 0 to 3 percent slopes (EcA).—Most of this soil occurs on ridgetops or on benches. A profile in a cultivated area is described as follows:

0 to 10 inches, dark yellowish-brown very friable light loam; weak crumb or granular structure.
10 to 18 inches, light yellowish-brown very friable light loam; weak subangular blocky structure.
18 to 25 inches, yellowish-brown friable loam; weak medium subangular blocky structure; 40 percent coarse fragments.
25 to 32 inches, light yellowish-brown channery very friable light loam; about 60 percent coarse fragments.
32 to 42 inches, light yellowish-brown weathered parent rock; 90 percent coarse fragments and 10 percent sandy loam soil.
42 inches +, fairly solid bedrock; tree roots and soil have penetrated cracks.

Most of this soil is only slightly eroded, having lost less than one-fourth of its surface soil. A few areas are moderately eroded. Runoff is slow to very slow.

Use and management (Capability unit IIe–4).—About 92 percent of this soil is used for crops, and 6 percent is used for pasture. This soil is suitable for rotation crops if it is heavily limed and fertilized. Other management problems are maintaining the supply of organic matter, controlling erosion, and conserving moisture.

Edgemont loam, 3 to 8 percent slopes (EcB).—This soil occurs on benches or near the top of slopes. It is similar to Edgemont loam, 0 to 3 percent slopes. Less than one-fourth of the surface soil has been lost through sheet erosion. Runoff is slow to medium.

Use and management (Capability unit IIe–4).—Most of this soil has been protected from erosion by trees or grass. About 82 percent is wooded, 8 percent is in pasture, and 8 percent is in crops. If this soil is used for crops, extra lime and fertilizer will be needed. Conservation measures are needed to prevent further damage from erosion and to conserve moisture and organic matter.

Edgemont loam, 3 to 8 percent slopes, moderately eroded (EcB2).—This is the most common of the Edgemont soils. It was originally like Edgemont loam, 0 to 3 percent slopes, but it has lost from one-fourth to three-fourths of its surface soil. Subsoil has been mixed into the plow layer in cultivation. Some areas have a few shallow gullies. Some spots are severely eroded. Runoff is slow to medium.

Use and management (Capability unit IIe–4).—About 82 percent of this soil is used for crops, 7 percent is used for pasture, 8 percent is in grounds and building sites, and 2 percent is idle. This soil is easily managed if used for general farming. It is suitable for rotation crops if protected against erosion, loss of organic matter, and loss of moisture.

Edgemont loam, 8 to 15 percent slopes (EcC).—This soil is shallower than Edgemont loam, 0 to 3 percent slopes. Less than one-fourth of the original surface soil has been removed by sheet erosion. Runoff is medium to rapid.

Use and management (Capability unit IIIe–5).—About 77 percent of this soil is in forest, 18 percent is in crops, and 4 percent is in pasture. If cultivated, this soil needs intensive conservation measures. The major problems are preventing erosion, maintaining fertility, maintaining the organic-matter content, and conserving moisture.

Edgemont loam, 8 to 15 percent slopes, moderately eroded (EcC2).—This soil is shallower than Edgemont loam, 0 to 3 percent slopes, and it has lost from one-fourth to three-fourths of its original surface soil. A few shallow gullies occur in some fields. Some spots are severely eroded. Runoff is medium to rapid.

Use and management (Capability unit IIIe–5).—About 85 percent of this soil is used for crops, 5 percent is used for pasture, 5 percent is wooded, and 5 percent is idle. These are the steepest areas of Edgemont loam that are suitable for cultivation. They can be cultivated in long rotations and with intensive conservation practices. Their limitations are the danger of further erosion, depletion of organic matter, low natural fertility, and low moisture-storing capacity. Severely eroded spots are better suited to permanent hay than to cultivated crops.

Edgemont loam, 8 to 15 percent slopes, severely eroded (EcC3).—This soil is on fairly well dissected topography on the sides of ridges or near valleys. It is like Edgemont loam, 0 to 3 percent slopes, but shallower. It has lost more than three-fourths of its surface soil through sheet erosion, and some fields have many shallow gullies. A few spots are very severely eroded. Runoff is medium to rapid.

Use and management (Capability unit VIe–2).—About 60 percent of this soil is in crops, and 13 per-

cent is idle. The remaining 27 percent probably is in building sites and town sites. This soil is best suited to pasture or other less intensive uses. If it is cultivated, erosion will continue; moisture, soil, and organic matter will be lost; and additional fertilizer will be needed to overcome the low natural fertility of the soil. The very severely eroded areas should be used for trees.

Edgemont loam, 15 to 25 percent slopes, moderately eroded (EcD2).—This soil is shallower than Edgemont loam, 0 to 3 percent slopes, and it has lost one-fourth to three-fourths of its surface soil. Runoff is rapid to very rapid. A few shallow gullies occur in some fields. Erosion has been slight in the woodland areas.

Use and management (Capability unit IVe–3).—About 77 percent of this soil is in crops, 16 percent is in pasture, and 7 percent is in woods. The slopes are almost too steep to allow safe operation of farm equipment. Soil, water, and organic matter are easily lost through erosion, and ground cover is difficult to maintain. The best use for this soil is production of forage crops. The less eroded areas can be reseeded or occasionally cultivated, but the more severely eroded fields cannot.

Edgemont loam, 15 to 25 percent slopes, severely eroded (EcD3).—This soil is shallower than Edgemont loam, 0 to 3 percent slopes. It has lost at least three-fourths of its surface soil, and in most places it has many shallow gullies. Some small areas are very severely eroded. Rapid runoff creates a serious erosion hazard.

Use and management (Capability unit VIIe–3).—About 93 percent of this soil is used for crops, and 5 percent is used for pasture. Erosion is the most serious limiting factor. Further erosion is likely if this soil is cultivated. Farm equipment is difficult to handle on the steeper slopes. Forestry is the best use for this soil because trees will produce some income and provide permanent protection while the surface soil is being rebuilt.

Edgemont channery loam, 0 to 3 percent slopes (EaA).—This soil is similar to Edgemont loam, 0 to 3 percent slopes, but it has thin fragments of rock on the surface and in the surface layer, as well as in the subsoil and substratum. The quantity of rock fragments depends on whether the soil has been cleared of stones so that it can be cultivated. Most of this soil is slightly eroded, but some small areas are moderately eroded. Under forest, the reaction ranges from pH 5.2 to 4.6.

Use and management (Capability unit IIe–4).—This soil is suitable for general farm crops in rotation, although the natural fertility and the moisture-holding capacity are both low. The organic-matter content can be maintained by including hay and pasture in the rotation. On some slopes contour cultivation is needed to conserve moisture and prevent erosion.

Edgemont channery loam, 3 to 8 percent slopes (EaB).—This soil is similar to Edgemont loam, 0 to 3 percent slopes, except that it is shallower and has rock fragments in the surface soil as well as in the subsoil and substratum. Erosion is generally slight, but the plow layer may contain a little subsoil. This soil is low in natural fertility and moderate in moisture-holding capacity.

Use and management (Capability unit IIe–4).—This soil is suitable for general farm crops in rotation. Cultivated fields should be protected from erosion by contour stripcropping and by diversion of water from long slopes.

Edgemont channery loam, 3 to 8 percent slopes, moderately eroded (EaB2).—This soil is like Edgemont loam, 0 to 3 percent slopes, except that it has rock fragments in the surface layer as well as in the subsoil and substratum. The original surface soil has been mixed with subsoil in plowing. The natural fertility is low.

Use and management (Capability unit IIe–4).—This soil is suitable for general farm crops in long rotations. Contour stripcropping and diversion of runoff from long slopes are necessary for conservation.

Edgemont channery loam, 3 to 8 percent slopes, severely eroded (EaB3).—This soil is shallower than Edgemont loam, 0 to 3 percent slopes, and its surface layer contains rock fragments. Most of the surface soil is gone. The plow layer consists mostly of subsoil and crop residues and is less suitable for crops than the original surface soil. A few areas are very severely eroded.

Use and management (Capability unit IVe–3).—This soil is best suited to permanent hay. It can be used for orchards or for crops in long rotations. If used for crops, it should be stripcropped on the contour and protected with diversion terraces.

Edgemont channery loam, 8 to 15 percent slopes, (EaC).—This soil is similar to Edgemont loam, 0 to 3 percent slopes, except that it is shallower and has rock fragments throughout the profile. No more than one-fourth of its surface soil has been removed by erosion.

Use and management (Capability unit IIIe–5).—General farm crops are suitable for this soil. Rotations should be long. Contour stripcropping and diverting water from long slopes will help to protect this soil.

Edgemont channery loam, 8 to 15 percent slopes, moderately eroded (EaC2).—Except that it is shallower and contains rock fragments, this soil is similar to Edgemont loam, 0 to 3 percent slopes. Erosion has removed part of the surface soil, and the remainder is mixed with subsoil in the plow layer. The present plow layer is not so good for farming as the original.

Use and management (Capability unit IIIe–5).—This soil can be used for crops in long rotations or for permanent hay. If it is cultivated, it should be protected by contour stripcropping and by diverting runoff on long slopes.

Edgemont channery loam, 8 to 15 percent slopes, severely eroded (EaC3).—This soil is shallower than Edgemont loam, 0 to 3 percent slopes, and its surface layer contains fragments of rock. Nearly all of the original surface soil is now gone, and the remainder has been mixed into the subsoil in cultivation.

Use and management (Capability unit VIe–2).—This soil is best suited to pasture. Reseeding should be done in contour strips, and water should be diverted from long slopes.

Edgemont channery loam, 15 to 25 percent slopes (EaD).—This soil is shallower than Edgemont loam,

0 to 3 percent slopes, and it has fragments of rock throughout the profile. It is only slightly eroded. The natural fertility is rather low.

Use and management (Capability unit IVe–3).—This soil is best suited to permanent hay. Cultivated crops can be grown in very long rotations if intensive conservation practices are applied. To prevent serious erosion, this soil should be stripcropped on the contour and terraced to divert runoff.

Edgemont channery loam, 15 to 25 percent slopes, moderately eroded (EaD2).—This soil is shallower than Edgemont loam, 0 to 3 percent slopes, and it has rock fragments throughout the profile. Some fields have a few shallow gullies. Most areas are moderately sheet eroded. Subsoil has been mixed into the plow layer, and the resulting surface soil is not so good for crops as the original.

Use and management (Capability unit IVe–3).—This soil is best suited to hay and other forage crops. It should be protected from further erosion by diverting runoff and by stripcropping on the contour. Crops can be grown in a very long rotation if appropriate conservation practices are used.

Edgemont channery loam, 15 to 25 percent slopes, severely eroded (EaD3).—This soil is shallower than Edgemont loam, 0 to 3 percent slopes. Its surface layer, as well as its subsoil and substratum, contain many fragments of rock. Nearly all fields have some shallow gullies, and in some areas gully erosion has almost destroyed the surface soil.

Use and management (Capability unit VIIe–3).—This soil should be used for forest or cover for wildlife. Good woodland management is needed.

Edgemont channery loam, 25 to 35 percent slopes (EaE).—This soil is shallow and contains many fragments of rock. It has been eroded very little.

Use and management (Capability unit VIe–2).—This steep soil is best suited to pasture. It should be reseeded in contour strips, and surface water should be diverted from long slopes.

Edgemont channery loam, 25 to 35 percent slopes, moderately eroded (EaE2).—This soil is shallower than Edgemont loam, 0 to 3 percent slopes. The lower layers contain more rock fragments than the upper layers. Evidence of moderate erosion is common. Some areas have a few shallow gullies.

Use and management (Capability unit VIe–2).—Pasture is the best use for this soil. Good pasture management includes diverting runoff and stripcropping when reseeding.

Edgemont channery loam, 25 to 35 percent slopes, severely eroded (EaE3).—This soil has many shallow gullies and has lost most of its surface soil. It is shallower than the other Edgemont soils.

Use and management (Capability unit VIIe–3).—This soil is not suitable for cultivation. Some of it needs to be reforested. Good woodland management should be practiced.

Edgemont silt loam, moderately well drained variant, 0 to 3 percent slopes (EdA).—This soil developed from materials similar to those from which other Edgemont soils developed, but it differs from the other soils of the series in being less permeable and having a mottled subsoil. It occurs mostly below slopes occupied by other Edgemont soils, from which it receives deposits of finer material. Typically, it has a profile like the following:

0 to 12 inches, dark yellowish-brown friable silt loam; weak fine granular structure.
12 to 18 inches, light yellowish-brown friable silt loam or loam; weak fine to medium subangular blocky structure.
18 to 30 inches, light yellowish-brown friable loam; common, coarse, gray and strong-brown mottles; weak medium blocky to subangular blocky structure.
30 to 48 inches, light yellowish-brown friable loam; some gray and strong-brown mottles; fragments of quartzite increase in number with depth.
48 inches +, quartzite bedrock.

Runoff is slow or very slow. Erosion is no problem; deposition of soil material is more common. The water table is high.

Use and management (Capability unit IIw–1).—This soil is not suited to alfalfa, root crops, orchards, or other crops that can be damaged by a high water table. It is suited to some rotation crops if drained and, at the same time, protected from erosion. Graded strips and bedding will help remove excess water. Terraces will divert runoff from adjacent higher soils. Tile drainage is useful where outlets are available.

Edgemont channery silt loam, 0 to 3 percent slopes (EbA).—This soil is like Edgemont loam, 0 to 3 percent slopes, but the surface soil is finer textured and contains fragments of rock. Runoff is slow to very slow. Little or no erosion has taken place on most areas, but some fields are moderately or slightly eroded. The natural fertility is low, and the moisture-holding capacity is moderate.

Use and management (Capability unit IIe–4).—About 95 percent of this soil is in crops, 2 percent is idle, and 13 percent is in pasture or woods. This soil is well suited to general farm crops in rotation. Simple conservation practices, such as contouring and stripcropping on the steeper slopes, are needed.

Edgemont channery silt loam, 3 to 8 percent slopes (EbB).—Most of this soil is only slightly eroded, but some fields are moderately eroded and have a few shallow gullies. Runoff is slow to medium.

Use and management (Capability unit IIe–4).—About 11 percent of this soil is in crops, 61 percent is in pasture, 27 percent is in woods, and 1 percent is idle. This soil is suitable for rotation crops but should not be farmed intensively. Cultivation should be on the contour, and runoff should be diverted from some areas.

Edgemont channery silt loam, 3 to 8 percent slopes, moderately eroded (EbB2).—This soil is shallower than Edgemont loam, 0 to 3 percent slopes. Most of the acreage is sheet eroded, and some fields have a few shallow gullies. Runoff is slow to medium.

Use and management (Capability unit IIe–4).—About 20 percent of this soil is in crops, 21 percent is in pasture, 43 percent is in woods, and 8 percent is idle. This soil can be used for crops in long rotations, but it should not be farmed intensively. Crops should be planted in contour strips. Runoff should be diverted from long slopes. Some areas need special care.

Edgemont channery silt loam, 3 to 8 percent slopes, severely eroded (EbB3).—Up to three-fourths of the surface soil has been removed from most of this unit.

The rest is mixed with subsoil in the plow layer. The present surface soil is not so good for crops as the original. Most fields have a few shallow gullies, and some fields have many. Runoff is slow to medium.

Use and management (Capability unit IVe–3).—Nearly all of this soil is in crops. It is best suited to permanent hay. It can be used for rotation crops if the rotation is very long and if intensive conservation practices are applied. Contour stripcropping and terracing are needed to prevent further erosion.

Edgemont channery silt loam, 8 to 15 percent slopes (EbC).—Although runoff is medium to rapid, this soil is generally only slightly eroded. It is shallower than Edgemont loam, 0 to 3 percent slopes.

Use and management (Capability unit IIIe–5).—Only 1 percent of this soil is in crops, 1 percent is in pasture, and 97 percent is in woods. This soil is suitable for crops in long rotations. Contour stripcropping and diverting water from long slopes are necessary to prevent erosion.

Edgemont channery silt loam, 8 to 15 percent slopes, moderately eroded (EbC2).—As much as three-fourths of the original surface layer has been eroded from this soil, and the rest has been mixed with subsoil in the plow layer. A few shallow gullies occur. Runoff is medium to rapid.

Use and management (Capability unit IIIe–5).—About 85 percent of this soil is used for crops, 7 percent is wooded, and 7 percent is idle. This soil can be used for crops, but long rotations are necessary to maintain the organic-matter content. Contour stripcropping and diverting water from long slopes will help prevent erosion. Some of the more eroded areas should be kept in permanent hay.

Edgemont channery silt loam, 8 to 15 percent slopes, severely eroded (EbC3).—The medium to very rapid runoff has caused enough erosion to damage this soil seriously. Most of the surface layer is gone. Most fields have a few shallow gullies, and some fields have many.

Use and management (Capability unit VIe–2).—Practically all of this soil is in crops, but pasture would be a better use for it. Pastures should be reseeded in contour strips, and water should be diverted from long slopes.

Edgemont channery silt loam, 15 to 25 percent slopes (EbD).—Although runoff is rapid to very rapid, little erosion has occurred on this soil because it has been protected by trees. Some areas have lost up to one-fourth of the surface soil. This soil is shallow and droughty.

Use and management (Capability unit IVe–3).—Almost all of this soil is in woods. It is suited to pasture and less intensive uses. If this soil is cleared and used for pasture, diversion terraces will be needed on very long slopes. Reseeding should be done in contour strips.

Edgemont channery silt loam, 15 to 25 percent slopes, moderately eroded (EbD2).—This soil has lost up to three-fourths of its surface soil through sheet erosion. Many areas have a few shallow gullies. The available moisture capacity has been reduced by the loss of soil. Runoff is rapid to very rapid.

Use and management (Capability unit IVe–3).—About 70 percent of this soil is used for crops, 18 percent is used for pasture, 7 percent is wooded, and 4 percent is idle. This soil is best suited to permanent hay, but cultivated crops can be grown in a very long rotation. Contour stripcropping and diverting water from long slopes will help prevent erosion in cultivated areas. The more severely eroded areas should be managed as permanent pasture. Pastures should be reseeded in contour strips. Farm machinery can not safely be used on the steeper slopes.

Edgemont channery silt loam, 15 to 25 percent slopes, severely eroded (EbD3).—This soil is shallower than Edgemont loam, 0 to 3 percent slopes, and it has lost most of its original surface soil. The plow layer is a mixture of subsoil and the remains of the original surface soil. Many areas have a few shallow gullies, and some fields have many gullies.

Use and management (Capability unit VIIe–3).—About 59 percent of this soil is in crops, 14 percent is in pasture, 6 percent is wooded, and 21 percent is idle. It is best to use this soil for forestry or for wildlife.

Edgemont very stony loam, 0 to 8 percent slopes (EfA).—Stones, boulders, and fragments of parent rock occupy 5 to 75 percent of the surface of this soil. The soil between the stones is like Edgemont loam, 0 to 3 percent slopes. Runoff is slow to very slow. Erosion is slight because the forest cover has protected the soil.

Use and management (Capability unit VIIe–3).—The best use for this soil is forest, and about 91 percent of it is now forested. Cleared fields should be planted to trees or shrubs. Good woodland management practices are needed to prevent erosion.

Edgemont very stony loam, 8 to 15 percent slopes (EfC).—Cleared areas of this soil are moderately eroded, but wooded areas are only slightly eroded. Runoff is medium to rapid. This soil is shallower than Edgemont very stony loam, 0 to 8 percent slopes.

Use and management (Capability unit VIIe–3).—About 90 percent of this soil is in forest. This is the most intensive use to which this soil is suited. The trees usually protect the soil from erosion, but good woodland management is needed.

Edgemont very stony loam, 15 to 25 percent slopes (EfD).—The rapid to very rapid runoff makes erosion a serious hazard to cleared areas of this soil. Some fields are moderately eroded. Areas protected by a cover of trees are slightly eroded.

Use and management (Capability unit VIIe–3).—About 78 percent of this soil is in woods, 15 percent is in crops, and 5 percent is idle. This soil should be used to produce timber or food and cover for wildlife. Good woodland management will prevent erosion.

Edgemont very stony loam, 25 to 40 percent slopes (EfE).—This soil is stonier and has more exposed ledges of bedrock than the other Edgemont soils. Runoff is very rapid. Some areas are eroded, but in most places erosion is slight because the native vegetation has protected the soil. The erosion hazard would be very high if the soil were cleared.

Use and management (Capability unit VIIe–3).—About 90 percent of this soil is in native forest. It is best used for trees and shrubs that provide food and

cover for wildlife. Good woodland management should be practiced to prevent erosion.

Elioak Series

Soils of the Elioak series are deep and well drained. They are underlain mostly by Wissahickon schist and Peters Creek schist. The native vegetation was a forest of oak, hickory, and yellow-poplar trees. These soils were intensively leached during development. They are medium textured and have a well-developed subsoil. They are productive when heavily fertilized. The moisture-holding capacity is high.

Elioak soils generally occur on broad, nearly level ridgetops or on gently sloping hillsides of the Piedmont Uplands. They are located south of Pequea, Smithville, Quarryville, and Christiana.

In most places the well-drained soils associated with the Elioak are of the Chester, Glenelg, and Manor series. The moderately well drained Glenville soil may occur in adjacent low spots.

Elioak silt loam, 0 to 3 percent slopes (EgA).—Most areas of this soil are on broad, gently sloping ridgetops. Runoff is slow to very slow. In some places as much as three-fourths of the original surface soil has been lost through sheet erosion, but the erosion hazard is normally slight. The following profile of this soil was observed in a cultivated field.

0 to 9 inches, dark yellowish-brown very friable silt loam; strong fine crumb structure in upper part, moderate thin platy structure in lower part.
9 to 13 inches, yellowish-brown friable silt loam; moderate thin platy and fine subangular blocky structure.
13 to 22 inches, yellowish-red, friable, somewhat heavy silt loam; moderate fine to medium blocky structure.
22 to 32 inches, yellowish-red to red friable silt loam; moderate fine blocky structure, tending toward platy; slight sparkle and greasy feel from mica flakes.
32 to 48 inches, red very friable silt loam; moderate medium platy structure; moderate sparkle and greasy feel from mica flakes.
48 to 72 inches, strong-brown disintegrated and decomposed schist; structureless; has greasy feel of finely divided mica.
72 inches +, relatively unweathered schist.

The colors of the decomposed schist vary considerably, depending on the minerals in the original schist. The texture of the surface layer varies somewhat.

Use and management (Capability unit I–2).—Practically all of this soil is used for crops. It is suitable for rotation crops if simple conservation measures are used to prevent and control erosion and maintain the supply of organic matter.

Elioak silt loam, 3 to 6 percent slopes (EgB).—This soil occurs on broad ridgetops and adjacent slopes. Runoff is slow to medium. The forest has protected the soil from erosion. Less than one-fourth of the surface soil has been lost.

Use and management (Capability unit IIe–4).—Almost all of this soil is forested. It is well suited to rotation crops, but simple conservation measures are needed to prevent and control erosion and to maintain the organic-matter content.

Elioak silt loam, 3 to 6 percent slopes, moderately eroded (EgB2).—This soil is on the gently sloping tops and sides of broad ridges. It is shallower than Elioak silt loam, 0 to 3 percent slopes. Runoff is slow to medium. Sheet erosion has removed up to three-fourths of the original surface soil. Some fields have a few shallow gullies. Some areas are severely eroded.

Use and management (Capability unit IIe–4).—About 81 percent of this soil is used for crops, 8 percent is used for pasture, 5 percent is wooded, and 2 percent is idle. This soil is suited to crops in long rotations, but it needs intensive conservation measures to prevent erosion, maintain the supply of organic matter, and conserve moisture.

Elioak silt loam, 6 to 12 percent slopes (EgC).—Runoff from this soil is medium to rapid. Most areas occur on the upper parts of ridge slopes, where runoff water has not concentrated. This soil is like Elioak silt loam, 0 to 3 percent slopes, but it is shallower and less eroded. A few fields have shallow gullies, and some fields have lost up to one-fourth of the original surface soil.

Use and management (Capability unit IIIe–5).—Forest protects practically all of this soil from erosion. Crops could be grown in long rotations if intensive conservation measures were used to prevent erosion, loss of organic matter, and loss of moisture.

Elioak silt loam, 6 to 12 percent slopes, moderately eroded (EgC2).—This soil is shallower than Elioak silt loam, 0 to 3 percent slopes. Runoff is medium to rapid. Sheet erosion has removed from one-fourth to three-fourths of the original surface soil. Some fields have a few shallow gullies. The remaining surface soil is mixed with subsoil in the plow layer. Those areas that are now wooded are protected against further erosion by the forest cover.

Use and management (Capability unit IIIe–5).—Nearly all of this soil is wooded. It is suitable for crops if intensive conservation measures are used to prevent erosion, maintain productivity, and conserve organic matter and moisture.

Elioak silt loam, 6 to 12 percent slopes, severely eroded (EgC3).—Before this soil was eroded, it was like Elioak silt loam, 0 to 3 percent slopes. Most of it is near the foot of long slopes, where surface water accumulates. Runoff is medium to rapid. At least three-fourths of the original surface soil, and in some places all of it, has washed away. The present plow layer absorbs less water and makes a poorer seedbed. Some fields have a few shallow gullies, and some have many. Some fields are very severely eroded.

Use and management (Capability unit IVe–3).—About 85 percent of this soil is in crops, and 15 percent is in pasture. This soil is best suited to permanent hay, but it can be cultivated occasionally if intensive conservation is practiced to prevent erosion and conserve moisture and organic matter.

Elioak silt loam, 12 to 18 percent slopes, moderately eroded (EgD2).—This soil is shallower than Elioak silt loam, 0 to 3 percent slopes, and it has lost as much as three-fourths of its original surface soil through erosion. The mixture of subsoil and surface soil in the present plow layer does not absorb water so quickly as the original surface layer, and it is less suitable for the growth of seedlings. Runoff is rapid to very rapid, and the hazard of further erosion is high. A few areas are only slightly eroded.

Use and management (Capability unit IVe–3).—

About 29 percent of this soil is in crops, 47 percent is wooded, 13 percent is in pasture, and 8 percent is idle. If this soil is cultivated, it is likely to lose soil material, moisture, and fertility through serious erosion. It can be cultivated occasionally in very long rotations and under intensive conservation management. Hay and pasture are the most intensive long-term uses to which this soil is suited.

Elioak silt loam, 12 to 18 percent slopes, severely eroded (EgD3).—This soil is shallower than Elioak silt loam, 0 to 3 percent slopes, and it has lost most or all of its surface layer through sheet erosion. Most fields have a few shallow gullies, and some fields have many gullies. Runoff is rapid to very rapid.

Use and management (Capability unit VIe–2).—About 60 percent of this soil is in crops, and 39 percent is used for pasture. Under cultivation, this soil is likely to erode and lose moisture and organic matter. Reseeding pastures is difficult because of the slope. In some fields farm equipment cannot be operated safely. This soil is best suited to pasture. It can also be used to grow trees, for timber or for shelter for wildlife.

Elk Series

The Elk series consists of deep, well-drained soils that occur in the central part of the county on high terraces above the present flood plains. These soils have developed from old alluvium washed from the nearby Duffield, Hagerstown, Conestoga, and other soils of the limestone uplands. The native forest consisted of oaks and hickories.

Elk gravelly silt loam, 0 to 3 percent slopes (EhA).—The following profile was observed in a cornfield.

0 to 9 inches, dark-brown friable silt loam; weak granular structure; gravel content varies from 10 to 30 percent.
9 to 11 inches, dark yellowish-brown to yellowish-brown friable silt loam; weak medium granular structure.
11 to 32 inches, strong-brown friable heavy silt loam; medium to strong blocky structure.
32 inches +, very dark grayish-brown friable silt loam; weak blocky structure.

Most of the gravel is fine quartz, and the quantity varies greatly with locality. In some areas the surface layer is silt loam, and in others it is fine sandy loam. Differences in color depend on the origin of the alluvial parent material.

Most of this soil is only slightly eroded. Some areas have been moderately sheet eroded. Runoff is slow to very slow.

Use and management (Capability unit I–1).—About 90 percent of this soil is used for crops, and about 9 percent for pasture. This soil is well suited to general crops in rotation. Problems of management are few. The principal ones are maintaining the supply of organic matter and keeping the soil in good tilth.

Elk gravelly silt loam, 3 to 6 percent slopes, moderately eroded (EhB2).—This soil is like Elk gravelly silt loam, 0 to 3 percent slopes, but it is more eroded. A few shallow gullies have formed in some areas. One very small area is only slightly eroded. Runoff is slow to medium.

Use and management (Capability unit IIe–1).—Nearly all of this soil is cultivated. It is well suited to general farm crops in long rotations. Simple conservation measures are needed to control erosion, conserve moisture, increase the supply of organic matter, and improve tilth.

Elk gravelly silt loam, 6 to 12 percent slopes, moderately eroded (EhC2).—Active sheet erosion has removed one-fourth to three-fourths of the surface layer from this soil, and some fields have a few shallow gullies. Some small areas are only slightly eroded. Runoff is medium to rapid. The profile is like that of Elk gravelly silt loam, 0 to 3 percent slopes.

Use and management (Capability unit IIIe–1).—About 55 percent of this soil is in crops, and about 42 percent is wooded. If this soil is used for crops, long rotations and intensive conservation practices are needed to control erosion, conserve moisture, and maintain the organic-matter supply.

Glenelg Series

The Glenelg series consists of moderately deep, well-drained, highly productive soils derived from schist and gneiss. Most areas are south of a line connecting Martic Forge, Smithville, Quarryville, and Christiana. These soils are underlain by Wissahickon schist and Peters Creek schist. The schist weathers rather deeply, forming a soil that has good water-holding capacity and moderate internal drainage. In a few areas near Mine Ridge and in the Welsh Mountains, Glenelg soils are underlain by Baltimore gneiss, gabbro, and granodiorite. In most places the native forest consisted of oaks and hickories, but in others it was a pure stand of yellow-poplar.

Glenelg soils normally occur on the sides of broad ridges. The deep, well-drained Chester and Elioak soils are generally located above them on the ridgetops. The shallow, well-drained Manor soils occur on the lower or steeper slopes of the same ridges. Generally, some of the moderately well drained Glenville soils are located nearby.

Glenelg silt loam, 3 to 6 percent slopes, moderately eroded (GbB2).—Most of this soil occurs on the upper parts of gentle slopes, where runoff is slow. This soil has lost up to three-fourths of its original surface soil. The following profile was observed in a cultivated field.

0 to 7 inches, dark-brown to very dark grayish-brown very friable silt loam; moderate fine to medium granular and fine subangular blocky structure.
7 to 10 inches, dark yellowish-brown friable silt loam; moderate fine subangular blocky structure.
10 to 24 inches, yellowish-brown friable silt loam; moderate medium blocky structure, about 10 percent fragments of schist.
24 to 30 inches, dark-brown to brown friable heavy silt loam; moderate medium to fine blocky structure; contains mica; 20 to 30 percent chips of schist.
30 inches +, yellowish-red to strong-brown very friable greasy silt loam; somewhat platy structure; grades into unweathered schist.

Use and management (Capability unit IIe–4).—About 80 percent of the soil is in crops, about 5 percent is in pasture, and 15 percent is in woods. This soil is suitable for rotation crops, but it needs to be protected against loss of soil, moisture, and organic matter. The problems of managing woodland are very slight.

Glenelg silt loam, 6 to 12 percent slopes, moderately eroded (GbC2).—Most of this soil occurs where runoff has concentrated on the middle of long slopes. It is slightly shallower than Glenelg silt loam, 3 to 6 percent slopes, moderately eroded. In most areas up to three-fourths of the surface soil has been lost through erosion, and the remainder has been mixed with subsoil. The present plow layer absorbs less water than the original surface soil. Some areas are only slightly eroded. Runoff is medium to rapid.

Use and management (Capability unit IIIe–5).—About 98 percent of this soil is in crops, and the rest is in pasture or woods. It is suited to crops in long rotations that include 3 or 4 years of hay. Intensive conservation practices are needed to conserve soil material, moisture, and organic matter.

Glenelg silt loam, 6 to 12 percent slopes, severely eroded (GbC3).—This soil occurs on the middle of longer slopes where runoff has concentrated and caused severe erosion damage. Erosion has removed at least three-fourths of the surface soil. The loss of surface soil has made this soil less absorbent and more droughty. Many shallow gullies occur in most fields, but some have only a few gullies. A few acres are very severely eroded. Runoff is medium to rapid.

Use and management (Capability unit IVe–3).—About 92 percent of this soil is in crops, and about 4 percent is wooded. Management needs depend on the degree of erosion. This soil is best suited to pasture or to very long rotations based on perennial hay.

Glenelg silt loam, 12 to 18 percent slopes, moderately eroded (GbD2).—This soil occurs on the middle of slopes, where the rapid to very rapid runoff is likely to cause erosion. It is shallower than Glenelg silt loam, 3 to 6 percent slopes, moderately eroded. Up to three-fourths of the original surface soil has been washed away, and a few shallow gullies have appeared in some areas. Subsoil has been mixed with the remaining surface soil in cultivation. Some areas are only slightly eroded.

Use and management (Capability unit IVe–3).—About 42 percent of this soil is in crops, 27 percent is in pasture, 23 percent is wooded, and 6 percent is idle. This soil is best suited to permanent hay. It can be cultivated occasionally if intensively managed to prevent erosion, conserve moisture, and maintain the content of organic matter.

Glenelg silt loam, 12 to 18 percent slopes, severely eroded (GbD3).—This soil is located on long slopes where runoff water has accumulated. More than three-fourths of the surface layer has been washed away. Some fields have many shallow gullies, and some have only a few. This soil is shallower than Glenelg silt loam, 3 to 6 percent slopes, moderately eroded. Runoff is rapid to very rapid. The rate is increased by the mixing of the less absorbent subsoil into the plow layer.

Use and management (Capability unit VIIe–3).—About 92 percent of this soil is in crops, 3 percent is idle, 3 percent is in pasture, and 1 percent is wooded. Because of the risk of further erosion, this soil is better suited to forest than to crops.

Glenelg silt loam, 18 to 25 percent slopes (GbE).—This soil is not eroded because it has been protected by forest. If it were cleared, erosion would be a constant hazard. Runoff is rapid to very rapid. The profile is like that of Glenelg silt loam, 3 to 6 percent slopes, moderately eroded, but is shallower.

Use and management (Capability unit VIe–2).—Nearly all of this soil is wooded. If cleared, it should be used for pasture. It is too steep to allow safe operation of farm equipment, and the danger of erosion is great.

Glenelg silt loam, 18 to 25 percent slopes, moderately eroded (GbE2).—This soil is like Glenelg silt loam, 3 to 6 percent slopes, moderately eroded, but it is shallower. It has lost as much as three-fourths of its original surface soil through sheet erosion. Some fields have a few shallow gullies. Runoff is rapid to very rapid. Runoff water accumulates on these steep slopes, and the erosion hazard is severe.

Use and management (Capability unit VIe–2).—About 50 percent of this soil is in crops, 20 percent is in woods, 16 percent is in pasture, and 11 percent is idle. This soil is better suited to pasture than to crops. Erosion and loss of moisture are serious hazards. Using farm equipment is risky on these steep slopes.

Glenelg silt loam, 18 to 25 percent slopes, severely eroded (GbE3).—This soil is shallower than Glenelg silt loam, 3 to 6 percent slopes, moderately eroded. Runoff is rapid to very rapid, and more than three-fourths of the surface soil has already been washed away. Some fields have many shallow gullies, and some have a few gullies. A few small areas are very severely eroded.

Use and management (Capability unit VIIe–3).—About 90 percent of this soil is in crops, 7 percent is in pasture, and 4 percent is idle. All of it should be in woods. When this soil is cultivated, erosion continues and moisture is lost. Operating farm equipment on these steep slopes is hazardous.

Glenelg channery sandy loam, 6 to 12 percent slopes, severely eroded (GaC3).—This soil is like Chester channery sandy loam, 0 to 3 percent slopes, except that it is shallower. More than three-fourths of the surface soil has been lost through erosion. The surface is littered with rock fragments. Shallow gullies are common over most of the area. Runoff is medium to rapid.

Use and management (Capability unit VIe–2).—Nearly all of this soil is cultivated. It should be used for pasture. The pastures should be reseeded in contour strips. Diversion terraces may be needed on long slopes.

Glenelg channery sandy loam, 12 to 18 percent slopes, severely eroded (GaD3).—In most fields this soil has lost more than three-fourths of its original surface layer, and shallow gullies are common. A few fields are very severely eroded, and a few others are only moderately eroded. Runoff is rapid to very rapid.

Use and management (Capability unit VIIe–3).—About 82 percent of this soil is used for crops, 15 percent is in pasture, 1 percent is wooded, and 1 percent is idle. This soil is not suitable for cultivation because of the danger of further erosion. It should be used for forest or for wildlife cover.

Glenelg channery sandy loam, 18 to 25 percent slopes, severely eroded (GaE3).—Most areas of this

soil have lost more than three-fourths of the surface soil. Runoff is very rapid. Shallow gullies are common. Some fields are moderately eroded, and some are only slightly eroded.

Use and management (Capability unit VIIe–3).—About 67 percent of this soil is used for crops, and 19 percent for pasture; 7 percent is wooded, and 4 percent is idle. All of it should be used for forest. Cleared areas should be replanted to trees.

Glenville Series

The soils of this series are moderately deep to deep, moderately well drained, and productive when fertilized. The moisture-holding capacity is high, and the permeability is moderately slow. These soils were derived from the schist and gneiss of the Piedmont Uplands. The principal rocks were Wissahickon schist, Baltimore gneiss, and some granodiorite and gabbro. The native forest under which the soils developed consisted of oak, hickory, ash, elm, and yellow-poplar trees.

These soils are located mostly around the heads of streams, in flats, and in drainageways. In these places the water table is high or the lower subsoil is usually wet. Most of the soil is in the southern part of the county, but some is in the northern part and some is south of the Welsh Mountains. Other soils that occur nearby are the deep, well-drained Chester and Elioak soils, the moderately deep, well-drained Glenelg soils, the shallow, well-drained Manor soils, and the floodplain soils along the local streams.

Glenville silt loam, 0 to 3 percent slopes (GcA).—A profile of this soil in a pasture is as follows:

0 to 8 inches, dark-brown silt loam; friable when moist; weak fine granular to weak medium subangular blocky structure.
8 to 16 inches, dark-brown silt loam; friable when moist; weak medium subangular blocky structure.
16 to 20 inches, dark yellowish-brown silt loam; faintly mottled with a few fine strong-brown streaks; friable when moist; weak fine to medium subangular blocky structure.
20 to 26 inches, strong-brown silt loam; faintly mottled with gray-brown streaks and blotches; friable when moist; weak medium subangular blocky structure.
26 to 38 inches, strong-brown firm silty clay loam; faintly mottled with dark-brown streaks; weak medium prismatic, breaking to weak medium platy, structure.
38 to 48 inches, strong-brown friable silt loam; weak medium prismatic, breaking to weak medium platy, structure; contains many glittering flakes of mica.

This soil may contain a few fragments of the parent rock. The reaction is acid, except where the soil has been limed.

Runoff is slow to very slow. The lower part of the subsoil is wet much of the time. Erosion is generally slight, but some areas have lost up to one-fourth of their surface soil through sheet erosion.

Use and management (Capability unit IIw–1).—About 48 percent of this soil is in pasture, 27 percent is in crops, 17 percent is wooded, and 6 percent is idle. This soil is fairly well suited to rotation crops, except those that would be affected by an occasionally high water table. Drainage should be provided by some means that will not cause erosion. Graded strips or rows, drainage terraces, diversion terraces, open ditches, or tile can be used.

Glenville silt loam, 3 to 6 percent slopes (GcB).—This soil occurs around the base of slopes and in drainageways. Some surface water from nearby areas runs over this soil, but little or no erosion has occurred. In most places deposits of soil material offset erosion or reduce its effect. Runoff is slow to medium. This soil is similar to Glenville silt loam, 0 to 3 percent slopes. It has better surface drainage because of the increased slope, but the subsoil is as wet.

Use and management (Capability unit IIw–1).—About 53 percent of this soil is in pasture, 25 percent is used for crops, 16 percent is wooded, and 4 percent is idle. This soil is suited to rotation crops, except those that are affected by an occasionally high water table. Drainage should be provided by some method that will not create an erosion hazard. Graded strips, graded rows, diversion terraces, drainage terraces, open ditches, or tile can be used.

Glenville silt loam, 3 to 6 percent slopes, moderately eroded (GcB2).—This soil is similar to Glenville silt loam, 0 to 3 percent slopes, but it is shallower. One-fourth to three-fourths of the surface soil has been removed, and the rest is mixed into the subsoil. Some areas have a few shallow gullies. Runoff is slow to medium. Surface drainage appears to be better than on the more nearly level phase, but the lower subsoil is wet most of the time.

Use and management (Capability unit IIIe–7).—About 42 percent of this soil is in crops, 40 percent is in pasture, 4 percent is wooded, and 9 percent is idle. This soil can be used for most rotation crops if it is drained. Rotations should be long. Diversion terraces, graded strips, drainage terraces, or tile drains are needed. Alfalfa, winter grain, and potatoes do not grow well on this wet soil.

Glenville silt loam, 6 to 12 percent slopes, moderately eroded (GcC2).—This soil is like Glenville silt loam, 0 to 3 percent slopes, but it is shallower and the surface layer is better drained. Runoff is medium to rapid. From one-fourth to three-fourths of the original surface soil has been washed away, and the rest of it is mixed with subsoil. The resulting plow layer is finer in texture and more difficult to work than the original surface soil.

Use and management (Capability unit IIIe–7).—About 50 percent of this soil is in pasture, 32 percent is cultivated, 9 percent is wooded, and 7 percent is idle. Some areas are better suited to hay or pasture than to cultivated crops. Some of this soil can be used for rotation crops if drained and protected from erosion. Long rotations, graded strips, drainage terraces, and diversion of water from long slopes will help to protect the soil.

Hagerstown Series

The soils of the Hagerstown series are well-drained, highly productive soils derived from relatively pure limestone. They have a reddish clay subsoil. They occur as scattered islands within larger areas of yellowish-brown Duffield soils. Most of them are deep or very deep, except where limestone ledges are exposed. They are underlain by limestone of the Beekmantown, Conococheague, and Elbrook formations and

from dolomite of the Ledger, Kinzer, and Vintage formations. They are moderately permeable, and they have a high moisture-holding capacity. They developed under a forest in which oaks, hickories, and chestnuts predominated and scattered stands of yellow-poplar and other trees were included.

The Hagerstown soils occur across the north-central part of the county, within a belt that averages 6 miles in width but in some places is as much as 12 miles wide. This belt begins at the Susquehanna River between Bainbridge and Marietta and runs between Kissel Hill and Lancaster to a point near New Holland. From here, one branch continues north of the Welsh Mountains through Churchtown, and another branch runs south of the Welsh Mountains through White Horse and Cains. A smaller area extends eastward from Manheim, Lititz, and Ephrata, then northward to Denver and westward to Clay. These two major areas are separated by a ridge of Cocalico shale that runs from Sporting Hill through Kissel Hill to Rothsville and Ephrata.

Duffield soils are usually next to Hagerstown soils. Other soils that occur in the same general area are the moderately well drained Lawrence soil, the well drained Huntington local alluvium soil, and the moderately well drained Lindside local alluvium soils.

Hagerstown silt loam, 0 to 3 percent slopes (HaA).—The following profile was observed in a hayfield.

0 to 11 inches, dark reddish-brown friable silt loam; very fine subangular blocky structure.
11 to 24 inches, dark reddish-brown friable heavy silt loam; moderate fine blocky structure; some blocks have thin black coatings of iron and manganese.
24 to 37 inches, dark reddish-brown to dark-red silty clay loam; firm when moist, sticky when wet; strong medium blocky structure; breaks into very fine blocks partly covered with black coatings.
37 to 42 inches, dark reddish-brown friable silt loam; strong to moderate medium blocky structure, breaks into very fine blocks; contains many concretions presumed to be iron and manganese.
42 to 48 inches, dark-brown to reddish-brown very friable silt loam; moderate fine subangular blocky structure.
48 inches +, dark-brown to reddish-brown friable silt loam; moderate fine subangular blocky structure.

The fertility of this soil is high, and the moisture-holding capacity is high. Runoff is slow or very slow. Loss of soil from the top of small hillocks or mounds is common. As much as one-fourth of the surface soil has been removed from some of these spots. In other places this soil shows little or no erosion. In depressions and drainageways in the valleys, surface water may be ponded for short periods.

Use and management (Capability unit I–1).—Most of this soil is cultivated. It is well suited to most general farm crops. It is not so well suited to potatoes and root crops because the subsoil is fine textured. Erosion is generally not a problem. The chief management problems are maintaining the supply of organic matter and keeping the soil in good tilth.

Hagerstown silt loam, 0 to 3 percent slopes, moderately eroded (HaA2).—This soil is located at the base of long slopes where runoff has accumulated, or on slightly higher ground from which part of the surface soil has been washed. From one-fourth to three-fourths of the original surface layer is gone. In some places the fine-textured red subsoil has been mixed with the remaining surface soil. Except for the effects of erosion, this soil is similar to Hagerstown silt loam, 0 to 3 percent slopes. Runoff is slow to very slow.

Use and management (Capability unit IIe–1).—Practically all of this soil is cultivated. It is suited to a wide range of rotation crops. Simple conservation practices are needed to prevent further erosion, maintain good tilth, and keep up the supply of organic matter.

Hagerstown silt loam, 3 to 6 percent slopes (HaB).—This soil is similar to Hagerstown silt loam, 0 to 3 percent slopes, but the surface layer is somewhat shallower. Runoff is medium. This soil has been only slightly eroded.

Use and management (Capability unit IIe–1).—This soil is well suited to most farm crops. Loss of soil, moisture, and organic matter are the chief management hazards. Cultivated crops should be grown on terraces or in strips.

Hagerstown silt loam, 3 to 6 percent slopes, moderately eroded (HaB2).—This soil occurs in all sections of the limestone belt. It is the most extensive of the Hagerstown soils. It is shallower than Hagerstown silt loam, 0 to 3 percent slopes, and it has lost from one-fourth to three-fourths of its original surface soil through sheet erosion. Some fields have a few shallow gullies. The remaining surface soil has been mixed with subsoil in cultivation. The resulting plow layer is finer textured, contains less organic matter, is less absorptive, and is more difficult to work than the original. During rains it is likely to seal over or puddle quickly. Some areas are severely eroded. Runoff is medium.

Use and management (Capability unit IIe–1).—About 94 percent of this soil is in crops, and 5 percent is in pasture. The chief management hazards are loss of soil, moisture, and organic matter. The fine-textured subsoil makes tillage difficult in some places.

Hagerstown silt loam, 6 to 12 percent slopes, moderately eroded (HaC2).—This soil is not so deep as Hagerstown silt loam, 0 to 3 percent slopes. Sheet erosion has removed up to three-fourths of the original surface soil. Some fields have a few shallow gullies, and a few fields have many shallow gullies. The remaining surface soil has been mixed with subsoil by plowing. The resulting finer textured surface layer sheds water rapidly. The medium to rapid runoff creates an erosion hazard. Some small areas are severely eroded.

Use and management (Capability unit IIIe–1).—About 88 percent of this soil is used for crops, and 11 percent is in pasture. This soil is suitable for crops in a long rotation if intensive conservation practices are used. The management problems are preventing erosion, increasing the supply of organic matter, and conserving moisture. This soil is difficult to till if erosion has exposed the fine-textured subsoil.

Hagerstown silt loam, 12 to 18 percent slopes, moderately eroded (HaD2).—This soil is similar to, but shallower than, Hagerstown silt loam, 0 to 3 percent slopes. Runoff is rapid to very rapid. As much as three-fourths of the surface soil has been removed by sheet erosion. Some fields have a few shallow

gullies. A few fields have many shallow gullies. Some small areas are only slightly eroded.

Use and management (Capability unit IVe–1).—This soil is best suited to permanent hay. It can be cultivated in a long rotation if protected against erosion, loss of moisture, and loss of organic matter. If the subsoil is plowed when too wet or too dry it becomes cloddy and difficult to work.

Hagerstown silt loam, 18 to 25 percent slopes, moderately eroded (HaE2).—Only a few small areas of this soil were mapped. Runoff is very rapid. Cultivated areas erode rapidly. The areas in pasture or woods are slightly eroded. The profile is similar to that of Hagerstown silt loam, 0 to 3 percent slopes, but is shallower.

Use and management (Capability unit VIIe–1).—Most of this soil is in pasture or woods. It is best suited to pasture. It is not suited to cultivation. Farm equipment cannot be operated safely on these steep slopes.

Hollinger Series

The soils of the Hollinger series are shallow and well drained. They are productive when fertilized and have low moisture-holding capacity. Internal drainage ranges from moderately slow to rapid.

These soils were derived from calcareous schist of the Conestoga limestone formations. They occur in a belt across the south-central part of the county. They developed under a forest of oak, hickory, yellow-poplar, and other trees. Nearby soils are the deep, well-drained Conestoga soils, the deep, well-drained Letort soils, and the shallow, well-drained Pequea soils.

Some small areas of Hollinger soils are more stony than the profile described.

Hollinger silt loam, 3 to 8 percent slopes, moderately eroded (HbB2).—The following profile of this soil was observed in a cultivated field.

0 to 6 inches, very dark brown friable silt loam; weak fine granular and thin platy structure.
6 to 11 inches, dark yellowish-brown friable silt loam; moderate thin platy structure.
11 to 15 inches, strong-brown to dark-brown friable silt loam; moderate thin to medium platy structure.
15 to 20 inches, strong-brown to dark-brown heavier silt loam; weak to moderate medium blocky structure.
20 inches +, yellowish-brown weathered parent material; very friable to loose.

Most areas of this soil have lost one-fourth to three-fourths of the original surface layer through sheet erosion. Some areas have a few shallow gullies. Runoff is slow to medium. The degree of acidity depends on the amount of calcareous material in the parent rock. A profile in undisturbed woodland would have a different kind of surface soil and different colors.

Use and management (Capability unit IIe–2).—This soil is fairly well suited to rotation crops, but it is better suited to deep-rooted legumes because their roots can penetrate the permeable parent material. Rotations should be long enough to build up the supply of organic matter. This soil should be protected from further erosion by stripcropping on the contour and by diverting runoff from long slopes.

Hollinger silt loam, 8 to 15 percent slopes, moderately eroded (HbC2).—This soil is shallower than Hollinger silt loam, 3 to 8 percent slopes, moderately eroded. Sheet erosion has removed from one-fourth to three-fourths of the original surface soil. Some areas have a few shallow gullies. Subsoil and weathered parent material have been mixed with the remaining surface soil in the plow layer. Runoff is medium to rapid.

Use and management (Capability unit IIIe–2).—This soil can be used for crops if the rotation is long. It should be protected by stripcropping on the contour and by diverting runoff. Some small areas are better suited to permanent hay than to cultivated crops.

Hollinger silt loam, 15 to 25 percent slopes, moderately eroded (HbD2).—This soil is like Hollinger silt loam, 3 to 8 percent slopes, moderately eroded, but it is shallower. Runoff is rapid to very rapid. From one-fourth to three-fourths of the surface soil has been lost through sheet erosion. Subsoil has been mixed with the remaining surface soil in plowed areas. Some areas have a few shallow gullies.

Use and management (Capability unit IVe–2).—This soil can be cultivated only if it is protected by using very long rotations, by stripcropping on the contour, and by diverting runoff. It is best suited to forage crops. Some areas should be used for permanent hay, and others should be used for pasture.

Hollinger silt loam, 25 to 35 percent slopes (HbE).—This soil is very shallow. Runoff is very rapid, and erosion is generally severe. Many shallow gullies have formed. The wooded areas are only slightly eroded because they have been protected by forest. This soil is somewhat similar to Hollinger silt loam, 3 to 8 percent slopes, moderately eroded.

Use and management (Capability unit VIe–3).—Most areas of this soil are suitable for pasture. They should be reseeded in contour strips and protected from erosion by good pasture management. The steeper and more severely eroded areas are better suited to forest or to cover for wildlife.

Huntington Series

The soils of the Huntington series are deep, well drained, and naturally fertile. They developed from alluvium washed from limestone uplands. They are located in the central part of the county, mostly on flood plains and in sinks and depressions. The native vegetation was a forest of elm, ash, hickory, willow, poplar, and other bottom-land hardwood trees.

The naturally high fertility of these soils is increased by lime, manure, and fertilizer washed from nearby fields. The moisture-holding capacity varies with the texture but is generally high. Internal drainage is good. These soils are occasionally flooded.

The local alluvium soils of this series are in sinkholes, depressions, intermittent stream beds, and areas at the base of slopes. Water is ponded in some places for short periods.

The upland soils that surround the Huntington soils are the Duffield, Hagerstown, Conestoga, Letort, Lindside, and other limestone soils.

Huntington fine sandy loam, 0 to 3 percent slopes (HcA).—This soil is located on the flood plains of the

larger streams. Runoff is slow to very slow. The following profile is in a pasture.

0 to 9 inches, dark-brown very fine sandy loam; weak very fine crumb and platy compound structure.
9 to 13 inches, slightly more reddish dark-brown loam; weak medium subangular blocky structure.
13 to 30 inches, dark-brown to brown fine sandy loam; weak medium blocky structure.
30 to 36 inches +, yellowish-brown to dark yellowish-brown sandy loam; moderate medium blocky structure.

This soil does not have so high a moisture-holding capacity as most of the other Huntington soils, because it contains more fine sand. Most of this soil is friable; some of the sandier spots are very friable. Some stream gouging and sheet erosion occurs, but generally more material is deposited than is removed by erosion.

Use and management (Capability unit I–3).—Most of this soil is used for pasture. It is well suited to rotation crops except those that cannot stand occasional flooding. If this soil is cultivated during the flood season, it needs protection against erosion.

Huntington silt loam, 0 to 3 percent slopes (HdA).—Most of this soil is on flood plains where runoff is slow to very slow. Cultivated areas have a profile like the following.

0 to 15 inches, dark-brown friable silt loam; moderate medium platy structure; slightly acid.
15 to 33 inches, slightly more reddish dark-brown friable silty clay loam; moderate fine to medium blocky structure; slightly acid.
33 inches +, reddish-brown to dark reddish-brown friable gravelly loam; contains about 30 percent shale and quartz gravel; slightly acid.

In some areas there is little difference in color or texture throughout the profile. Erosion is not generally a problem; as a rule, more material is deposited during floods than is removed by erosion. A few small areas are very severely eroded.

Use and management (Capability unit I–3).—About 70 percent of this soil is used for pasture, and about 28 percent is used for crops. This soil is well suited to general farm crops, but it needs protection against washouts and sheet erosion during floods.

Huntington silt loam, local alluvium, 0 to 3 percent slopes (HeA).—This soil lies in narrow bands along drainageways, and in pockets, depressions, or other low areas in undulating topography. A profile in a cultivated area is as follows:

0 to 9 inches, dark-brown friable silt loam; moderate medium crumb structure.
9 to 30 inches, slightly lighter dark-brown friable heavy silt loam; moderate fine blocky structure.
30 to 42 inches, dark yellowish-brown friable silt loam; moderate medium blocky structure.
42 to 52 inches, dark-brown friable shaly silt loam; weak fine subangular blocky structure; 40 to 60 percent fragments of quartz and shale.
52 inches +, strong-brown friable shaly silt loam; 60 to 70 percent fragments of shale and quartz.

Runoff from this soil is slow to very slow. Some sheet erosion occurs in small spots, but in most places fresh material is deposited by floods. In a few places topsoil from nearby fields has accumulated to a depth of 3 feet or more.

Use and management (Capability unit I–1).—About 50 percent of this soil is used for crops, and about 46 percent for pasture. This soil is excellent for growing crops. It has few management problems. Occasionally, it is ponded for a short while.

Lansdale Series

The Lansdale series consists of deep, well-drained soils of low natural fertility. They occur on low ridges and undulating topography in the northwestern part of the county, from Bainbridge to Elizabethtown and Elstonville. The parent material is yellowish-brown, soft, arkosic sandstone and conglomerate of Triassic age. The type of soil formed depends on the coarseness of the sand and the number of pebbles and stones in the parent sandstone.

These soils are generally moderate to low in moisture-holding capacity because they contain so much coarse material. Internal drainage is moderately rapid. The native vegetation was a forest of oaks and hickories.

Soils that are generally located near the Lansdale soils are the shallow, well drained Steinsburg soils, the moderately well drained Readington soils, the poorly drained Croton soils, and the Penn soils. In some localities the areas of Lansdale soil are so small and so intricately mixed with Penn soils that the two series are mapped as a complex.

Lansdale gravelly loam, 3 to 8 percent slopes, moderately eroded (LaB2).—The following profile was observed in a cultivated field.

0 to 7 inches, very dark grayish-brown, very friable loam; weak fine granular structure; about 10 percent quartz gravel from ½ to 10 centimeters in diameter.
7 to 11 inches, yellowish-brown to light yellowish-brown friable loam; very weak medium platy structure; contains quartz gravel.
11 to 15 inches, yellowish-brown friable silt loam; weak medium subangular blocky structure; contains quartz pebbles.
15 to 19 inches, yellowish-brown friable heavy silt loam; weak medium blocky structure; contains quartz gravel and pebbles.
19 to 24 inches, yellowish-brown firm heavy gritty silt loam; moderate medium blocky structure; contains rounded gravel and pebbles.
24 to 32 inches, yellowish-brown friable sandy loam; weak medium blocky structure; contains quartz gravel.
32 inches +, weathered parent material, grading into relatively solid yellow Triassic sandstone or conglomerate.

In some places angular fragments of parent sandstone or conglomerate are present in the profile.

Runoff is medium to slow. The loss of surface soil through erosion and the mixing of subsoil into the plow layer has not made this soil harder to work, but it has made it droughtier. Some small areas included in this unit are slightly eroded, and some are severely eroded.

Use and management (Capability unit IIe–4).—About 92 percent of this soil is used for crops, 2 percent is used for pasture, and 4 percent is idle. This soil is suited to general crops in long rotations. Intensive conservation practices are needed to prevent erosion and to make up for droughtiness, low natural fertility, and lack of organic matter.

Lansdale gravelly loam, 0 to 3 percent slopes (LaA).—This soil occurs on level ridgetops, on benches, and in valleys. It is deeper than Lansdale gravelly loam,

3 to 8 percent slopes, moderately eroded. No more than one-fourth of the surface layer has been lost through sheet erosion. Runoff is slow to very slow.

Use and management (Capability unit IIe–4).—About 90 percent of this soil is used for crops, and 8 percent is in grass or pasture. This soil is suitable for general rotation crops if it is managed carefully to prevent erosion, increase fertility, and conserve moisture.

Lansdale gravelly loam, 8 to 15 percent slopes, moderately eroded (LaC2).—This soil is like Lansdale gravelly loam, 3 to 8 percent slopes, moderately eroded, but is shallower. The depth has been further reduced and the water-holding capacity has been impaired by the loss of from one-fourth to three-fourths of the surface soil through sheet erosion. Some fields have a few shallow gullies. Runoff is medium to rapid.

Use and management (Capability unit IIIe–5).—About 82 percent of this soil is in crops, and 17 percent is idle. Some of the more seriously eroded fields should be used for hay instead of cultivated crops. Areas that are less seriously eroded can be cultivated in long rotations if intensively conserved. The chief hazards are erosion, loss of organic matter, and loss of moisture-holding capacity. The fertility is low.

Lansdale gravelly loam, 8 to 15 percent slopes, severely eroded (LaC3).—This soil was formerly like Lansdale gravelly loam, 3 to 8 percent slopes, moderately eroded, but all of the original surface soil and much of the subsoil has been removed. Gullies are common. Runoff is medium to rapid. This soil is droughty, and its natural fertility is low.

Use and management (Capability unit VIe–2).—About 91 percent of this soil is used for crops, 3 percent is used for pasture, and 6 percent is idle. The productivity has been greatly reduced by erosion. Pasture is the best use because a grass cover will check erosion. Some small areas are so severely eroded that they are suitable only for forest.

Lansdale gravelly loam, 15 to 25 percent slopes, moderately eroded (LaD2).—This soil is not so deep as Lansdale gravely loam, 3 to 8 percent slopes, moderately eroded, but the profile is similar. It has lost from one-fourth to three-fourths of its surface soil through sheet erosion. A few shallow gullies occur in some areas. Runoff is rapid to very rapid.

Use and management (Capability unit IVe–3).—About 50 percent of this soil is in crops, and 25 percent is in pasture; the rest is wooded. This soil should be used for forage crops. If cultivated, it is likely to erode, to lose moisture and organic matter, and to decline in fertility. Farm equipment cannot safely be used on some of these slopes.

Lansdale gravelly loam, 15 to 25 percent slopes, severely eroded (LaD3).—Most of this soil occurs on long slops where surface water accumulates. Runoff is rapid to very rapid, and the erosion hazard is serious. More than three-fourths of the surface soil has been washed away. Some fields have a few shallow gullies, and a few fields have many gullies. A few areas are very severely eroded. The profile of this soil is like that of Lansdale gravely loam, 3 to 8 percent slopes, moderately eroded, but shallower.

Use and management (Capability unit VIIe–3).—About 31 percent of this soil is used for crops, 33 percent is used for pasture, 3 percent is wooded, and the rest is idle. Because it is difficult to control or prevent erosion and conserve moisture, and dangerous to operate farm equipment on the steep slopes, this soil is very poorly suited to cultivation. It is best to use it to grow timber or to provide food and cover for wildlife.

Lansdale gravelly loam, 25 to 40 percent slopes (LaE).—This shallow soil erodes very easily. Runoff is very rapid. Some areas are already eroded. The profile is somewhat similar to that of Lansdale gravelly loam, 3 to 8 percent slopes, moderately eroded.

Use and management (Capability unit VIIe–3).—This soil can be used for pasture if it is not overgrazed. The slopes are so steep that farm equipment cannot be used safely. Erosion and loss of moisture are likely. It is best to use this soil to grow timber or to provide food and cover for wildlife.

Lansdale loam, 0 to 3 percent slopes (LbA).—This soil is like Lansdale gravelly loam, 0 to 3 percent slopes, except that it has a finer textured subsoil and contains fewer coarse fragments. The following profile was observed in a cultivated field.

0 to 10 inches, dark-brown very friable loam; weak fine granular structure.
10 to 13 inches, brown loam; very weak thin platy structure.
13 to 26 inches, brown to dark-brown silt loam; moderate medium to fine subangular blocky structure.
26 to 32 inches, dark-brown heavy gritty silt loam; moderate medium subangular blocky structure.
32 to 37 inches, dark-brown sandy loam; about 50 percent weathered yellow sandstone.
37 inches +, unweathered yellow sandstone.

Less than one-fourth of the surface soil has been removed by erosion. Runoff is slow or very slow. The fertility is low.

Use and management (Capability unit IIe–4).—About 97 percent of this soil is cultivated, and only 2 percent is used for pasture. This soil is suitable for general rotation crops, but some simple conservation measures are needed to maintain the supply of organic matter, keep the soil in good tilth, build up the fertility, conserve moisture, and prevent erosion. On the slopes of more than 2 percent, some protection against erosion is necessary.

Lansdale loam, 3 to 8 percent slopes (LbB).—Most of this soil is located on benches or on ridgetops. It is like Lansdale loam, 0 to 3 percent slopes. Runoff is slow to medium. In most places the forest cover has protected the soil from erosion, but in some areas up to one-fourth of the surface soil has been washed away.

Use and management (Capability unit IIe–4).—All of this soil is wooded. It is erodible and rather droughty. It can be used for general farming if simple management practices are used to conserve soil, moisture, and organic matter.

Lansdale loam, 3 to 8 percent slopes, moderately eroded (LbB2).—This soil occurs on midslopes and in undulating valleys. It is like Lansdale loam, 0 to 3 percent slopes, but it has lost from one-fourth to three-fourths of its surface soil through sheet erosion. Some fields have a few shallow gullies. Runoff is slow to medium.

Use and management (Capability unit IIe–4).—Half of this soil is used for crops, and the other half is used for pasture. This soil is suitable for general crops in long rotations, but it needs intensive conservation practices to prevent erosion and to conserve organic matter and moisture.

Lansdale loam, 8 to 15 percent slopes, moderately eroded (LbC2).—This upland soil occurs near streams, on the sides of low hills, and on short breaks of slope in more gently sloping areas. It is shallower than Lansdale loam, 0 to 3 percent slopes, and it has lost from one-fourth to three-fourths of its original surface layer. Many fields have a few shallow gullies. Runoff is medium to rapid.

Use and management (Capability unit IIIe–5).—About 80 percent of this soil is in crops, 16 percent is in pasture, and 3 percent is wooded. The soil is droughty and low in fertility. It can be used for cultivated crops in long rotations if intensive conservation measures are applied to control erosion and to conserve moisture and organic matter. This soil is better suited to hay, pasture, or orchard trees than to cultivated crops.

Lansdale loam, 15 to 25 percent slopes (LbD).—This soil occurs on the sides of rather narrow ridges or in places where streams have cut into the lowland. It is droughty and low in fertility. It is like Lansdale loam, 0 to 3 percent slopes, but shallower. Runoff is rapid to very rapid, but there has been little erosion because of the forest cover. Less than one-fourth of the original surface soil has been lost.

Use and management (Capability unit IVe–3).—All of this soil is wooded. If cleared, it could be used for hay, pasture, or orchards.

Lansdale sandy loam, 0 to 3 percent slopes (LcA).—This soil developed from a coarse-grained sandstone that weathers somewhat more rapidly than the finer grained sandstone from which the Lansdale loams and gravelly loams developed. This soil is deeper than the loams and gravelly loams, but it is more droughty. Runoff is slow to very slow. The fertility is low. A profile in a cultivated field is described as follows:

0 to 9 inches, dark-brown loose sandy loam; weak fine crumb structure.
9 to 11 inches, strong-brown very friable sandy loam; weak fine subangular blocky structure.
11 to 36 inches, yellowish-red friable sandy loam; moderate fine to medium blocky structure.
36 inches +, reddish-brown weathered sand; structureless; grades into relatively soft yellowish Triassic sandstone.

Use and management (Capability unit IIe–6).—This soil is suited to rotation crops, especially to deep-rooted crops. It is a good soil for orchards. Erosion is not a serious problem.

Lansdale sandy loam, 3 to 8 percent slopes (LcB).—This soil is shallower than Lansdale sandy loam, 0 to 3 percent slopes. Runoff is slow to medium. Erosion has removed less than one-fourth of the surface layer.

Use and management (Capability unit IIe–6).—Most of this soil is used for crops. It is suitable for rotation crops, but simple conservation measures are needed to protect it against erosion and to conserve moisture. Improving fertility and conserving organic matter are other management problems.

Lansdale sandy loam, 3 to 8 percent slopes, moderately eroded (LcB2).—This soil is more eroded than Lansdale sandy loam, 0 to 3 percent slopes. From one-fourth to three-fourths of the surface layer is gone. Some fields have a few shallow gullies. Runoff is medium to slow. This soil erodes easily.

Use and management (Capability unit IIe–6).—This soil is suited to general farm crops, in long rotations and under intensive conservation practices. Management needs include preventing erosion, maintaining fertility, building up the supply of organic matter, and conserving moisture.

Lansdale sandy loam, 8 to 15 percent slopes (LcC).—This soil is not so deep as Lansdale sandy loam, 0 to 3 percent slopes. Some fields have lost up to one-fourth of their surface soil through erosion. Runoff is medium to rapid.

Use and management (Capability unit IIIe–8).—Much of this soil is cultivated. It can be used for general crops if intensively managed to prevent erosion, to conserve moisture and organic matter, and to maintain fertility. Some areas need very intensive management.

Lansdale stony sandy loam, 0 to 8 percent slopes (LdA).—This soil occurs on ridges where the slope is not favorable for the development of soil or where the sandstone is resistant to weathering. It is shallower and stonier than Lansdale sandy loam, 0 to 3 percent slopes, and has a more yellowish brown subsoil. The stones are larger and more numerous than those in other types of Lansdale soils. They cover 15 percent of the surface and make cultivation impractical. Some surface soil may have been lost through sheet erosion, but erosion is not generally a problem.

Use and management (Capability unit VIIe–3).—Because of droughtiness and low natural fertility, it is unprofitable to clear this soil of trees, stumps, and stones. It should be kept in trees.

Lansdale stony sandy loam, 8 to 15 percent slopes (LdC).—This soil is similar to Lansdale sandy loam, 0 to 3 percent slopes, except that it is stonier and shallower. A little sheet erosion has occurred. The hazard of further erosion would be moderate if the soil were cultivated, but erosion is not generally a problem because most areas are protected by forest. Runoff is medium to rapid.

Use and management (Capability unit VIIe–3).—Most of this soil is wooded. It is too stony, steep, and droughty to be used economically for crops or pasture. The best use for this soil is to leave it in woods. Areas now cleared should be replanted to trees.

Lansdale stony sandy loam, 15 to 25 percent slopes (LdD).—This soil is shallower than Lansdale stony sandy loam, 0 to 8 percent slopes, but the profiles of the two soils are similar. Some of the surface soil has been washed away. Runoff is rapid.

Use and management (Capability unit VIIe–3).—This soil is too steep and stony to be cleared. If cultivated, it would erode easily. Safe operation of farm machinery would be difficult. These areas should be kept in woods or replanted to trees.

Lansdale stony sandy loam, 25 to 35 percent slopes (LdE).—This soil is shallow, steep, and stony. The

erosion hazard is very high because of the very rapid runoff. Some areas are already eroded.

Use and management (Capability unit VIIe–3).—This soil should be kept in woods because it is too steep and stony to be useful if cleared. Farm machinery could not be used. Erosion would be rapid if the protective cover of trees were removed.

Lawrence Series

The soils of the Lawrence series are deep, moderately well drained to somewhat poorly drained, and productive. They developed in drainageways, at the heads of streams, and around springs or seep areas in the central part of the county. The parent materials were mainly weathered products of impure limestone and dolomite. Some of the parent material was residual, and some colluvial. The original vegetation was a forest of oaks and hickories.

Some areas of these soils are cultivated, but most areas are in pasture because they are so wet. Internal drainage is moderate to slow because of the fine texture of the subsoil. The moisture-holding capacity is high. Surface water accumulates on these soils and keeps them wet during at least part of the year.

Lawrence silt loam, 0 to 3 percent slopes (LeA).—This soil occurs in drainageways where runoff and seepage water accumulate. Some is in wet spots where shale and limestone formations meet. A profile observed in a cultivated field follows.

0 to 9 inches, dark grayish-brown silt loam; weak fine crumb structure.
9 to 12 inches, yellowish-brown silt loam, mottled with strong brown; moderate medium blocky structure.
12 to 34 inches, light yellowish-brown to yellowish-brown silt loam, mottled with strong brown and dark reddish brown; moderate coarse subangular blocky structure in upper part, moderate medium platy structure in lower part.
34 inches +, yellowish-brown silty clay loam, mottled with strong brown; moderate medium blocky structure.

The contrast between the color of the subsoil and the color of the mottles becomes stronger with depth. Fragments of white chert are scattered on the surface and throughout the profile. Dark-colored shotlike concretions of iron and manganese occur in the profile; they increase in number with depth.

Runoff is slow to very slow. Some areas have lost up to one-fourth of the original surface soil, but in most places soil material accumulates faster than it is removed by erosion. A few spots of poorly drained soils have been included in this unit because they are too small to map separately.

Use and management (Capability unit IIw–2).—About 65 percent of this soil is used for pasture, and 35 percent is used for crops. Improving drainage is the chief management problem. This soil is well suited to pasture. It can be cultivated if it is drained and if surface water is diverted from the fields. It is not suitable for crops that are sensitive to a high water table.

Lawrence silt loam, 3 to 6 percent slopes, moderately eroded (LeB2).—Most of this soil is located in drainageways or near the base of slopes where seepage occurs under the surface. This soil is like Lawrence silt loam, 0 to 3 percent slopes, but it is more eroded and has a little better surface drainage. Erosion has removed up to three-fourths of the surface soil. The present plow layer is a mixture of subsoil and surface soil. It is more difficult to manage than the original surface layer.

Use and management (Capability unit IIIe–4).—This soil is best suited to grass. It can be cultivated if it can be drained without creating an erosion hazard. Only crops that are tolerant of excess moisture should be planted.

Lehigh Series

The Lehigh series consists of moderately deep, moderately well drained to somewhat poorly drained soils. They are low in natural fertility and in moisture-holding capacity. Internal drainage is slow.

These soils occur in the northwestern and northeastern parts of the county. They developed from metamorphosed Triassic shales and sandstones near diabase dikes. Most areas occur on the lower slopes of the ironstone ridges; others are in depressions, in drainageways, or at the foot of slopes where underground water seeps out. The original forest was composed of oak, hickory, and poplar trees.

Other soils in the same localities are the well-drained Brecknock soils, the poorly drained Croton soils, the Montalto soils, and soils of the Penn-Lansdale complex.

Lehigh silt loam, 3 to 8 percent slopes, moderately eroded (LfB2).—This soil occurs on slopes or benches near diabase dikes. It developed from metamorphosed Triassic sandstone. A profile in a cultivated field is as follows:

0 to 9 inches, very dark grayish-brown very friable silt loam; weak very fine granular structure.
9 to 14 inches, light yellowish-brown friable silt loam; moderate thin platy, breaking to very fine subangular blocky structure; mottled with a few fine, faint, streaks of light brownish gray and light olive brown.
14 to 23 inches, light yellowish-brown firm heavy silt loam distinctly mottled with medium-sized streaks of light gray and yellowish brown; moderate thin platy structure, breaking to very fine subangular blocky structure.
23 inches +, yellowish-brown metamorphosed Triassic sandstone.

As much as three-fourths of the surface layer has been lost through erosion. Runoff is slow to medium.

Use and management (Capability unit IIIe–7).—This soil can be used for crops, but it is better suited to hay or pasture. Erodibility, poor drainage, and low natural fertility are its principal limitations. Surface drainage will make it more productive and easier to work.

Lehigh silt loam, 0 to 3 percent slopes (LfA).—Most of this soil is at the foot of slopes where extra water accumulates. It is slightly deeper than Lehigh silt loam, 3 to 8 percent slopes, moderately eroded. The surface soil is 9 to 12 inches deep. Runoff is slow or very slow.

Use and management (Capability unit IIIw–1).—This soil is best suited to hay or pasture. The wet subsoil makes it unsuitable for crops sensitive to excess water. Improving the drainage, increasing the fertility, and maintaining the supply of organic matter are the major management problems.

Lehigh slaty silt loam, 3 to 8 percent slopes, moderately eroded (LgB2).—This soil is mostly on benches or at the base of slopes where surface and subsurface water accumulates. It developed from shaly material of Triassic age. The following profile was observed in a cultivated field.

0 to 6 inches, dark-brown friable silt loam; weak very fine subangular blocky structure.
6 to 10 inches, dark yellowish-brown friable silt loam; moderate medium blocky structure.
10 to 27 inches, dark yellowish-brown friable silty clay loam; many distinct, medium-sized, light brownish-gray streaks and blotches; moderate fine blocky structure; some black iron and manganese stains coat the surfaces of the blocks.
27 to 36 inches, dark yellowish-brown friable shaly silt loam; many prominent, medium-sized streaks of light olive brown; moderate fine blocky structure.
36 inches +, bluish-gray partly weathered metamorphosed shale.

Runoff is slow to medium. Some fields have lost as much as three-fourths of their surface soil through sheet erosion.

Use and management (Capability unit IIIe–7).—This soil can be used for crops, but it is better suited to hay or pasture. The chief management problems are controlling erosion, improving drainage, and increasing fertility. Artificial surface drainage will make this soil more productive and less difficult to work.

Lehigh slaty silt loam, 8 to 15 percent slopes, moderately eroded (LgC2).—This soil is on the sides of ridges. Most areas are long and narrow. Drainageways form wet strips across these areas. This soil is shallower than Lehigh slaty silt loam, 3 to 8 percent slopes, moderately eroded. Runoff is medium to rapid. Sheet erosion has removed from one-fourth to three-fourths of the original surface layer. Some very small areas are only slightly eroded.

Use and management (Capability unit IIIe–7).—Most areas of this soil are best suited to forage crops. The less eroded areas can be cultivated if intensive management is used to control erosion, remove excess water, and maintain fertility.

Lehigh slaty silt loam, 15 to 25 percent slopes, moderately eroded (LgD2).—This soil is located on the sides of rather steep, narrow ridges, where some water seeps out. It is like Lehigh slaty silt loam, 3 to 8 percent slopes, moderately eroded, but shallower. Runoff is rapid to very rapid. In most areas erosion has removed up to three-fourths of the surface soil. Some fields have a few shallow gullies, and some have many. A few small areas of slightly eroded soil and a few areas of severely eroded soil are included in this unit.

Use and management (Capability unit VIe–2).—Because of the erosion hazard, this soil should be kept in pasture or woodland. Poor drainage and low fertility are the chief limitations. Farm equipment cannot be operated safely on these steep slopes.

Letort Series

The soils of this series are deep, well drained, and productive. They occur in the south-central part of the county. They are residual soils that developed from dark-colored lime schist. The schist contains graphite—in some places enough to make the soil black throughout the profile. The forest cover of most of the area was originally oaks and hickories, but stands of yellow-poplar are now common.

These soils are used mostly for crops. They have moderately high water-holding capacity and moderate permeability. Associated soils are the shallow Pequea soils, the deep, well-drained Conestoga soils, the shallow, well-drained Hollinger soils, and the flood-plain soils that developed from calcareous alluvium.

Letort silt loam, 0 to 3 percent slopes (LhA).—A profile of this soil in a cultivated field is as follows:

0 to 9 inches, dark yellowish-brown friable silt loam; moderate fine granular structure.
9 to 17 inches, dark grayish-brown friable silt loam; moderate very fine subangular blocky structure.
17 to 24 inches, dark yellowish-brown to yellowish-brown friable silt loam; moderate very fine blocky structure.
24 to 34 inches, yellowish-brown friable silt loam; moderate medium blocky structure; contains enough mica to sparkle slightly.
34 to 39 inches, yellowish-brown friable heavy silt loam; strong medium blocky structure.
39 to 55 inches, yellowish-brown friable heavy silt loam; strong very fine blocky structure.
55 to 62 inches, very dark grayish-brown to olive-brown silt loam; moderate medium subangular blocky structure.
62 inches +, weathered parent material grading into solid rock.

The colors of the various layers range from those described in this profile all the way to black, depending on the amount of graphite in the parent material.

Runoff is slow to very slow. A few areas where surface water accumulates have lost part of their surface layer through sheet erosion, but most areas have lost little or no soil.

Use and management (Capability unit IIe–3).—This soil is well suited to many crops, including tobacco. It should be cultivated on the contour. Some areas need to be protected by the diversion of water. Crop rotations should be long.

Letort silt loam, 3 to 6 percent slopes, moderately eroded (LhB2).—This soil is shallower than Letort silt loam, 0 to 3 percent slopes. Runoff is slow to medium. From one-fourth to three-fourths of the original surface soil has been lost. Some fields have a few shallow gullies.

Use and management (Capability unit IIe–3).—This soil is well suited to crops in long rotations. To protect it from further erosion, it should be stripcropped on the contour, and water should be diverted from long slopes.

Letort silt loam, 6 to 12 percent slopes, moderately eroded (LhC2).—This soil is shallower than Letort silt loam, 0 to 3 percent slopes, and it has lost up to three-fourths of its surface soil through erosion. The mixture of subsoil and surface soil in the plow layer is less suitable for crops than the original uneroded surface layer. Some areas have a few gullies. Runoff is medium to rapid.

Use and management (Capability unit IIIe–3).—This soil can be used for crops in a long rotation if it is protected by contour stripcropping and terracing. Erosion is a serious hazard.

Letort silt loam, 6 to 12 percent slopes, severely eroded (LhC3).—This soil is shallower than Letort silt

loam, 0 to 3 percent slopes. Many areas have lost all of the surface soil and part of the subsoil. Most fields have many shallow gullies. Runoff is medium to rapid.

Use and management (Capability unit IVe–1).—This soil is best suited to forage crops. Hayfields should be reseeded in contour strips. Crops can be grown in a very long rotation if this soil is strip-cropped on the contour and protected by diversion terraces on long slopes. Erosion is a constant hazard.

Letort silt loam, 12 to 18 percent slopes, moderately eroded (LhD2).—This soil is shallower than Letort silt loam, 0 to 3 percent slopes, and it is more eroded. Generally as much as three-fourths of the surface soil is gone. Some fields have a few shallow gullies, and some have many. Runoff is rapid to very rapid.

Use and management (Capability unit IVe–1).—The best use for this soil is permanent hay. Cultivated crops can be grown in a very long rotation. They should be planted in contour strips, and water should be diverted from long slopes.

Letort silt loam, 18 to 25 percent slopes, moderately eroded (LhE2).—This soil is similar to Letort silt loam, 0 to 3 percent slopes, but it is shallower. From one-fourth to three-fourths of the surface soil has been removed by sheet erosion. Some areas have a few shallow gullies, and others have many. Subsoil has been mixed into the surface soil in cultivation. Runoff is rapid to very rapid.

Use and management (Capability unit VIe–1).—This soil is best suited to pasture. It needs a cover of vegetation to protect it from erosion. Pastures should be reseeded in contour strips. Operating farm equipment on these slopes is hazardous.

Lewisberry Series

The soils of the Lewisberry series are deep and well drained. They are moderately low in natural fertility. They occur on the ridges and uplands in the north-central part of the county, extending from a point near Mount Hope to Brickerville and Reinholds, and from Ephrata to Terre Hill. They developed from hard, red, Triassic sandstone and conglomerate of the Brunswick or Gettysburg formation. These rocks, locally called Elizabeth Furnace conglomerate, contain many water-rounded pebbles and cobblestones of pink to reddish quartz ranging in diameter from ⅛ inch to more than 1 foot. They are more resistant to weathering than the surrounding formations; consequently the Lewisberry soils are higher than the nearby soils.

The range in texture and stoniness of these soils depends on the original parent material. The generally sandy texture provides moderate to rapid internal drainage but only low moisture-holding capacity.

These soils are closely related to the moderately deep, well-drained Penn soils, which occur next to them. Other soils that occur nearby are the deep, well drained Lansdale, the shallow Steinsburg, the moderately well drained Readington, the poorly drained Croton, and, in some places, the Brecknock and Montalto.

Lewisberry gravelly sandy loam, 0 to 3 percent slopes (LkA).—This soil developed on broad ridgetops, on benches, or at the foot of slopes. The parent material was red Triassic conglomerate. A typical profile is as follows:

0 to 7 inches, very dusky red, loose sandy loam; weak very fine granular structure, in some places tending toward platy; about 10 percent gravel.
7 to 11 inches, reddish-brown very friable sandy loam; weak very fine subangular blocky structure; about 10 percent pebbles 5 to 10 millimeters in diameter.
11 to 18 inches, reddish-brown friable loam; moderate fine subangular blocky structure; up to 30 percent quartz pebbles 5 to 15 millimeters in diameter.
18 to 31 inches, dusky-red friable loam; moderate fine blocky structure; 10 to 20 percent gravel.
31 to 40 inches, weak-red, firm, heavy silt loam; moderate medium blocky structure, breaking into fine blocky and thin platy.
40 inches +, red weathered conglomerate, sandstone, and shale; varies in texture from heavy silt loam to sandy loam.

The gravel in the profile consists of quartz pebbles and a few angular sandstone fragments. In a few places the profile is 75 percent gravel.

Runoff is slow to very slow. Some areas have lost up to one-fourth of their surface soil, and further erosion is a hazard. The moisture-holding capacity is low, and the natural fertility is low.

Use and management (Capability unit IIe–6).—If this soil is heavily fertilized, it is fairly well suited to cultivated crops. It should not be intensively cropped. The principal management problems are preventing erosion, conserving moisture, and increasing fertility.

Lewisberry gravelly sandy loam, 3 to 8 percent slopes moderately eroded (LkB2).—This soil is shallower than Lewisberry gravelly sandy loam, 0 to 3 percent slopes. It has lost from one-fourth to three-fourths of its surface soil through sheet erosion. Some areas have a few shallow gullies. This unit contains small areas that are only slightly eroded and others that are severely eroded. Runoff is slow to medium.

Use and management (Capability unit IIe–6).—Rotation crops can be grown on this soil if large amounts of lime and fertilizer are applied. The principal management problems are conserving moisture, improving fertility, and preventing loss of soil and organic matter.

Lewisberry gravelly sandy loam, 8 to 15 percent slopes, moderately eroded (LkC2).—This soil is like Lewisberry gravelly sandy loam, 0 to 3 percent slopes, except that it is shallower. It has lost from one-fourth to three-fourths of its surface soil. A few shallow gullies have formed in some fields. The loss of surface soil has made this soil more droughty but, because of the coarse texture of the lower layers, has not made it more difficult to work. Some small areas are only slightly eroded. Runoff is medium to rapid.

Use and management (Capability unit IIIe–8).—If crops are grown on this soil, the rotation should be long and intensive conservation measures should be applied. The productivity is limited by low fertility, by poor moisture-holding capacity, and by the results of erosion.

Lewisberry gravelly sandy loam, 15 to 25 percent slopes, moderately eroded (LkD2).—This soil is similar to Lewisberry gravelly sandy loam, 0 to 3 percent slopes, but shallower. The loss of up to three-fourths of the surface soil through erosion has lowered the productivity. Some areas have a few shallow gullies

and others have many. Some small areas have been severely eroded; others are only slightly eroded. Runoff is rapid to very rapid.

Use and management (Capability unit VIe–2).—This soil should be used for pasture because it needs a cover of vegetation to prevent erosion. It is droughty and low in fertility. Some fields are too steep for the safe operation of farm equipment.

Lewisberry stony sandy loam, 0 to 8 percent slopes (LmA).—This soil is located on ridgetops, on benches, and on nearly level areas at the foot of slopes. The following profile was observed in woodland.

0 to 13 inches, yellowish-red to reddish-brown friable sandy loam; very weak blocky structure.
13 to 16 inches, reddish-brown friable sandy loam; weak medium blocky structure.
16 to 23 inches, dark-red friable loam; weak medium blocky structure.
23 to 38 inches, dark reddish-brown friable loam; weak medium blocky structure.
38 to 54 inches, dark reddish-brown gravelly sandy loam; single grain (structureless).
54 inches +, relatively unweathered red Triassic sandstone.

Coarse fragments of sandstone occur throughout the profile. Sandstone cobbles and boulders cover up to 3 percent of the surface.

Most of this soil is practically uneroded because it has been protected by forest. A few small areas have been moderately eroded. Natural fertility is low, and moisture-holding capacity is low.

Use and management (Capability unit VIIe–3).—Most of this soil is wooded. It is not productive enough to justify the expense of clearing trees and removing stones. It should be left in forest.

Lewisberry stony sandy loam, 8 to 15 percent slopes (LmC).—This soil is shallower than Lewisberry stony sandy loam, 0 to 8 percent slopes. Some areas have a few gullies. The steeper slopes are more stony and droughty than the milder slopes. Runoff is medium to rapid. The fertility and the moisture-holding capacity are both low.

Use and management (Capability unit VIIe–3).—This soil is too stony for farming. It should be kept in forest.

Lewisberry stony sandy loam, 15 to 25 percent slopes (LmD).—This soil is located on the upper slopes of ridges and the sides of stream valleys. It is similar to, but shallower than, Lewisberry stony sandy loam, 0 to 8 percent slopes. Runoff is rapid to very rapid.

Use and management (Capability unit VIIe–3).—This soil should be used for forest. It is stony, droughty, and low in fertility. It erodes easily if cleared. Some areas are already eroded. The steep slopes make the use of farm equipment hazardous.

Lewisberry stony sandy loam, 25 to 40 percent slopes (LmE).—This shallow soil occurs on the steep, rather narrow tops of Furnace Ridge, Blackoak Ridge, and Kline Hill. Some areas are eroded, but not enough to affect management. Runoff is rapid to very rapid.

Use and management (Capability unit VIIe–3).—This soil is so steep and stony that it will not produce a good stand of high-quality trees. It should not be used for anything but forest or a refuge for wildlife.

Lindside Series

The soils of the Lindside series are deep, moderately well drained to somewhat poorly drained, and naturally fertile. They occur in the central part of the county. Some of them developed from alluvium on the first bottoms of the larger streams and their tributaries, and some from material that rolled or was washed from nearby slopes into pockets, sinks, drainageways, and areas around the base of slopes. Differences in mica content and in color depend on the origin of the alluvium. Most of the parent material was originally the topsoil of Duffield, Hagerstown, Conestoga, Letort, and Pequea soils. All of these are fertile limestone soils, and the Lindside soils are therefore high in fertility. Lime, fertilizer, and manure have also been washed from the other soils onto the Lindside soils. The native forest consisted of oak, sycamore, elm, ash, hickory, yellow-poplar, and walnut trees.

The Lindside soils are wet part of the year because of floods or because of the accumulation of water that runs off nearby slopes. Water is sometimes ponded in the depressions. The water table is high, and the subsoil is wet. These soils are moderately permeable. The internal drainage is generally good enough for most crops, but some crops are drowned in wet periods. The moisture-holding capacity is high.

Most of the flood-plain soils are used for pasture, and most of the others are used for crops. Almost none of the acreage is wooded.

Associated with the Lindside soils on the flood plains are the deep, well-drained Huntington soils and the poorly drained Melvin soils. On the uplands are the Duffield, Hagerstown, Conestoga, Letort, and Pequea soils.

Lindside silt loam, 0 to 3 percent slopes (LnA).—This soil is located on nearly level flood plains. The following profile was observed in a pasture.

0 to 8 inches, dark-brown friable silt loam; weak fine granular structure.
8 to 11 inches, yellowish-red friable fine sandy loam; weak medium subangular blocky structure.
11 to 20 inches, dark yellowish-brown to yellowish-brown friable silty clay loam mottled with strong-brown streaks; moderate medium blocky structure.
20 to 37 inches, yellowish-brown firm silty clay mottled with yellowish-red and gray streaks; moderate medium blocky structure.
37 inches +, dark grayish-brown to olive-brown firm silty clay mottled with strong-brown streaks and blotches.

Erosion is not generally a problem on this soil. Some areas lose soil by stream gouging, but in most places soil material is more likely to be deposited than to be washed away. Runoff is slow to very slow.

Included are some very small areas of moderately eroded Lindside silt loam on slopes of 3 to 6 percent.

Use and management (Capability unit IIw–3).—About 84 percent of this soil is in pasture, 14 percent is used for crops, and a little is wooded or idle. This soil is best suited to hay or pasture. It can be used for rotation crops that will withstand flooding and wetness in the subsoil. The high water table and the occasional floods are the chief management hazards. Artificial drainage would make this soil more productive and easier to manage.

Lindside silt loam, local alluvium, 0 to 3 percent slopes (LoA).—This soil occurs in drainageways and depressions at the base of slopes in the limestone areas. Water sometimes ponds in the depressions. The following profile is in pasture.

0 to 10 inches, dark grayish-brown to dark-brown silt loam; moderate fine granular structure.
10 to 15 inches, dark yellowish-brown silt loam faintly mottled with light brownish gray; moderate medium blocky structure.
15 to 24 inches, yellowish-brown firm silty clay loam faintly mottled with brown; moderate medium blocky structure.
24 to 37 inches, yellowish-brown firm silty clay loam with streaks of strong-brown mottling; moderate medium blocky structure.
37 inches +, dark-brown very friable sandy loam mottled with a few fine, faint streaks of yellowish red; weak coarse blocky structure.

A few quartz fragments about 2 inches in diameter are scattered throughout the profile. Earthworms are abundant in the middle layers. Runoff is slow to very slow. Deposition of soil material is more common than erosion.

Use and management (Capability unit IIw–2).—About 70 percent of this soil is used for crops and 29 percent for pasture. This soil is too wet to be well suited to alfalfa, winter grain, and root crops. Occasional flooding kills or damages some plants. Drainage will improve yields.

Lindside silt loam, local alluvium, 3 to 6 percent slopes (LoB).—This soil occurs at the foot of slopes, on the border of seep spots, and, less commonly, in drainageways. It is similar to Lindside silt loam, local alluvium, 0 to 3 percent slopes. It has better surface drainage, but it is more likely to erode. Generally it has lost not more than one-fourth of the original surface soil. Runoff is slow to medium.

Use and management (Capability unit IIw–2).—About 41 percent of this soil is in crops, 29 percent is in pasture, and 29 percent is wooded. It is suitable for crops, but simple conservation practices are needed to prevent erosion, remove excess water, and maintain tilth.

Manor Series

The soils of the Manor series are shallow and well-drained. They occur principally in the southern part of the county, south of a line connecting Creswell, Safe Harbor, Martic Forge, Smithville, Quarryville, and Christiana. Other areas are located near Mine Ridge and the Welsh Mountains. The parent material was derived from the underlying rock. In the larger area, this is Wissahickon schist and Peters Creek schist; in the areas near Mine Ridge and the Welsh Mountains, it is Baltimore gneiss. The schists weather rapidly. In many places they are so soft and decomposed that there appears to be a deep soil, although the true soil is shallow. The original forest consisted, in most places, of oak, hickory, and chestnut trees. There were a few pure stands of yellow-poplar.

Internal drainage is moderately rapid because the underlying material is porous. The moisture-holding capacity is low. These soils feel greasy because they contain mica.

Associated with the Manor soils are the deep, well-drained Chester and Elioak soils, the moderately deep, well-drained Glenelg soils, and the moderately well drained and somewhat poorly drained Glenville soils.

Manor channery loam, 8 to 15 percent slopes (MaC). This soil occurs on the Piedmont Uplands. The following is a typical profile.

0 to 7 inches, very dark grayish-brown very friable loam; weak fine granular structure; 10 to 90 percent fragments of schist ranging from ½ to 4 inches in diameter.
7 to 23 inches, yellowish-brown friable silt loam; weak fine subangular blocky structure; 30 to 50 percent rock fragments.
23 inches +, olive-brown friable loam, consisting of weathered schist and gneiss.

Use and management (Capability unit IIIe–6).—Almost all of this soil is wooded. It is easily managed if protected by forest. If cleared and cultivated, it is likely to erode and to lose organic matter and moisture. It can be used for crops in a long rotation if intensively conserved.

Manor channery loam, 3 to 8 percent slopes, moderately eroded (MaB2).—This soil is deeper than Manor channery loam, 8 to 15 percent slopes. Erosion has removed up to three-fourths of the original surface soil. Some fields have a few shallow gullies. Some small areas are only slightly eroded. The loss of surface soil has reduced the ability of the soil to absorb and store moisture, as well as its ability to produce crops. Runoff is slow to medium.

The mapping unit includes small areas that are nearly level.

Use and management (Capability unit IIe–5).—About 56 percent of this soil is in crops, 21 percent is in pasture, 15 percent is wooded, and 5 percent is idle. This soil is suitable for rotation crops if simple conservation measures are applied.

Manor channery loam, 8 to 15 percent slopes, moderately eroded (MaC2).—This is a shallower soil than Manor channery loam, 8 to 15 percent slopes. Erosion has removed up to three-fourths of the surface soil, and a few shallow gullies have formed in some fields. Runoff is medium to rapid.

Use and management (Capability unit IIIe–6).—About 78 percent of this soil is used for crops, 4 percent is idle, 5 percent is in pasture, and 6 percent is wooded. This soil can be used for crops in a long rotation, but it needs intensive conservation practices to prevent erosion and maintain a good supply of organic matter.

Manor channery loam, 15 to 25 percent slopes (MaD).—This soil is shallower than Manor channery loam, 8 to 15 percent slopes. Less than one-fourth of the surface layer has been removed. Runoff is rapid to very rapid.

Use and management (Capability unit IVe–4).—Almost all of this soil is in woods. It has few management problems when covered by forest. If this soil is cleared, it is best suited to hay. It is likely to erode and to lose organic matter and moisture if cultivated. It can be cultivated occasionally if intensive conservation practices are used.

Manor channery loam, 15 to 25 percent slopes, moderately eroded (MaD2).—This soil is similar to Manor channery loam, 8 to 15 percent slopes, but it is shal-

lower. Erosion has removed up to three-fourths of the original surface soil and cut a few shallow gullies in some fields. This loss of surface soil has reduced the productivity and the moisture-holding capacity of the soil. Runoff is rapid to very rapid.

Use and management (Capability unit IVe–4).—About 55 percent of this soil is cropped, 13 percent is idle, 12 percent is pastured, and 9 percent is wooded. This soil is best suited to permanent hay. A cultivated crop can be grown occasionally if intensive conservation is applied to prevent and control erosion, maintain the organic-matter content, and conserve moisture.

Manor channery silt loam, 3 to 8 percent slopes (MbB).—The following profile is typical of cultivated areas of this soil.

0 to 9 inches, very dark grayish-brown friable silt loam; weak fine granular structure; surface partly covered with fragments of schist ranging from 1½ to 8 inches in diameter.
9 to 15 inches, dark yellowish-brown to yellowish-brown friable shaly silt loam; weak fine subangular blocky, tending toward platy, structure; contains many fragments of micaceous schist.
15 to 20 inches, olive-brown to light olive-brown shaly silt loam; 90 percent very micaceous weathered schist.
20 inches +, fragmented light-gray weathered schist.

The depth of the first two layers may differ from that of the profile given, but their total depth is not over 24 inches.

Areas protected by forest have lost little of their surface layer, but in other places erosion has removed up to one-fourth of the surface soil. The moisture-holding capacity is low. Runoff is slow to medium. Some small areas on slopes of less than 3 percent are included.

Use and management (Capability unit IIe–5).—About 82 percent of this soil is in woods, 11 percent is in crops, and 3 percent is in pasture. If protected by forest, this soil has few management problems. If cleared, it can be used for cultivated crops, but it needs careful management to prevent erosion, control surface water, and maintain the organic-matter content.

Manor channery silt loam, 3 to 8 percent slopes, moderately eroded (MbB2).—This soil was originally like Manor channery silt loam, 3 to 8 percent slopes, but it has lost up to three-fourths of its surface soil through erosion. Some fields have many shallow gullies, and other fields have a few. Runoff is slow to medium.

Use and management (Capability unit IIe–5).—About 75 percent of this soil is in crops, 8 percent is idle, 8 percent is in pasture, and 7 percent is wooded. This soil is suitable for rotation crops, but intensive conservation is needed to prevent erosion, conserve moisture and organic matter, and maintain productivity.

Manor channery silt loam, 3 to 8 percent slopes, severely eroded (MbB3).—Before it was eroded, this soil was similar to Manor channery silt loam, 3 to 8 percent slopes. Runoff is medium, but surface water that runs from higher areas has washed away at least three-fourths of the original surface soil and cut many shallow gullies. Some very small areas have been very severely eroded.

Use and management (Capability unit IVe–4).—About 62 percent of this soil is used for crops, and about 25 percent for pasture. About 7 percent is wooded, and 3 percent is idle. This soil should be kept in hay. It should be cultivated only when the hay fields need reseeding. Intensive conservation is necessary to conserve moisture and protect the soil from further erosion.

Manor channery silt loam, 8 to 15 percent slopes (MbC).—This soil is shallower than Manor channery silt loam, 3 to 8 percent slopes. Some areas have lost up to one-fourth of their surface soil through sheet erosion. Runoff is medium to rapid.

Use and management (Capability unit IIIe–6).—Almost all of this soil is wooded. It presents few problems if protected by native forest. It can be cultivated in a long rotation, but it needs intensive conservation practices to prevent erosion, loss of organic matter, and loss of moisture.

Manor channery silt loam, 8 to 15 percent slopes, moderately eroded (MbC2).—This soil is shallower than Manor channery silt loam, 3 to 8 percent slopes. Up to three-fourths of the original surface soil has been lost, and the rest has been mixed with the upper subsoil in plowing. The present plow layer is less absorptive than the original surface soil. Some fields have a few shallow gullies. Runoff is medium to rapid.

Use and management (Capability unit IIIe–6).—About 74 percent of this soil is used for crops, 13 percent is used for pasture, 8 percent is wooded, and 4 percent is idle. This soil can be used for crops in a long rotation if protected against erosion, loss of organic matter, and loss of moisture.

Manor channery silt loam, 8 to 15 percent slopes, severely eroded (MbC3).—This very shallow soil originally had a profile similar to that of Manor channery silt loam, 3 to 8 percent slopes, but at least three-fourths of the surface soil has been washed away. Most fields have shallow gullies. The loss of soil has reduced the moisture-storage capacity of the soil and made it more difficult to work. Runoff is medium to rapid.

Use and management (Capability unit VIe–3).—About 69 percent of this soil is used for crops, 15 percent is used for pasture, and 16 percent is idle. Erosion has made this soil almost completely unsuitable for cultivation. Most areas are suited to pasture, but some should be forested. The management problems are to prevent erosion, to maintain the supply of organic matter, and to conserve moisture.

Manor channery silt loam, 15 to 25 percent slopes (MbD).—This is a shallower soil than Manor channery silt loam, 3 to 8 percent slopes. The native vegetation has prevented serious erosion. Runoff is rapid to very rapid, but less than one-fourth of the original surface soil has been washed away.

Use and management (Capability unit IVe–4).—Only 2 percent of this soil is used for crops, and 2 percent is used for pasture. The rest is wooded. If this soil is cleared, it should be used mainly for hay or pasture. Cultivation will cause serious erosion and loss of moisture. The operation of farm equipment is hazardous because of the steep slopes.

Manor channery silt loam, 15 to 25 percent slopes, moderately eroded (MbD2).—This soil is shallower

than Manor channery silt loam, 3 to 8 percent slopes. Up to three-fourths of its original surface soil has been removed by erosion. A few shallow gullies have formed in many fields. Erosion has reduced the moisture-storing capacity. Runoff is rapid to very rapid.

Use and management (Capability unit IVe–4).—About 50 percent of this soil is in crops, 22 percent is in pasture, 22 percent is wooded, and 6 percent is idle. This soil is best suited to forage crops. It can be cultivated occasionally, but it needs intensive conservation practices to prevent erosion and loss of moisture. Farm equipment cannot be used safely on some of these steep slopes.

Manor silt loam, 3 to 8 percent slopes, moderately eroded (McB2).—The profile of this soil is deeper than that of Manor channery silt loam, 3 to 8 percent slopes, and it does not contain so many platy fragments of schist. The parent material of the silt loam was more weathered than that of the channery silt loam. In some places the silt loam is underlain by weathered rock that has not yet begun to develop into soil.

Runoff is slow to medium. Erosion has removed up to three-fourths of the original surface soil. Some areas have a few shallow gullies. A few small areas are more nearly level and less eroded than the rest of the unit. Other small areas are more severely eroded.

Use and management (Capability unit IIe–5).—About 71 percent of this soil is used for crops, and 14 percent for pasture. About 18 percent is wooded, and 4 percent is idle. This soil is suitable for rotation crops if simple conservation measures are used to prevent erosion, conserve moisture, and build up the supply of organic matter.

Manor silt loam, 8 to 15 percent slopes (McC).—This soil is like Manor channery silt loam, 3 to 8 percent slopes, but it is shallower and does not contain so many fragments of rock. Less than one-fourth of the surface soil has been lost through erosion. Runoff is slow to medium.

Use and management (Capability unit IIIe–6).—Practically all of this soil is wooded. It can be used for crops in a long rotation, but it needs intensive conservation measures to maintain the organic-matter supply, to prevent erosion, and to conserve moisture.

Manor silt loam, 8 to 15 percent slopes, moderately eroded (McC2).—This soil is shallower than Manor channery silt loam, 3 to 8 percent slopes. It has lost up to three-fourths of the surface soil through erosion. A few shallow gullies have been cut in many fields. Runoff is medium to rapid.

Use and management (Capability unit IIIe–6).—About 84 percent of this soil is used for crops, 4 percent is in pasture, 7 percent is in woods, and 5 percent is idle. This soil can be used for crops in a long rotation if intensively managed to prevent erosion, supply organic matter, and conserve moisture.

Manor silt loam, 8 to 15 percent slopes, severely eroded (McC3).—Before this soil was eroded, it was similar to Manor channery silt loam, 3 to 8 percent slopes, but shallower. Now, at least three-fourths of the surface soil is gone—in some places, all of it and part of the subsoil. Most fields have many shallow gullies; other fields have only a few. A few very small areas are very severely eroded. The moisture-storage capacity is low. Runoff is medium to rapid.

Use and management (Capability unit VIe–3).—About 85 percent of this soil is cropped, 1 percent is pastured, and 12 percent is idle. This soil is so severely eroded that it is no longer suitable for cultivation. It should be used for pasture.

Manor silt loam, 15 to 25 percent slopes (McD).—This soil is somewhat similar to Manor channery silt loam, 3 to 8 percent slopes, but it is shallower. It does not contain so many fragments of rock, although it contains more than the less strongly sloping Manor silt loam soils. Runoff is rapid to very rapid. Erosion has removed less than one-fourth of the original surface soil.

Use and management (Capability unit IVe–4).—Practically all of this soil is wooded. It is too steep to be used for regular crop rotations, but it can be cultivated occasionally if long-term hay is grown the rest of the time. It needs intensive conservation practices to prevent erosion and loss of moisture. Farm equipment cannot be operated safely on these steep slopes.

Manor silt loam, 15 to 25 percent slopes, moderately eroded (McD2).—This soil is shallower and less stony than Manor channery silt loam, 3 to 8 percent slopes. Erosion has removed up to three-fourths of the original surface soil. Most fields have a few shallow gullies. Runoff is rapid to very rapid. The moisture-holding capacity is low.

Use and management (Capability unit IVe–4).—About 67 percent of this soil is used for crops, and 12 percent for pasture. Another 15 percent is wooded, and 6 percent is idle. This soil is best suited to hay. It can be cultivated occasionally if conservation practices are used to prevent erosion and conserve moisture. The operation of farm equipment is not safe on some of these steep slopes.

Manor soils, 15 to 25 percent slopes, severely eroded (MdD3).—This unit consists of severely eroded areas of Manor channery loam, Manor channery silt loam, and Manor silt loam. The effects of erosion have destroyed any differences between the soils that would affect management. Most of the unit is shallower and more stony than the same soils as mapped individually.

Runoff is rapid to very rapid. Most of the acreage has lost at least three-fourths of its original surface layer. Most fields have a few shallow gullies, and some fields have many.

Use and management (Capability unit VIIe–3).—These soils are best used for forest or for game refuges. Good woodland management is needed to protect the soils. Some areas should be replanted to trees and shrubs.

Manor soils, 25 to 40 percent slopes (MdE).—This unit consists of shallow, steep Manor soils. Although runoff is very rapid, these areas have not been seriously eroded. Generally less than one-fourth of the original surface soil has been lost.

Use and management (Capability unit VIe–3).—Permanent pasture, well managed, is the most intensive use recommended for these soils. The steeper areas should be planted to trees.

Manor soils, 25 to 40 percent slopes, moderately eroded (MdE2).—The soils in this unit have lost up to three-fourths of their surface soil through sheet erosion. Some areas have a few shallow gullies. Runoff is very rapid.

Use and management (Capability unit VIe–3).—The less eroded areas of these soils are suited to forage crops; the more eroded areas should be used for forest. Some fields should be replanted to trees or grass.

Manor soils, 25 to 40 percent slopes, severely eroded (MdE3).—These soils are somewhat like those in the other undifferentiated groups of Manor soils, but most of them are coarser, steeper, and stonier. They contain more and larger fragments of the parent rock. Runoff is very rapid. At least three-fourths of the surface soil has been lost through erosion. Most areas have a few shallow gullies, and some areas have many. The loss of soil exposes weathered schist and, in some places, pieces of mica.

Use and management (Capability unit VIIe–3).—These soils need a protective cover of trees and shrubs. Cleared areas should be reforested.

Manor stony loam, 0 to 8 percent slopes (MeA).—This shallow, stony soil is located on narrow ridges or benches. It is like Manor channery loam, 8 to 15 percent slopes, except that the fragments of rock are so large and so numerous that plowing or cultivating is difficult or impossible. In some places there is enough soil between the rocks to cultivate, but in other places the surface is nearly covered with boulders, flat rocks, and fragments.

Runoff is medium to slow. Most of the unit is moderately to slightly eroded. A few areas have a few shallow gullies. The moisture-holding capacity is low, and the productivity is low.

Use and management (Capability unit VIIe–3).—Only 6 percent of this soil is used for crops, and only 2 percent for pasture. About 87 percent is wooded. This soil is best suited to forest.

Manor stony loam, 8 to 15 percent slopes (MeC).—Most of this soil occurs on the tops of narrow ridges or on slopes. It contains more and larger fragments of rock than Manor channery loam, 8 to 15 percent slopes. The forest cover has protected this soil from serious erosion. Runoff is medium to rapid.

Use and management (Capability unit VIIe–3).—Nearly all of this soil is wooded; only 2 percent is used for crops. It is too stony to be tilled with tractor plows and cultivators. It is best suited to forest for timber, wildlife habitats, and watershed protection. There is little danger of erosion in wooded areas.

Manor stony loam, 8 to 15 percent slopes, moderately eroded (MeC2).—This soil is shallower and rockier than Manor channery loam, 8 to 15 percent slopes. Erosion has removed up to three-fourths of the surface soil from these areas and some fields have a few shallow gullies. A few very small areas are severely eroded. Runoff is medium to rapid.

Use and management (Capability unit VIIe–3).—About 85 percent of this soil is wooded. Only 8 percent is used for crops, and only 5 percent for pasture; 2 percent is idle. This soil is too stony to be suitable for cultivation. It should be used for trees—for timber, for wildlife shelter, or for watershed protection.

Manor stony loam, 15 to 25 percent slopes (MeD).—This soil is somewhat similar to Manor channery loam, 8 to 15 percent slopes, but it is shallower and extremely stony. Runoff is rapid to very rapid, but less than one-fourth of the surface soil has been lost through sheet erosion because the native forest has protected the soil.

Use and management (Capability unit VIIe–3).—Practically all of this soil is in forest. Stones seriously interfere with the cultivation of this soil. It is best suited to trees—for timber, for shelter for wildlife, or for protection of watersheds.

Manor stony loam, 15 to 25 percent slopes, moderately eroded (MeD2).—This soil is shallower and rockier than Manor channery loam, 8 to 15 percent slopes. It has lost up to three-fourths of the original surface soil. Some areas have a few shallow gullies, and a few fields have lost practically all of their surface soil. Runoff is rapid to very rapid.

Use and management (Capability unit VIIe–3).—About 71 percent of this soil is wooded, and 8 percent is idle. Only 14 percent is used for crops, and 4 percent for pasture. This soil is best suited to forestry. It is too steep, shallow, and stony to be cultivated.

Manor stony loam, 25 to 40 percent slopes (MeE).—This is an extensive unit. Most of it is stony loam, but it includes areas of all the other stony Manor soils on slopes of more than 25 percent. This soil is shallow, and it contains many fragments of rock. It is only slightly eroded because it has been protected by the native vegetation. Runoff is very rapid.

Use and management (Capability unit VIIe–3).—Practically all of this soil is wooded. It is too steep and stony for any use other than forestry.

Melvin Series

The Melvin series consists of deep, poorly drained to very poorly drained, highly fertile soils that developed from calcareous alluvium on flood plains. The Melvin soil in this county is located in the central part, along streams that drain areas of Hagerstown, Duffield, Conestoga, Letort, and other limestone soils. The original forest consisted of elm, ash, hickory, willow, poplar, and other bottom-land hardwood trees.

The moisture-holding capacity is high, but slow permeability and a high water table limit the usefulness of the soils. Melvin soils are associated with the moderately well drained Lindside soils and the well drained Huntington soils.

Melvin silt loam, 0 to 3 percent slopes (MfA).—This soil occurs on rather narrow valley floors. The following profile was observed in a pasture.

0 to 10 inches, dark grayish-brown friable silt mottled with dark reddish brown; moderate thin platy to fine blocky structure.

10 to 24 inches, grayish-brown to brown very friable silt, mottled with indistinct streaks and splotches of brown and very dark brown; moderate medium to fine blocky structure.

24 to 30 inches, friable dark-brown to brown silty clay, prominently mottled with a few fine lines of dark reddish brown; moderate fine blocky structure.

30 to 38 inches, dark-gray silty clay, prominently mottled with many fine streaks of yellowish red; sticky when wet; moderate medium blocky structure.

The water table is at a depth of 18 inches. Floods are frequent, and runoff water from adjoining slopes ponds on the surface.

Runoff is slow to very slow. Erosion is not generally a problem; deposition of silt during floods is more common. Some stream gouging may take place during heavy floods. Small included areas that have slopes of up to 6 percent are slightly to moderately eroded. A few spots of poorly drained, dark-colored soils of other series are also included in this unit.

Use and management (Capability unit VIw–1).—About 86 percent of this soil is used for pasture. Only 7 percent is in crops, 3 percent is wooded, and 3 percent is idle. Pasture is the most suitable use. Improving drainage is the most serious management problem.

Montalto Series

This series contains deep, well-drained, productive soils that developed from diabase. The diabase, locally called ironstone, was intruded between beds of Triassic sandstone and shale. Smaller dikes of diabase came up through cracks in other formations. These areas of ironstone range from several feet to thousands of feet in width.

These soils are not important agriculturally because they are generally stony. Their moisture-holding capacity is high, but internal drainage is moderately slow to slow. Kaolinite, which weathered from feldspars contained in the parent material, is found in large quantities throughout the soil profile.

The Montalto soils are located in the northern part of the county, in an area extending from Falmouth to Elizabethtown and Bellaire and in a narrow belt running from Adamstown to Bowmansville and into Caernarvon Township. The associated soils are the poorly drained Watchung, which formed from the same kind of parent material, and the Brecknock and Lehigh, which developed from metamorphosed Triassic rocks.

Montalto channery silt loam, 0 to 3 percent slopes (MgA).—This soil occurs on flat ridgetops or benches. It was originally much stonier than it is now, but many stones have been removed to make cultivation easier. Many small cobblestones and a few stones or boulders are on the surface of most fields. Well-rounded cobblestones and fragments of diabase are common throughout the profile. A typical profile follows.

0 to 10 inches, dark-brown very friable silt loam; weak fine granular structure.
10 to 19 inches, yellowish-red friable to firm silty clay loam; weak fine blocky structure; in a few places the blocks are coated with black iron and manganese.
19 to 35 inches, red firm heavy silty clay loam; moderate blocky structure; in the upper part, the blocks have black iron and manganese coatings.
35 to 60 inches, yellowish-red friable light silty loam; weak platy structure.
60 to 72 inches, gritty clay loam.
72 inches +, solid bedrock.

Runoff is slow to very slow. Erosion has not been a problem; less than one-fourth of the surface soil has been lost through sheet erosion. This soil is naturally fertile, but it is more acid than the limestone soils.

Use and management (Capability unit IIe–4).—About 52 percent of this soil is used for crops and 30 percent for pasture. About 10 percent is wooded, and 7 percent is idle. This soil is best suited to grass or to orchard crops. It can be used for rotation crops if simple conservation methods are used. The stones are likely to damage tillage equipment. Spots of exposed subsoil are difficult to work.

Montalto channery silt loam, 3 to 8 percent slopes (MgB).—This soil occurs on the upper parts of slopes or sides of ridges. It is like Montalto channery silt loam, 0 to 3 percent slopes. Runoff is slow to medium. Erosion is not a serious problem.

Use and management (Capability unit IIe–4).—About 33 percent of this soil is in crops, 29 percent is in pasture, and 38 percent is in forest. This soil is best suited to grass or orchards. It can be cropped in rotations if simple measures are taken to conserve soil and water.

Montalto channery silt loam, 3 to 8 percent slopes, moderately eroded (MgB2).—This soil is similar to Montalto channery silt loam, 0 to 3 percent slopes, but it is shallower and has lost from one-fourth to three-fourths of its original surface soil. A few shallow gullies have been cut. Several areas are severely eroded. Cultivation has mixed some of the subsoil into the remaining surface soil. This new plow layer is cloddy and difficult to till; it seals over quickly and allows water to run off. Runoff is slow to medium.

Use and management (Capability unit IIIe–5).—About 82 percent of this soil is used for crops, 4 percent is used for pasture, and 12 percent is idle. This soil can be used for rotation crops if intensively managed to prevent erosion, conserve moisture, and maintain the supply of organic matter. It is better suited to grass or orchards. Spots where the subsoil is exposed are difficult to till.

Montalto channery silt loam, 8 to 15 percent slopes (MgC).—This soil is shallower than Montalto channery silt loam, 0 to 3 percent slopes. It is uneroded because it has been protected by forest. If this soil is cleared, erosion is likely to expose the subsoil, which is difficult to till. Runoff is medium to rapid.

Use and management (Capability unit IIIe–5).—Practically all of this soil is wooded. It can be used for crops in a long rotation if it is managed intensively to conserve moisture and organic matter and to prevent erosion. It is better suited to grass or orchards than to cultivated crops.

Montalto channery silt loam, 8 to 15 percent slopes, moderately eroded (MgC2).—This soil is like Montalto channery silt loam, 0 to 3 percent slopes, but it is shallower. Erosion has removed from one-fourth to three-fourths of the original surface soil. A few shallow gullies have formed in some areas. In small areas of severely eroded soil, the subsoil is exposed. Runoff is medium to rapid.

Use and management (Capability unit IIIe–5).—About 82 percent of this soil is in crops, 5 percent is in pasture, 4 percent is in forest, and 8 percent is idle. It is better suited to grass or orchards than to cultivated crops, because of the difficulty of tilling the spots where the subsoil is at the surface. Other problems are controlling erosion, maintaining the supply of organic matter, and conserving moisture.

Montalto channery silt loam, 15 to 25 percent slopes (MgD).—This is a shallower soil than Montalto chan-

nery silt loam, 0 to 3 percent slopes. Runoff is rapid to very rapid, but the forest cover has prevented serious erosion.

Use and management (Capability unit IVe–3).—Practically all of this soil is wooded. If it is kept in woods, it presents few management problems. Cleared areas are best suited to pasture or long-term hay.

Montalto channery silt loam, 15 to 25 percent slopes, moderately eroded (MgD2).—This soil is shallower than Montalto channery silt loam, 0 to 3 percent slopes. It has lost enough of the original surface soil to bring the upper subsoil within reach of the plow. The present plow layer is fine textured, difficult to work, and less absorbent than the original surface soil. Some fields have a few shallow gullies. Runoff is rapid to very rapid.

Use and management (Capability unit IVe–3).—About 57 percent of this soil is idle. The rest is still used for crops. It is best suited to long-term hay. Farm equipment should be handled carefully on these slopes. Controlling erosion is the chief management problem; other problems are conserving moisture and maintaining the organic-matter supply.

Montalto channery silt loam, 25 to 35 percent slopes (MgE).—This soil is shallower than Montalto channery silt loam, 0 to 3 percent slopes. It is unevenly eroded. Some areas have lost almost no soil; some have lost their entire surface layer. Runoff is very rapid.

Use and management (Capability unit VIIe–2).—Some of this soil is used for crops and some for forest. A little is idle. These areas are best suited to trees and shrubs. Farm equipment cannot be operated safely on these slopes.

Montalto very stony silt loam, 0 to 8 percent slopes (MhA).—This soil is like Montalto channery silt loam, 0 to 3 percent slopes, except that cobblestones, stones, and boulders occur throughout the profile. Boulders of diabase cover 1 to 3 percent of the surface. Runoff is slow to medium.

Use and management (Capability unit VIs–1).—About 44 percent of the acreage is in pasture, and 44 percent is in woods. The rest is idle. Wooded areas should be kept in trees, and cleared areas are best used for pasture. Some areas can be used for hay crops or improved pasture. Cultivation is impractical because of the stones. Removing the stones is too expensive to be practical.

Montalto very stony silt loam, 8 to 15 percent slopes (MhC).—This soil is similar to Montalto channery silt loam, 0 to 3 percent slopes, but it contains many large and small stones. It is stonier and somewhat shallower than Montalto very stony silt loam, 0 to 8 percent slopes. The trees that cover most of this soil protect it from erosion. A few areas have a few shallow gullies. Runoff is medium to rapid.

Use and management (Capability unit VIs–1).—Most of this soil is wooded. It should be kept in trees because removing stumps and boulders is too expensive to be practical. Areas that are already cleared are best suited to pasture.

Montalto very stony silt loam, 15 to 25 percent slopes (MhD).—This soil is like Montalto very stony silt loam, 8 to 15 percent slopes, but shallower and more rocky. Runoff is rapid to very rapid.

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Use and management (Capability unit VIIe–2).—All of this soil is wooded and should remain so. Erosion is a major hazard, overshadowing even the stoniness.

Montalto very stony silt loam, 25 to 35 percent slopes (MhE).—This soil is like the other Montalto very stony silt loams, but it is shallower and stonier. Some areas have lost part of their surface soil, but the forest cover has prevented serious erosion. Runoff is very rapid.

Use and management (Capability unit VIIe–2).—All of this soil is wooded. If it were cleared, the erosion hazard would be serious.

Montalto extremely stony silt loam, 0 to 8 percent slopes (MkA).—Large areas of this soil are mapped in the northwestern part of the county, near Elizabethtown. The profile is like that of the other Montalto soils, but boulders cover 15 to 90 percent of the surface. In some places very little soil has developed between the large stones. Erosion is slight. Runoff is slow to very slow.

Use and management (Capability unit VIIe–3).—Most of this soil is wooded. It is too stony for any other agricultural use. Farm equipment cannot be used. In many places the large boulders prevent the use of tractors for logging.

Montalto extremely stony silt loam, 8 to 15 percent slopes (MkC).—This soil has a great many rocks in the profile and on the surface. It is not seriously eroded. Runoff is slow to medium.

Use and management (Capability unit VIIe–3).—Nearly all of this soil is in woods; some small areas are used for building sites. It is best suited to trees and shrubs or to recreational uses. Stoniness limits its use.

Montalto extremely stony silt loam, 15 to 25 percent slopes (MkD).—This soil is shallower and stonier than the other Montalto soils. Little soil has developed between the boulders. Erosion is not a problem because the woodland cover protects the soil.

Use and management (Capability unit VIIe–3).—Nearly all of this soil is wooded. Small areas are used for building sites. This soil can best be used for trees. It is too steep and stony to be cultivated.

Montalto extremely stony silt loam, 25 to 35 percent slopes (MkE).—This is a shallow, stony soil. The profile is similar to that of other Montalto soils. Erosion is not a problem because a cover of trees protects the soil.

Use and management (Capability unit VIIe–3).—Most of this soil is wooded, but some is used for homesites and other building sites. These areas are best suited to trees.

Murrill Series

The soils of the Murrill series are deep, well drained, and fertile. They formed where weathered material washed or rolled down the slopes of sandstone or quartzite ridges and became mixed with soil that had developed from limestone. These soils vary considerably in texture and stoniness, depending on the proportion of colluvial material to limestone soil. The type of underlying limestone influences the texture and color of the lower subsoil.

The Murrill soils are productive and high in moisture-holding capacity. Permeability is moderate.

These soils are located in the west-central part of the county, near the base of Chestnut Hill and Chickies Ridge, and in the east-central part, on the lower slopes of the Welsh Mountains. Associated soils are the Edgemont soils of the quartzite ridges and the Duffield soils of the limestone valleys.

Murrill loam, 0 to 3 percent slopes (MnA).—This soil is normally acid, but it overlies calcareous bedrock. The following profile was observed on the boundary between a road and a cultivated field. It has been altered slightly by deposition and erosion.

0 to 16 inches, dark-brown very friable loam; moderate very fine crumb structure.
16 to 30 inches, yellowish-brown very friable silt loam; moderate very fine subangular blocky structure.
30 to 37 inches, yellowish-red or reddish-brown friable silt loam; moderate medium to fine blocky structure.
37 to 43 inches, red friable heavy silt loam; moderate fine blocky structure.
43 to 56 inches, red to yellowish-red firm silty clay loam; strong thick platy structure.
56 to 71 inches, red firm silty clay loam; strong coarse to very coarse blocky structure; some tendency toward prismatic or columnar structure.

Erosion has removed less than one-fourth of the surface layer of this soil. Runoff is slow to very slow.

Use and management (Capability unit I–1).—This soil is well suited to rotation crops, hay, and orchards. Short slopes should be cultivated on the contour. Slopes of more than 2 percent may need contour stripcropping.

Murrill loam, 3 to 8 percent slopes (MnB).—This soil is similar to Murrill loam, 3 to 8 percent slopes, moderately eroded, except that it has a thicker surface layer because less than one-fourth has been lost by erosion. Runoff is slow to medium.

Use and management (Capability unit IIe–1).—This soil is suited to general crops in rotation. It should be stripcropped on the contour to control erosion. Diversion terraces may be needed on long slopes.

Murrill loam, 3 to 8 percent slopes, moderately eroded (MnB2).—The following profile was observed in a cultivated field.

0 to 7 inches, dark-brown very friable loam; moderate fine crumb to fine subangular blocky structure.
7 to 12 inches, yellowish-red friable heavy silt loam; moderate fine subangular blocky structure.
12 to 18 inches, red friable heavy silt loam; moderate fine blocky structure.
18 to 31 inches, red to yellowish-red firm silty clay loam; strong thick platy structure.
31 to 46 inches, red firm silty clay loam; strong coarse to very coarse blocky structure; some tendency toward prismatic or columnar structure.

Sheet erosion has removed up to three-fourths of the original surface layer from this soil. Some fields have a few shallow gullies. The loss of most of the surface soil and the mixing of subsoil into the remainder has made the plow layer more difficult to till. Runoff is slow to medium.

Use and management (Capability unit IIe–1).—This soil is suited to crops if the rotation is long and if the soil is protected by contour stripcropping and by diverting water from long slopes.

Murrill loam, 8 to 15 percent slopes, moderately eroded (MnC2).—This soil is somewhat shallower than Murrill loam, 3 to 8 percent slopes, moderately eroded, but has a similar profile. Some areas show little erosion, but most of the acreage has lost up to three-fourths of the surface soil. Some areas have a few shallow gullies. The plow layer is less suitable for cultivation than the original surface layer because part of the subsoil has been mixed into it. Runoff is medium to rapid.

Use and management (Capability unit IIIe–1).—This soil is suited to crops in a long rotation if it is protected against erosion by contour stripcropping and by diverting water from long slopes.

Murrill gravelly loam, 0 to 3 percent slopes (MmA).—This soil has a profile like that of Murrill loam, 0 to 3 percent slopes, except that from 15 to 30 percent of each layer consists of gravel. Little erosion has taken place. Runoff is slow to very slow.

Use and management (Capability unit I–1).—This soil is suitable for many kinds of rotation crops. Slopes of less than 2 percent should be cultivated on the contour. Slopes of more than 2 percent should be protected by contour stripcropping. Surface water should be diverted from long slopes.

Murrill gravelly loam, 3 to 8 percent slopes (MmB).—This soil is somewhat shallower and much more gravelly than Murrill loam, 0 to 3 percent slopes. It is only slightly eroded. In some fields, as much soil has been deposited as has been lost through erosion. Runoff is slow to medium.

Use and management (Capability unit IIe–1).—This soil is suited to many kinds of rotation crops. It should be protected by contour stripcropping and by diversion of water from long slopes.

Murrill gravelly loam, 3 to 8 percent slopes, moderately eroded (MmB2).—This soil is shallower and more gravelly than Murrill loam, 3 to 8 percent slopes, moderately eroded, but the two soils have similar profiles. Up to three-fourths of the surface soil has been lost through erosion. Some areas have a few shallow gullies. Runoff is slow to medium.

Use and management (Capability unit IIe–1).—This soil is suited to crops in long rotations. It is especially well suited to orchards and legume hay. If cultivated, it should be stripcropped on the contour, and water should be diverted from long slopes.

Murrill gravelly loam, 3 to 8 percent slopes, severely eroded (MmB3).—This soil is similar to Murrill loam, 3 to 8 percent slopes, moderately eroded, but it is shallower and contains more gravel. At least three-fourths of the surface soil has been lost through erosion. Many shallow gullies have been cut. Runoff is slow to medium.

Use and management (Capability unit IVe–1).—This soil can be cultivated, but it is best suited to perennial hay. If it is cultivated, the rotation should be long, the soil should be protected by contour stripcropping, and water should be diverted from long slopes.

Murrill gravelly loam, 8 to 15 percent slopes (MmC).—This soil is shallower and more gravelly than Murrill loam, 0 to 3 percent slopes, but the profile is similar.

Less than one-fourth of the surface soil has been lost through erosion. Runoff is medium to rapid.

Use and management (Capability unit IIIe–1).—This soil can be used for crops in a long rotation if contour stripcropping is practiced and if water is diverted from long slopes. It is best suited to orchards and hay.

Murrill gravelly loam, 8 to 15 percent slopes, moderately eroded (MmC2).—Except that it contains more gravel and is shallower, this soil is like Murrill loam, 3 to 8 percent slopes, moderately eroded. Most areas have lost up to three-fourths of the original surface soil. Some have a few shallow gullies. Runoff is medium to rapid.

Use and management (Capability unit IIIe–1).—Hay and orchard fruits are suitable crops for this soil. It can be used for general crops in a long rotation if it is farmed in contour strips. Diversion terraces are needed on the longer slopes.

Murrill gravelly loam, 15 to 25 percent slopes, moderately eroded (MmD2).—This soil is shallower and more gravelly than Murrill loam, 3 to 8 percent slopes, moderately eroded. As much as three-fourths of the surface soil is gone from most of the area. A few shallow gullies have been cut in some places. The loss of surface soil and the mixing of subsoil material into the plow layer have made this soil more difficult to work. Runoff is rapid to very rapid.

Use and management (Capability unit IVe–1).—This soil is best suited to permanent hay. It can be cultivated in long rotations if intensively managed. Fields should be stripcropped on the contour, and water should be diverted from long slopes.

Neshaminy Series

The Neshaminy series consists of deep, well-drained, fertile soils. They developed over Baltimore gneiss, over serpentine rocks, or over igneous rocks that are high in manganese and iron. Their moisture-holding capacity is high, and internal drainage is moderate.

These soils occur on the Welsh Mountains near Cambridge. Most of the soils nearby belong to the Chester, Manor, or Montalto series.

Neshaminy silt loam, 0 to 3 percent slopes (NaA).—The following profile, observed in a cultivated field, is slightly eroded.

0 to 9 inches, dark yellowish-brown friable silt loam; moderate medium crumb structure.
9 to 12 inches, dark yellowish-brown to reddish-brown friable silt loam; weak fine blocky structure.
12 to 30 inches, yellowish-red silty clay loam; slightly sticky and slightly plastic; moderate to strong medium and coarse subangular blocky structure; the blocks are coated with slighty grayer clay; in some places blocks have black specks or coatings.
30 inches +, yellowish-red slightly friable silty clay loam or clay loam; less sticky than layer above; moderate coarse subangular blocky structure; many blocks covered or partly covered with black iron and manganese coatings; contains many tiny specks of shiny mica.

The subsoil is not so tough and sticky as that of the Montalto soils, and its blocky structure is not so strongly developed.

Runoff is slow or very slow. Erosion is generally slight. In most fields, less than one-fourth of the surface layer has been lost through sheet erosion. Some small areas that are moderately eroded have been included in this unit.

Use and management (Capability unit IIe–4).—This soil is well suited to grass and orchards. It can be used for cultivated crops in long rotations. Maintaining good tilth and supplying organic matter are the principal management problems. Some erosion control is needed on slopes over 2 percent.

Neshaminy silt loam, 3 to 6 percent slopes (NaB).—This soil has a profile like that of Neshaminy silt loam, 0 to 3 percent slopes. In some places sheet erosion has removed up to one-fourth of the original surface soil. Runoff is slow to medium.

Use and management (Capability unit IIe–4).—This soil is suited to cultivated crops in long rotations. Simple conservation practices are needed to prevent erosion, maintain good tilth, and supply organic matter.

Neshaminy silt loam, 3 to 6 percent slopes, moderately eroded (NaB2).—This soil is slightly shallower than Neshaminy silt loam, 0 to 3 percent slopes, but it is similar. It has lost from one-fourth to three-fourths of its original surface soil through sheet erosion. Some areas have a few shallow gullies. The mixing of subsoil with the remaining surface soil has made the plow layer finer textured and more difficult to work. It is more plastic and less absorbent than the original surface layer. A few small areas of severely eroded soils have been included in this unit. Runoff is slow to medium.

Use and management (Capability unit IIIe–5).—This soil is best suited to forage crops or orchards. It can be used for cultivated crops if the rotation is long and if intensive conservation measures are practiced to prevent erosion, supply organic matter, and conserve moisture.

Neshaminy silt loam, 6 to 12 percent slopes (NaC).—This is a shallower soil than Neshaminy silt loam, 0 to 3 percent slopes. Erosion is not generally a problem, but some areas have lost up to one-fourth of their original surface layer. Runoff is medium to rapid.

Use and management (Capability unit IIIe–5).—These areas are best suited to grass or orchard crops. Under intensive management they can be used for general crops in a long rotation. Erosion, loss of organic matter, and loss of moisture are the chief hazards.

Neshaminy silt loam, 6 to 12 percent slopes, moderately eroded (NaC2).—This is a shallower soil than Neshaminy silt loam, 0 to 3 percent slopes. It has lost from one-fourth to three-fourths of the original surface soil through erosion. Part of the fine-textured, plastic subsoil has been mixed into the surface layer during cultivation. This has made the soil less productive, less absorptive, and more difficult to till. Runoff is medium to rapid.

Use and management (Capability unit IIIe–5).—A long rotation is needed if this soil is cultivated. Intensive conservation is needed to prevent erosion, conserve moisture, and maintain the supply of organic matter.

Neshaminy silt loam, 6 to 12 percent slopes, severely eroded (NaC3).—Accumulated runoff water has caused

serious erosion on this soil. The profile was originally like that of Neshaminy silt loam, 0 to 3 percent slopes, but more than three-fourths of the original surface soil has been washed away. Most areas have a few shallow gullies, and some have many gullies. Runoff is medium.

Use and management (Capability unit IVe–3).—Permanent hay is the best crop for this soil. Cultivated crops can be grown if the rotation is very long and if conservation practices are intensively applied.

Penn Series

The Penn series contains moderately deep to shallow, well-drained soils that have moderate to low natural fertility. They developed from red shales, sandstones, and conglomerates of Triassic age. The Penn soils that developed from sandstones and conglomerates have a low moisture-holding capacity, but those that developed from the shales have a moderate moisture-holding capacity. The Penn soils are located north of a line that begins near Falmouth and runs eastward to Brickerville and Denver, from Denver southward to Ephrata, and from Ephrata eastward to Terre Hill and to the county line. The native vegetation was a forest of mixed hardwoods, chiefly oaks and hickories.

Soils that occur near the Penn soils belong to the Lewisberry, Lansdale, Steinsburg, Brecknock, Readington, Lehigh, and Croton series.

Penn loam, 0 to 3 percent slopes (PcA).—The following profile of this soil was observed in a cultivated field.

0 to 8 inches, dark reddish-brown very friable loam; weak fine granular structure.
8 to 13 inches, reddish-brown friable light silt loam; weak medium subangular blocky structure.
13 to 21 inches, dark reddish-brown firm silt loam; moderate medium subangular blocky structure.
21 to 26 inches, red firm loam; moderate medium platy structure.
26 inches +, red firm loam, composed of weathered Triassic sandstone.

Runoff is slow to very slow. Most areas have lost little or no soil through erosion. In some places, up to one-fourth of the surface soil is gone. The fertility is low and the moisture-holding capacity is low.

Use and management (Capability unit IIe–5).—This soil is fairly well suited to general crops in rotation. Some slopes may need contour cultivation. Stripcropping on the contour is necessary on slopes of more than 2 percent.

Penn loam, 3 to 8 percent slopes, moderately eroded (PcB2).—This soil is shallower than Penn loam, 0 to 3 percent slopes. It has lost from one-fourth to three-fourths of the original surface soil through erosion. Some fields have a few shallow gullies. Runoff is slow to medium.

Use and management (Capability unit IIe–5).—This soil is fairly well suited to rotation crops. It should be protected from further erosion by long rotations, contour stripcropping, and diversion of water from long slopes.

Penn loam, 3 to 8 percent slopes, severely eroded (PcB3).—Except for the effects of erosion, this soil is similar to Penn loam, 0 to 3 percent slopes. More than three-fourths of the original surface soil has been washed away. Most areas have at least a few shallow gullies. Runoff is slow to medium.

Use and management (Capability unit IVe–4).—The best long-term use for this soil is perennial hay. Cultivated crops can be grown in very long rotations under intensive conservation practices. Fields should be stripcropped on the contour, and terraces should be used to divert water from long slopes.

Penn loam, 8 to 15 percent slopes, moderately eroded (PcC2).—This soil is shallower than Penn loam, 0 to 3 percent slopes. It has lost one-fourth to three-fourths of its original surface layer through erosion. A few shallow gullies are present in some fields. Runoff is medium to rapid.

Use and management (Capability unit IIIe–6).—This soil is fairly well suited to general crops in long rotations. It should be stripcropped on the contour, and long slopes should be protected by diversion terraces.

Penn loam, 8 to 15 percent slopes, severely eroded (PcC3).—Before it was eroded, this soil was similar to Penn loam, 0 to 3 percent slopes. More than three-fourths of the surface soil has been lost. Most fields have a few shallow gullies, and some have many. Runoff is medium to rapid.

Use and management (Capability unit VIe–3).—The best use for this soil is forage crops or pasture. Pastures should be reseeded in contour strips. Some areas can be managed more easily if kept in trees.

Penn gravelly loam, 0 to 3 percent slopes (PaA).—This soil is like Penn loam, 0 to 3 percent slopes, except that it contains a considerable quantity of water-rounded quartz pebbles and cobblestones. These range from ¼ inch to 4 inches in diameter, but most are between 1 and 2 inches in diameter. Angular fragments of shale, sandstone, or conglomerate also occur in the profile. Runoff is slow to very slow. Erosion has been slight.

Use and management (Capability unit IIe–5).—This soil is suited to general farm crops in rotation. The chief management problems are caused by the moderate to low natural fertility, the low moisture-holding capacity, and the hazard of erosion on slopes of more than 2 percent.

Penn gravelly loam, 3 to 8 percent slopes (PaB).—This soil is similar to Penn loam, 0 to 3 percent slopes, but it is more gravelly. Less than one-fourth of the surface soil has been removed by sheet erosion. Runoff is slow to medium. The natural fertility is rather low.

Use and management (Capability unit IIe–5).—This soil is fairly well suited to general crops in rotation. It should be protected against erosion by contour stripcropping and by diverting water from long slopes.

Penn gravelly loam, 3 to 8 percent slopes, moderately eroded (PaB2).—This soil contains more gravel than Penn loam, 0 to 3 percent slopes, and it is shallower. It has lost up to three-fourths of its original surface layer through erosion. A few shallow gullies have been cut in some fields. Subsoil has been mixed with the remaining surface soil, and the resulting plow layer is more difficult to manage than the original. Runoff is slow to medium.

Use and management (Capability unit IIe–5).—This soil is fairly well suited to general crops in long rotations. It should be cultivated in contour strips. Terraces are needed to divert water from longer slopes.

Penn gravelly loam, 3 to 8 percent slopes, severely eroded (PaB3).—Originally, except for the gravel in the profile, this soil was similar to Penn loam, 0 to 3 percent slopes. More than three-fourths of the surface soil has been lost through erosion, and subsoil has been mixed with the rest of it. The new plow layer is less absorbent and more difficult to manage than the original surface soil. Most areas have at least a few shallow gullies. Runoff is slow to medium.

Use and management (Capability unit IVe–4).—This soil is best suited to hay. It can be used for crops in very long rotations if intensively conserved. It should be cultivated in strips on the contour. Diversion terraces are needed on longer slopes.

Penn gravelly loam, 8 to 15 percent slopes (PaC).—This soil is shallower and more gravelly than Penn loam, 0 to 3 percent slopes. Most areas are slightly eroded, but forested areas have lost very little soil. Runoff is medium to rapid.

Use and management (Capability unit IIIe–6).—This soil is suited to crops in long rotations. Crops should be planted in contour strips. Water should be diverted from long slopes.

Penn gravelly loam, 8 to 15 percent slopes, moderately eroded (PaC2).—This soil is not so deep as Penn loam, 0 to 3 percent slopes, and it contains more gravel. As much as three-fourths of the original surface soil has been removed by erosion. A few shallow gullies are present in some areas. Runoff is medium to rapid.

Use and management (Capability unit IIIe–6).—This soil is fairly well suited to crops if contour stripcropped in long rotations. Diversion terraces are needed to protect the longer slopes from erosion.

Penn gravelly loam, 8 to 15 percent slopes, severely eroded (PaC3).—This soil is shallower and more gravelly than Penn loam, 0 to 3 percent slopes. More than three-fourths of the original surface soil has been lost through erosion. Some places have a few shallow gullies, and others have many. The mixture of subsoil and surface soil in the plow layer is more difficult to manage than the original surface layer. Runoff is medium to rapid.

Use and management (Capability unit VIe–3).—This soil is best suited to hay and pasture. Reseeding should be done in contour strips.

Penn gravelly loam, 15 to 25 percent slopes, moderately eroded (PaD2).—Up to three-fourths of the original surface layer of this soil has been lost through erosion. A few shallow gullies have been cut. This soil is shallower and more gravelly than Penn loam, 0 to 3 percent slopes. Runoff is rapid to very rapid.

Use and management (Capability unit IVe–4).—This soil is best suited to perennial hay, but it can be cultivated occasionally. It should be cultivated in contour strips, and water should be diverted from long slopes.

Penn gravelly loam, 15 to 25 percent slopes, severely eroded (PaD3).—This soil was originally like Penn loam, 0 to 3 percent slopes, except that it was shallower and more gravelly. Nearly all of the original surface soil has been lost through erosion. The plow layer is a mixture of subsoil and crop residues. Some areas have a few shallow gullies and some have many. Runoff is very rapid.

Use and management (Capability unit VIIe–3).—Good woodland management is needed to protect this soil. It should be kept in trees and shrubs, and areas that lack a good cover should be replanted.

Penn silt loam, 0 to 3 percent slopes (PdA).—A profile of this soil in a cultivated field follows:

0 to 8 inches, dark reddish-brown very friable silt loam; weak fine granular structure.
8 to 11 inches, reddish-brown friable heavy silt loam; weak fine to medium subangular blocky structure.
11 to 16 inches, weak-red firm silt loam; moderate medium subangular blocky structure.
16 to 24 inches, dusky-red firm heavy silt loam; moderate medium subangular blocky structure.
24 inches +, weathered Triassic shale and sandstone; becomes harder with depth.

Most of this soil is practically uneroded, but some areas have lost as much as one-fourth of the surface soil. Runoff is slow to very slow. The natural fertility and the moisture-holding capacity are moderate to low.

Use and management (Capability unit IIe–5).—This soil is fairly well suited to rotation crops. On slopes of less than 2 percent, contour cultivation will protect the soil from erosion. On slopes of more than 2 percent, contour stripcropping is needed.

Penn silt loam, 0 to 3 percent slopes, moderately eroded (PdA2).—This soil is like Penn silt loam, 0 to 3 percent slopes, except that it has lost from one-fourth to three-fourths of its original surface soil through sheet erosion. A few shallow gullies have formed in some fields. Runoff is slow to very slow.

Use and management (Capability unit IIe–5).—This soil is fairly well suited to general crops in rotation. Contour cultivation will prevent erosion on slopes of less than 2 percent. Contour stripcropping is needed on slopes over 2 percent. Diversion of surface water may be needed in some fields.

Penn silt loam, 3 to 8 percent slopes (PdB).—This soil is somewhat shallower than Penn silt loam, 0 to 3 percent slopes. Most areas are practically uneroded, but some fields have lost up to one-fourth of their original surface layer. Runoff is slow to medium.

Use and management (Capability unit IIe–5).—This soil is fairly well suited to general farm crops in long rotations. Crops should be planted in contour strips. Some fields should be protected by diverting surface water.

Penn silt loam, 3 to 8 percent slopes, moderately eroded (PdB2).—This soil is shallower than Penn silt loam, 0 to 3 percent slopes. It has lost one-fourth to three-fourths of its surface layer through erosion and has a few shallow gullies. Runoff is slow to medium.

Use and management (Capability unit IIe–5).—This soil is suited to crops in long rotation, if it is protected by contour stripcropping and by diversion terraces on long slopes.

Penn silt loam, 8 to 15 percent slopes (PdC).—This is a shallower soil than Penn silt loam, 0 to 3 percent

slopes. Most of it is practically uneroded. Runoff is medium to rapid.

Use and management (Capability unit IIIe–6).—This soil is fairly well suited to general crops in long rotations, if it is cultivated in contour strips and if the longer slopes are protected by diversion terraces.

Penn silt loam, 8 to 15 percent slopes, moderately eroded (PdC2).—The following profile in a cultivated field is typical of this soil.

0 to 8 inches, reddish-brown friable silt loam; weak fine granular to weak subangular blocky structure.
8 to 17 inches, red firm silty clay loam; moderate medium to coarse blocky structure; some shale and sandstone fragments.
17 to 21 inches, dusky-red firm loam; moderate coarse blocky to coarse platy structure; some shale and sandstone fragments.
21 inches +, stratified sandstone, siltstone, and shale.

This soil has lost from one-fourth to three-fourths of its original surface layer. Some fields have a few shallow gullies. Runoff is medium to rapid.

Use and management (Capability unit IIIe–6).—This soil is fairly well suited to general crops in long rotations. Crops should be planted in contour strips. Diversion terraces are necessary on long slopes.

Penn silt loam, 8 to 15 percent slopes, severely eroded (PdC3).—This soil is similar to Penn silt loam, 8 to 15 percent slopes, moderately eroded, but it has lost nearly all of its surface soil. Most fields have a few shallow gullies, and some have many gullies. The plow layer is a mixture of subsoil and surface soil. It is more difficult to manage than the original surface soil. Runoff is medium to rapid.

Use and management (Capability unit VIe–3).—This soil is best suited to permanent pasture. Hay can be produced economically on some fields. Reseeding should be done in contour strips.

Penn gravelly silt loam, 0 to 3 percent slopes (PbA).—This soil has a profile like that of Penn silt loam, 0 to 3 percent slopes, except that 15 to 30 percent of each layer consists of gravel. Some fields have lost up to one-fourth of their surface soil through sheet erosion, but most areas are practically uneroded. Runoff is slow to very slow. The fertility is moderate, and the water-holding capacity is low.

Use and management (Capability unit IIe–5).—This soil is suited to rotation crops. Moisture should be conserved and erosion controlled by contour cultivation on slopes of less than 2 percent and by contour stripcropping on slopes of more than 2 percent.

Penn gravelly silt loam, 3 to 8 percent slopes (PbB).—This soil is shallower than Penn silt loam, 0 to 3 percent slopes, and it contains more gravel. Less than one-fourth of the surface soil has been washed away. Runoff is slow to medium.

Use and management (Capability unit IIe–5).—This soil is suited to crops in long rotations, if protected by contour stripcropping.

Penn gravelly silt loam, 3 to 8 percent slopes, moderately eroded (PbB2).—This soil is deeper than Penn silt loam, 8 to 15 percent slopes, moderately eroded, and it contains more gravel. Up to three-fourths of the surface soil has been lost through erosion, and many areas have a few shallow gullies. Subsoil is mixed with the remaining surface soil. Runoff is slow to medium.

Use and management (Capability unit IIe–5).—This soil can be used for general crops in long rotations, if cultivated in contour strips. Long slopes should be protected by diversion terraces.

Penn gravelly silt loam, 3 to 8 percent slopes, severely eroded (PbB3).—This soil is like Penn silt loam, 8 to 15 percent slopes, moderately eroded, but it is more gravelly and it has lost more than three-fourths of its original surface soil. Most areas have a few shallow gullies, and some fields have many gullies. Runoff is slow to medium.

Use and management (Capability unit IVe–4).—This soil is best suited to perennial hay. It can be cultivated in very long rotations. It should be cultivated in contour strips. Diversion terraces are needed on very long slopes.

Penn gravelly silt loam, 8 to 15 percent slopes (PbC).—This soil is somewhat shallower and more gravelly than Penn silt loam, 0 to 3 percent slopes. Runoff is medium to rapid, but little or no soil has been lost through erosion. Much of this soil has been protected by a forest cover.

Use and management (Capability unit IIIe–6).—Most of this soil is suitable for crops in long rotations. Crops should be planted in contour strips, and diversion terraces are needed on long slopes.

Penn gravelly silt loam, 8 to 15 percent slopes, moderately eroded (PbC2).—This soil is deeper and more gravelly than Penn silt loam, 8 to 15 percent slopes, moderately eroded. Up to three-fourths of the surface soil has been lost through erosion. Some fields have a few shallow gullies. Runoff is medium to rapid.

Use and management (Capability unit IIIe–6).—This soil is fairly well suited to crops in long rotations. Crops should be planted in contour strips, and diversion terraces are needed on long slopes.

Penn gravelly silt loam, 8 to 15 percent slopes, severely eroded (PbC3).—This shallow soil is similar to Penn silt loam, 8 to 15 percent slopes, moderately eroded, but it is more gravelly. More than three-fourths of the surface soil has been lost through erosion. Most areas have shallow gullies. Subsoil and shattered parent rock have been mixed with the remaining surface soil in the plow layer. This new surface soil is more difficult to manage than the original. Runoff is medium to rapid.

Use and management (Capability unit VIe–3).—Permanent pasture is the best use for most of this soil, but some areas are suited to hay. Drought-resistant varieties of grasses and legumes should be seeded in contour strips.

Penn gravelly silt loam, 15 to 25 percent slopes (PbD).—This soil is shallower and more gravelly than Penn silt loam, 0 to 3 percent slopes. Most of it is practically uneroded, but in some places up to one-fourth of the surface soil has been removed. Runoff is rapid to very rapid.

Use and management (Capability unit IVe–4).—This soil is best suited to perennial hay. If it is cultivated, rotations should be very long and crops should be planted in contour strips. Long slopes should be protected by diversion terraces.

Penn gravelly silt loam, 15 to 25 percent slopes, moderately eroded (PbD2).—This soil is more gravelly than Penn silt loam, 8 to 15 percent slopes, moderately eroded. It has lost up to three-fourths of the original surface soil through erosion. A few shallow gullies have formed. Runoff is rapid to very rapid.

Use and management (Capability unit IVe–4).—This soil is best suited to perennial hay. It can be cultivated in very long rotations under intensive conservation. It should be farmed in contour strips and protected with diversion terraces.

Penn gravelly silt loam, 15 to 25 percent slopes, severely eroded (PbD3).—This soil is shallow. It has lost more than three-fourths of its original surface soil. Most fields have a few shallow gullies, and some have many. Runoff is rapid to very rapid.

Use and management (Capability unit VIIe–3).—This soil should be used to grow timber or to provide shelter for wildlife. Some areas need to be reforested.

Penn stony silt loam, 0 to 8 percent slopes (PeA).—This soil is like Penn silt loam, 0 to 3 percent slopes, except that many stones are scattered through the profile, and stones cover 3 to 15 percent of the surface. Erosion is generally slight. Runoff is slow to medium.

Use and management (Capability unit VIIe–3).—Practically all of this soil is wooded. It is too stony to be cultivated, and stone removal is expensive. These areas should be used to grow timber or to provide shelter for wildlife.

Penn stony silt loam, 8 to 15 percent slopes (PeC).—This soil is shallow and stony, but the profile is similar to that of Penn silt loam, 0 to 3 percent slopes. Runoff is medium to rapid, but erosion has been generally slight.

Use and management (Capability unit VIIe–3).—Most of this soil is in woods. It is not suitable for cultivation. It should be kept in trees for timber or for wildlife shelter. Some areas need to be reforested.

Penn stony silt loam, 8 to 15 percent slopes, moderately eroded (PeC2).—This shallow stony soil is similar to Penn silt loam, 8 to 15 percent slopes, moderately eroded. Many areas have a few shallow gullies, and from one-fourth to three-fourths of the original surface soil has been lost through erosion. As a result of erosion, ledges and outcrops of rock are common. Runoff is medium to rapid.

Use and management (Capability unit VIIe–3).—This soil is too stony to cultivate. It is best suited to forest for timber or wildlife shelter.

Penn stony silt loam, 15 to 25 percent slopes (PeD).—This soil is steeper, shallower, and more stony than Penn silt loam, 0 to 3 percent slopes. Runoff is rapid to very rapid, but this soil is only slightly eroded because it has been protected by a forest cover.

Use and management (Capability unit VIIe–3).—Most of this soil is wooded. It should be used to produce lumber or to provide shelter for wildlife. Some fields need to be reforested.

Penn stony silt loam, 15 to 25 percent slopes, moderately eroded (PeD2).—This soil is stonier than Penn silt loam, 8 to 15 percent slopes, moderately eroded. Erosion has removed from one-fourth to three-fourths of the surface soil. Runoff is rapid to very rapid.

Use and management (Capability unit VIIe–3).—This soil is too stony to cultivate. It is best suited to trees for timber or wildlife shelter.

Penn stony silt loam, 25 to 35 percent slopes (PeE).—This is a very stony and shallow soil. Runoff is very rapid, but erosion is slight because of the forest cover.

Use and management (Capability unit VIIe–3).—Practically all of this soil is in woods. Forest, for timber or for wildlife shelter, is the best use for this soil. Some areas may need to be reforested.

Penn soils, 25 to 35 percent slopes, moderately eroded (PfE2).—This unit contains loam, gravelly loam, stony loam, silt loam, gravelly silt loam, and stony silt loam soils, all of the Penn series. These soils are very shallow. They are mapped together because they are all so steep and so likely to erode that the differences between them are not important to management. From one-fourth to three-fourths of the surface soil has already been lost through erosion, and some areas have a few shallow gullies. Runoff is very rapid.

Use and management (Capability unit VIe–3).—Most of this unit is wooded. Cleared areas are best suited to permanent pasture, which should be reseeded in contour strips. The most severely eroded areas can be replanted to trees.

Penn soils, 25 to 35 percent slopes, severely eroded (PfE3).—This unit is like Penn soils, 25 to 35 percent slopes, moderately eroded, but more than three-fourths of the original surface soil has been lost through erosion. Some areas have many shallow gullies, and some have lost much of their subsoil. Runoff is very rapid.

Use and management (Capability unit VIIe–3).—These soils should be used to grow trees, either for timber or for wildlife shelter. Some areas need to be reforested.

Penn-Lansdale Complex

This complex contains well-drained soils that formed in place from interbedded layers of red and gray rocks of the Triassic Lowland. The shallow Penn soils formed from red shales, sandstones, and conglomerates. The deeper Lansdale soils formed from light-gray or greenish-yellow soft crumbly sandstones and conglomerates that contain crystals of feldspar and flakes of mica. The native vegetation consisted mostly of oak, hickory, and yellow-poplar trees.

Areas of the individual Penn and Lansdale soils are so intermixed that they cannot be mapped separately. Both soils are medium textured and have low natural fertility, moderately rapid permeability, and low moisture-holding capacity. Soils of the Montalto, Readington, and Croton series are located nearby.

Penn-Lansdale gravelly loams, 0 to 3 percent slopes (PgA).—The Penn soil in this complex has a profile similar to that described for Penn loam, 0 to 3 percent slopes, but it contains more gravel. The Lansdale soil is like Lansdale gravelly loam, 3 to 8 percent slopes, moderately eroded. Small areas of each soil occur in a mixed pattern. The effects of erosion vary, depending on vegetation and accumulation of water. Some areas have a few shallow gullies. Runoff is slow.

Use and management (Capability unit IIe–5).—These soils are suitable for rotation crops, and most

areas are used for that purpose. Simple conservation practices are needed to supply organic matter, maintain tilth, prevent erosion, conserve moisture, and build up fertility.

Penn-Lansdale gravelly loams, 3 to 8 percent slopes, moderately eroded (PgB2).—The soils in this complex are similar to those in Penn-Lansdale gravelly loams, 0 to 3 percent slopes, but they have lost up to three-fourths of their original surface soil through sheet erosion. Some fields have a few shallow gullies. Some slightly eroded areas are included. Runoff is slow to medium.

Use and management (Capability unit IIe–5).—About 86 percent of this unit is used for crops, and 7 percent is wooded. The rest is pasture or idle land. These areas are suitable for rotation crops if intensive conservation is practiced. The chief management problems are preventing erosion, maintaining the supply of organic matter, and conserving moisture.

Penn-Lansdale gravelly loams, 8 to 15 percent slopes, moderately eroded (PgC2).—These soils are shallower than Penn-Lansdale gravelly loams, 0 to 3 percent slopes, and they are more eroded. Up to three-fourths of the original surface layer has been removed by sheet erosion. Some fields have a few shallow gullies, and some small areas are severely eroded. Runoff is medium to rapid.

Use and management (Capability unit IIIe–6).—Practically all of this unit is used for crops. These soils are suitable for crops in a long rotation, if intensive conservation is practiced to prevent erosion, supply organic matter, and conserve moisture.

Penn-Lansdale gravelly loams, 15 to 25 percent slopes, moderately eroded (PgD2).—The soils in this unit are shallower than those in the other Penn-Lansdale gravelly loam complexes. As much as three-fourths of the original surface soil has been washed away. Some fields have a few shallow gullies. A few areas that have been protected by a cover of forest are only slightly eroded. Runoff is rapid to very rapid. The fertility is low.

Use and management (Capability unit IVe–4).—These soils are too steep for cultivation, except in very long rotations with intensive conservation practices. They erode easily and lose moisture if cultivated. Permanent hay is the best use for these soils.

Penn-Lansdale loams, 0 to 3 percent slopes (PhA).—The Penn soil in this unit is like Penn loam, 0 to 3 percent slopes. The Lansdale soil is like Lansdale loam, 0 to 3 percent slopes. The two soils occur in small areas, in a pattern so intricate that they cannot be separated in mapping. Along some boundaries between the soils, tillage has mixed the plow layer of one soil with that of the other. A few areas are moderately eroded, but most areas show little or no evidence of erosion. Runoff is slow.

Use and management (Capability unit IIe–5).—Most areas of these soils are used for crops. Small areas are in pasture or woods. These soils are suited to rotation crops, if simple conservation practices are used to counteract the low natural fertility and to prevent erosion.

Penn-Lansdale loams, 3 to 8 percent slopes, moderately eroded (PhB2).—The soils in this unit are like those in Penn-Lansdale loams, 0 to 3 percent slopes, but somewhat shallower. Erosion has removed up to three-fourths of the surface soil. Some fields have a few shallow gullies. Some small areas are only slightly eroded. Runoff is medium to rapid. The fertility is low.

Use and management (Capability unit IIe–5).—About 88 percent of this unit is used for crops, 7 percent is used for building sites, and 4 percent is used for pasture. These areas are suited to rotation crops, but intensive conservation practices are needed to improve the fertility, conserve moisture, and protect the soils against the constant hazard of erosion.

Penn-Lansdale loams, 8 to 15 percent slopes (PhC).—These soils are shallower than those in Penn-Lansdale loams, 0 to 3 percent slopes. One-fourth or less of the original surface soil has been lost through sheet erosion. Runoff is medium to rapid.

Use and management (Capability unit IIIe–6).—Areas of these soils are best suited to hay or pasture. If they are cultivated, intensive conservation will be needed to prevent erosion and to overcome droughtiness and low natural fertility.

Penn-Lansdale loams, 8 to 15 percent slopes, moderately eroded (PhC2).—The soils in this unit are like those in Penn-Lansdale loams, 0 to 3 percent slopes, but they are shallower. Up to three-fourths of the original surface soil has been removed by erosion. Some areas have a few shallow gullies. A few small areas are severely eroded. Runoff is medium to rapid.

Use and management (Capability unit IIIe–6).—Nearly all of these areas are used for crops. They are suitable for crops in long rotations and under intensive management. The hazards of management include erosion, loss of organic matter, and loss of moisture.

Pequea Series

The soils of the Pequea series are shallow and well drained. They occur on narrow ridges and abrupt slopes in the central part of the county. They formed in place from dark-colored layers of Conestoga limestone. In places the parent rock contained considerable graphite, which makes the soil very dark colored. A few areas that have outcrops of rock are shown by rock outcrop symbols on the map. The native vegetation was a forest of oak, hickory, and yellow-poplar trees.

These soils are fertile, but they are so steep and shallow that the moisture-holding capacity is low. Internal drainage is moderately rapid. Other soils that developed near the Pequea soils are the deep, well-drained Letort soils, the deep, well-drained Conestoga soils, and the shallow, well-drained Hollinger soils.

Pequea silt loam, 3 to 8 percent slopes, moderately eroded (PkB2).—The following profile is typical of this soil under cultivation before it has been eroded.

0 to 10 inches, very dark grayish-brown friable silt loam; weak medium granular to thin platy structure.
10 to 24 inches, very dark grayish-brown friable heavy silt loam, slightly lighter colored than layer above; weak fine subangular blocky structure.
24 inches +, nearly black, micaceous rock material that is weathered, decomposed, and disintegrated.

Most areas of this soil have lost from one-fourth to three-fourths of the original surface soil through sheet erosion. Some areas have a few shallow gullies. Runoff is slow to medium.

Use and management (Capability unit IIe–2).—This soil is suited to general crops in rotation. It should be cultivated in contour strips, and long slopes should be protected by diversion terraces.

Pequea silt loam, 8 to 15 percent slopes, moderately eroded (PkC2).—This soil is shallower than Pequea silt loam, 3 to 8 percent slopes, moderately eroded. Sheet erosion has removed from one-fourth to three-fourths of the surface soil. A few shallow gullies occur in some fields. Runoff is slow to medium.

Use and management (Capability unit IIIe–2).—This soil is fairly well suited to crops in long rotations, if contour stripcropping is practiced and diversion terraces are used on longer slopes. It is better suited to perennial hay than to cultivated crops.

Pequea silt loam, 15 to 25 percent slopes, moderately eroded (PkD2).—This soil has a shallower profile than Pequea silt loam, 3 to 8 percent slopes, moderately eroded. It has lost from one-fourth to three-fourths of its original surface soil through erosion. Some fields have a few shallow gullies. Runoff is rapid.

Use and management (Capability unit IVe–2).—This soil is best suited to hay or pasture. Some of it can be cultivated in very long rotations, if protected by contour stripcropping and by diversion terraces on the longer slopes.

Pequea silt loam, 15 to 25 percent slopes, severely eroded (PkD3).—This is one of the most severely eroded soils in the county. Where it is cultivated, the profile is like the following.

0 to 6 inches, dark-brown to very dark grayish-brown friable silt loam; moderate fine granular to very fine subangular blocky structure.
6 inches +, dark olive-gray to olive-gray, greasy, decomposed and disintegrated rock; weak fine subangular blocky structure, tending strongly toward platy structure.

In most places three-fourths or more of the surface soil has been removed by erosion. Gullies are common.

Use and management (Capability unit VIe–3).—This soil needs a permanent cover of woody vegetation. Cleared areas should be replanted to trees or shrubs.

Pequea silt loam, 25 to 35 percent slopes, moderately eroded (PkE2).—This soil is similar to Pequea silt loam, 3 to 8 percent slopes, moderately eroded, but it is shallower. From one-fourth to three-fourths of the original surface soil has been eroded away. A few shallow gullies have formed in some fields. Runoff is very rapid.

Use and management (Capability unit VIe–3).—This soil is best suited to permanent pasture. Special management is needed to maintain the supply of organic matter and control erosion. Pastures should be reseeded in contour strips. Operation of farm equipment is difficult or dangerous on these slopes.

Pequea silt loam, 25 to 35 percent slopes, severely eroded (PkE3).—This soil is like Pequea silt loam, 15 to 25 percent slopes, severely eroded. It is very shallow. At least three-fourths of the surface soil has been lost through erosion. Shallow gullies are common. Runoff is very rapid.

Use and management (Capability unit VIIe–3).—This soil is best suited to forest, either for lumber or for food and shelter for wildlife. The operation of farm equipment on these slopes would be difficult and hazardous.

Readington Series

The Readington series consists of moderately well drained soils that developed over Triassic rocks on conclave slopes, in drainageways and depressions, and near the base of slopes. They formed over the light-gray or greenish-yellow crumbly sandstone of the New Oxford formation or over the soft red sandstone and shale of the Gettysburg formation in the northern part of the county. Part of the parent material weathered from the rock beneath, and part was washed in. The native vegetation consisted of oak, hickory, and yellow-poplar trees.

These soils generally have a clay loam subsoil that has a rather high moisture-holding capacity. Internal drainage is moderately slow to slow, depending somewhat on the nature of the underlying rock strata. The natural fertility is low.

Other soils that develop in the same area are the deep, well-drained Penn, Lansdale, and Lewisberry soils, the shallow, well-drained Steinsburg soils, and the poorly drained Croton soils.

Readington loam, 0 to 3 percent slopes (RaA).—This soil is located in depressions, on flats, and in spots near steep areas, where surface water accumulates. The following profile, observed in a cultivated field, is typical of the spots of this soil that developed from the gray or yellow sandstones within areas of Lansdale soils.

0 to 8 inches, dark-brown friable loam; moderate fine granular structure.
8 to 10 inches, yellowish-brown friable loam; weak coarse subangular blocky or thick platy structure.
10 to 18 inches, strong-brown friable clay loam; weak medium blocky structure.
18 to 24 inches, dark-brown friable loam, in many places mottled with a few slightly darker or lighter streaks; weak medium blocky structure.
24 to 36 inches, brown to dark-brown firm sandy loam, mottled with many coarse strong-brown and light brownish-gray streaks; coarse prismatic, breaking into thin or medium platy, structure.
36 inches +, relatively solid sandstone.

The Readington soil that developed from the red shales or sandstones has a profile more like that of the Penn soils or the Lewisberry soils. Mottling occurs in the subsoil at about the same depth as in the areas associated with the Lansdale soils. The following profile of such a soil was observed in a pasture.

0 to 3 inches, dark reddish-brown friable silt loam; moderate very fine blocky to platy structure.
3 to 12 inches, dark reddish-brown to reddish-brown friable silt loam; moderate fine blocky to medium platy structure.
12 to 16 inches, reddish-brown firm heavy silt loam; moderate medium to thick platy structure.
16 to 36 inches, dusky-red and yellowish-red very firm silty clay loam; contains a few fine, distinct mottles of pink and light reddish brown; strong coarse to very coarse angular blocky structure.

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Erosion has not been a problem on this soil. Most areas receive more soil material in fresh deposits than they lose by erosion. Runoff is slow to very slow.

Use and management (Capability unit IIw–1).—About 61 percent of this soil is in crops, 23 percent is in pasture, 9 percent is idle, and 5 percent is forested. This soil is sometimes too wet to cultivate when other soils nearby are ready. It is suitable for those rotation crops that are not easily damaged by poor drainage. Artificial drainage usually improves yields. The supply of organic matter should be maintained.

Readington loam, 3 to 8 percent slopes (RaB).—This soil occurs where surface water accumulates or where the water table is high because of underground seepage. In many places deposition adds as much soil as is removed by erosion. Runoff is slow to medium.

Use and management (Capability unit IIw–1).—This soil is suited to many, but not all, of the rotation crops commonly grown in the county. The high water table retards root development and causes heaving, which damages small grains. Erosion is also a hazard. Underground drainage and control of runoff are needed to increase the productivity.

Readington loam, 3 to 8 percent slopes, moderately eroded (RaB2).—This soil is in the more strongly sloping drainageways and in wet spots on slopes. It is like Readington loam, 0 to 3 percent slopes, except that erosion has removed from one-fourth to three-fourths of the surface soil. A few areas have shallow gullies. Runoff is medium to slow.

Use and management (Capability unit IIIe–7).—This soil needs to be drained and protected against erosion.

Readington loam, 8 to 15 percent slopes, moderately eroded (RaC2).—This soil occurs in wet spots, on hillsides and where drainageways enter stream valleys. The profile is shallower than that of Readington loam, 0 to 3 percent slopes. Sheet erosion has removed from one-fourth to three-fourths of the original surface soil. Runoff is medium to rapid.

Use and management (Capability unit IIIe–7).—This soil will produce cultivated crops, but it is best suited to grass. The wet subsoil and the danger of erosion limit its use for crops.

Riverwash

Riverwash consists of somewhat poorly drained to very poorly drained alluvial soils that occur along the shores of and on the islands in the Susquehanna River. These soils are composed of transported materials, including cobblestones, gravel, sand, and silt. Some of these materials contain a large percentage of anthracite coal flakes washed from the coal fields. These soils are so recent in origin or so frequently changed that they have not developed distinct profiles. The native vegetation ranges from grasses, sedges, and rushes to open stands of willow, ash, birch, and cherry trees.

Riverwash (Rb).—These level to nearly level soils are so low and so near the river that they are flooded very frequently. The water table is high. No distinct profile characteristics have been developed.

Use and management (Capability unit VIIIs–1).—Trees and shrubs grow on most of these areas. These soils are not suitable for cultivated crops, because they are likely to be flooded and because the rooting depth is limited by the high water table. They can be used for recreation.

Rowland Series

Soils of the Rowland series are deep, moderately well drained, flood plain soils. They occur in a belt across the northern part of the county, extending from Bainbridge through Elizabethtown, Mastersonville, Hopeland, Denver, Ephrata, and Terre Hill. The parent material was sand, silt, and clay washed from nearby fields of Penn and Lansdale soils during floods and deposited on the first bottoms of streams. The native vegetation was a forest of ash, maple, elm, walnut, locust, oak, and hickory trees.

These soils have moderate to low natural fertility, but lime, fertilizer, and manure that have been washed from nearby fields have added to the fertility. They have moderate internal drainage and a high moisture-holding capacity.

In this county the Rowland soils occur in such small areas and are so closely associated with Bermudian soils that they cannot be separated accurately in mapping.

Rowland and Bermudian silt loams, 0 to 3 percent slopes (RcA).—This undifferentiated group consists of Rowland silt loam and Bermudian silt loam.

The well-drained Bermudian soil lies in narrow strips along the streams, where internal drainage is moderate. The Rowland soil occurs a little farther from the streams, where the internal drainage is slow, the water table is higher, and surface water is more likely to be ponded. Both soils are frequently flooded. Erosion is not generally a problem, but some sheet erosion or stream gouging may occur during floods. Material is more often deposited on these soils than washed from them.

The following profile of Rowland silt loam was sampled in a pasture.

0 to 13 inches, dark-brown loose light silt loam; weak medium granular structure.
13 to 47 inches, dark-brown to dark reddish-brown very friable silt loam to loam; has a few fine faint mottles of lighter and darker shades of the background colors; moderate to weak very fine blocky to thin platy structure.
47 to 63 inches, dark reddish-gray to gray silt loam to silty clay loam, mottled with fine streaks of dark reddish brown and gray; moderate medium blocky structure.

The following profile of Bermudian silt loam was observed in a pasture.

0 to 11 inches, dusky-red very friable light silt loam; weak very fine subangular blocky or granular structure.
11 to 26 inches, dark reddish-brown firm silt loam; strong to moderate medium blocky structure.
26 to 40 inches, dark reddish-brown very friable gravelly sandy loam; weak subangular blocky structure.
40 to 66 inches, dark reddish-brown sandy gravel; very firm or partly cemented in place; pebbles are from ⅛ to ¾ inch in diameter.

Use and management (Capability units IIw–3).—About 63 percent of this unit is in pasture, 32 percent is in woods, 3 percent is idle, and only 2 percent is

used for crops. These soils are commonly not cultivated because they are likely to be flooded often. If cultivated, they need careful management to preserve their structure and maintain the supply of organic matter.

The Bermudian soil is well suited to corn, pasture, and hay. Cover crops are needed to protect the soil during floods. The Rowland soil is also suitable for crops, but it needs both surface and subsurface drainage.

Sciotoville Series

The Sciotoville series consists of deep, moderately well drained soils developed from old alluvium. They form a belt, about half a mile wide, that parallels the Susquehanna River near Marietta. The original forest was composed of oak, hickory, yellow-poplar, and other trees.

The parent material consisted of sand, silt, and gravel deposited on old terraces above the Susquehanna River. These alluvial deposits were later covered by a mantle of silt ranging up to 24 inches in thickness (*12*). This silt has been mixed into the underlying sediments.

These soils are moderate to high in natural fertility. They are generally high in moisture-holding capacity. Internal drainage is moderate to slow. Associated with the Sciotoville soils are the deep, well-drained Wheeling soils.

Sciotoville silt loam, 0 to 3 percent slopes (SaA).—Erosion is not a serious problem on this soil; less than one-fourth of the surface soil has been lost through sheet erosion. Runoff is slow. The subsoil is saturated by water that collects on flats and in pockets. A profile in a cultivated area is described as follows.

0 to 11 inches, very dark grayish-brown friable silt loam; weak fine subangular blocky structure.
11 to 20 inches, dark yellowish-brown friable silt loam; moderate medium blocky structure.
20 to 60 inches, dark-brown friable silty clay loam; mottled with grayish brown, mottling increases in intensity with depth; moderate medium blocky structure; in many places the lower part contains stratified gravel.

A few water-rounded pebbles are present in all layers of the profile.

Use and management (Capability unit IIw–2).—Nearly all of this soil is used for crops. It is not suited to alfalfa, winter grains, or root crops because its subsoil is wet. Surface and subsurface drainage will improve crop yields. The principal management problems are improving drainage and maintaining the supply of organic matter.

Sciotoville silt loam, 3 to 6 percent slopes (SaB).—This soil is located on the slopes between terraces or in stream cuts. It is similar to Sciotoville silt loam, 0 to 3 percent slopes. It has lost from one-fourth to three-fourths of the original surface soil. Subsoil has been mixed into the remaining surface soil, and the resulting plow layer is heavier and less absorbent than the original surface soil. Runoff is slow to medium.

Use and management (Capability unit IIw–2).—Most of this soil is cultivated. It needs intensive management to control erosion, remove excess water, and maintain the supply of organic matter.

Steinsburg Series

The Steinsburg series consists of moderately deep to shallow, well-drained soils. The parent material was derived from yellow Triassic sandstone of the New Oxford formation. These soils occur on narrow ridges, along the sides of stream valleys, and at sharp breaks in slopes. They are located mostly in the northwestern part of the county near Falmouth, Bainbridge, Mastersonville, and Elstonville. A few small areas are elsewhere in the Triassic Lowland.

The parent material is light-gray or brownish-yellow crumbly sandstone that contains grains of white feldspar, glassy crystals of quartz, flakes of mica and, in some places, rounded pebbles of quartz. Little clay or silt is formed in the weathering of this sandy parent rock, and the subsoil is only weakly developed. The native forest consisted of oaks, hickories, chestnuts, and other hardwoods.

The natural fertility of these soils is low. Internal drainage is moderately rapid. The moisture-holding capacity is low. Other soils that developed in the same vicinity are of the Penn, Lewisberry, Lansdale, Readington, and Croton series.

Steinsburg gravelly loam, 8 to 15 percent slopes, severely eroded (ScC3).—This soil is so severely eroded that its productivity has been seriously reduced. More than three-fourths of the surface soil has been removed, and some fields have shallow gullies. Runoff is medium to rapid. The following profile was observed in one of the less eroded and less strongly sloping spots in this unit.

0 to 8 inches, dark-brown loose gravelly loam; weak medium crumb structure.
8 to 19 inches, dark-brown to yellowish dark-brown loam; weak medium crumb structure to very fine subangular blocky structure, lower part of layer may be structureless; loose consistence.
19 to 29 inches, light-gray partly weathered parent material.
29 inches +, fairly solid sandstone.

The subsoil is only weakly developed; in many places it is missing entirely.

Use and management (Capability unit VIe–3).—This soil is suited only to woodland or pasture. It is droughty, low in fertility, and likely to erode. Conservation measures should be applied to prevent further deterioration.

Steinsburg gravelly loam, 15 to 25 percent slopes, severely eroded (ScD3).—Most of this soil lies on narrow ridges and along stream valleys. The profile was originally similar to that described under Steinsburg gravelly loam, 8 to 15 percent slopes, severely eroded, but it was somewhat more shallow. Severe sheet erosion has removed more than three-fourths of the surface soil. Many shallow gullies have been cut. In some places, no profile layers can be distinguished.

This soil is droughty because the loss of surface soil has severely reduced the moisture-storage capacity. The fertility is low. Runoff is rapid to very rapid. The hazard of further erosion is high.

Use and management (Capability unit VIIe–3).—This soil is best suited to trees and shrubs. It needs a permanent vegetative cover to protect it from erosion and loss of moisture.

Steinsburg gravelly loam, 25 to 35 percent slopes (ScE).—This soil has a profile that is much shallower than that described under Steinsburg gravelly loam, 8 to 15 percent slopes, severely eroded. Runoff is very rapid, and the loose soil is easily eroded. Some areas of this soil are already eroded, but some have been protected by forest.

Use and management (Capability unit VIe–3).—Most of this soil is wooded. It is best suited to trees and shrubs. Its usefulness is limited by the erosion hazard, the low fertility, and droughtiness. Farm equipment cannot be operated safely on these slopes.

Watchung Series

The soils of the Watchung series are deep and poorly drained. They have moderate to high natural fertility.

These soils formed from diabase, locally called ironstone. One large area of diabase is located in the northwestern part of the county near Falmouth, Elizabethtown, and Bellaire. Another large area is in the northeastern part near Adamstown and Bowmansville. In these areas, dikes and intrusions of diabase were forced between beds and through cracks in formations of Triassic red sandstones and shales. These ironstone dikes range from several feet to thousands of feet in width.

These soils have a high moisture-holding capacity. Internal drainage is slow. The Watchung soils formed in pockets near small streams and at the base of slopes where the water table is high or where surface water accumulates. Part of the parent material weathered from the underlying rock, and part was washed down the slopes. The deep, well-drained Montalto soils developed nearby from similar materials.

Watchung silt loam, 0 to 3 percent slopes (WaA).—This soil is located on flats and at the base of slopes where water accumulates. The following profile is typical.

0 to 9 inches, very dark grayish-brown friable silt loam; moderate fine crumb structure; contains a few concretions.
9 to 30 inches, gray firm silty clay mottled with many prominent, medium-sized, strong-brown streaks; moderate fine blocky structure; contains small round concretions of iron and manganese.
30 to 40 inches, yellowish-brown gritty loam mottled with dark red; weathered parent material.
40 inches +, unweathered diabase.

Some fields have lost up to one-fourth of their original surface soil, and a few have a few shallow gullies. However, erosion is not a problem in most areas. Runoff is slow to very slow. Water sometimes accumulates on the surface in the more nearly level places.

Use and management (Capability unit VIw–2).—About 38 percent of this soil is wooded, 23 percent is in pasture, 14 percent is in crops, and 24 percent is idle. This soil is fairly well suited to pasture, if surface drainage is installed.

Watchung silt loam, 3 to 8 percent slopes (WaB).—This soil is like Watchung silt loam, 0 to 3 percent slopes. Erosion is not generally a problem, but some fields have a few shallow gullies. Runoff is slow to medium.

Use and management (Capability unit VIw–2).—About 94 percent of this soil is wooded, 4 percent is pastured, and 2 percent is idle. It is too wet to be suitable for crops. It is best suited to pasture. Pastures can be improved by surface drainage.

Watchung silt loam, 3 to 8 percent slopes, moderately eroded (WaB2).—This soil is like Watchung silt loam, 0 to 3 percent slopes, except that it has lost one-fourth to three-fourths of the surface soil through sheet erosion. Some fields contain a few shallow gullies. In cultivated areas, subsoil has been mixed with the remaining surface soil, and the resulting plow layer is fine textured and very difficult to work. Runoff is slow to medium.

Use and management (Capability unit VIw–2).—About 32 percent of this soil is used for crops, 24 percent for woods, and 16 percent for pasture. The rest is idle. This soil is best suited to pasture. Drainage improves yields but is so difficult that it is seldom practical. Control of erosion is needed.

Watchung very stony silt loam, 0 to 8 percent slopes (WbA).—This soil is much stonier than Watchung silt loam, 0 to 3 percent slopes. In some of the wooded areas, well-rounded diabase boulders 2 to 10 feet in diameter and 6 to 8 feet high lie close together, with little soil between them. The more nearly level areas generally have fewer and smaller stones. In pastures, most of the small and medium-sized rocks have been picked from the surface. These fields still have many cobblestones in the soil, and a few boulders too large to be moved with farm equipment are on the surface or partly exposed. Runoff is slow, and erosion is not generally a problem.

Use and management (Capability unit VIIw–1).—Nearly all of this soil is in woods. A few small areas are in pasture. This soil is too wet and stony to be cultivated. It should be kept in forest. Some places are so stony that timber cannot be taken out easily.

Wehadkee Series

The Wehadkee series consists of poorly drained, moderately fertile soils that occur on flood plains in rather narrow valleys mostly in the southern part of the county. The parent material was alluvium washed from Chester and Manor soils of the Piedmont Uplands. The Wehadkee soils developed under a moisture-tolerant forest of ash, poplar, hickory, elm, willow, birch, and alder trees.

These soils vary considerably in appearance. The color and texture of the soils depend on the origin of the sediments from which they were formed. Color and intensity of mottling vary with drainage. Materials that have been in place for a longer time have more distinct profiles.

These soils are frequently flooded. The water table is high, and internal drainage is moderate to slow. The moisture-holding capacity is high. The natural fertility is only moderate, but in recent years it has been improved by the lime, fertilizer, and manure that has washed from nearby fields. The moderately well drained Chewacla soils and the well drained Congaree soils developed nearby from similar materials.

Wehadkee silt loam, 0 to 3 percent slopes (WcA).—This soil is located on nearly level flood plains that have some depressions and pockets. Runoff is slow to

very slow. The following profile, observed in a pasture, is typical.

0 to 10 inches, dark grayish-brown silt loam; weak fine crumb structure.
10 to 15 inches, gray silty clay loam distinctly mottled with fine dark reddish-brown and yellowish-brown streaks; weak fine blocky structure.
15 to 34 inches, gray firm silty clay, lighter colored than layer above; prominently mottled with many strong-brown streaks; weak medium blocky structure.
34 inches +, gray firm silty clay distinctly mottled with fine to medium-sized yellowish-brown streaks.

More soil material is deposited on these areas than is removed by erosion. A little erosion occurs where drainageways cross the flood plains. Some stream gouging takes place during floods. In some places the sediments are deposited or rearranged often enough to prevent the development of definite horizons in the profile. A few very small areas that are moderately eroded and some areas that are more sloping are included in this unit.

Use and management (Capability unit VIw–1).—About 68 percent of this soil is in pasture, 22 percent is in woods, 5 percent is in crops, and 4 percent is idle. Frequent floods and a high water table limit the use of this soil for crops. It is fairly well suited to pasture if drainage is improved.

Wheeling Series

The Wheeling series consists of deep, well-drained soils that formed on old river terraces from alluvium mixed with silty material, possibly of windblown origin. They lie in a belt less than half a mile wide that parallels the Susquehanna River near Marietta. Smaller areas are located along the river north as far as Falmouth and south as far as Creswell Station. The native forest consisted of oak, hickory, maple, and walnut trees.

The original sediments were stratified sand, silt, and gravel that was washed from shale, sandstone, quartzite, and limestone areas. These alluvial deposits were later covered with a mantle of silt up to 24 inches deep (*12*). This silt was mixed into the underlying sediments to form the parent materials of the Wheeling soils.

These soils are moderate to high in natural fertility. In most places the moisture-holding capacity is high. Internal drainage is moderate. Wheeling soils are associated with the moderately well drained Sciotoville soils, which formed from the same parent materials, and with other soils of the limestone belt.

Wheeling silt loam, 0 to 3 percent slopes (WdA).—This soil lies on broad flats separated by narrow bands of sloping soils. Erosion is not a serious problem. Runoff is slow. A profile in a cultivated field follows.

0 to 10 inches, very dark grayish-brown friable light silt loam; weak medium granular or subangular blocky structure.
10 to 22 inches, slightly reddish dark-brown friable silt loam; strong medium blocky structure.
22 to 42 inches, dark-brown sandy loam; weak medium blocky structure.
42 to 80 inches +, stratified sand, silt, and gravel.

A few rounded pebbles are found throughout the profile. In some areas the soil is generally coarser textured or more gravelly.

Use and management (Capability unit I–1).—Nearly all of this soil is used for crops. A few very small areas are in pasture or woods. This is a highly productive soil, well suited to a wide range of crops. It has few limitations. The principal management problems are maintaining the supply of organic matter and conserving fertility.

Wheeling silt loam, 3 to 6 percent slopes, moderately eroded (WdB2).—This soil is like Wheeling silt loam, 0 to 3 percent slopes, except that it has lost from one-fourth to three-fourths of its original surface soil through sheet erosion. The mixing of part of the subsoil with the remainder of the surface soil has made the plow layer less absorbent than before. A few shallow gullies have appeared in some fields. A few small areas are more severely eroded than the rest of the unit, and some are only slightly eroded. Runoff is slow to medium.

Use and management (Capability unit IIe–1).—Almost all of this soil is used for crops, but there are some small areas in pasture. It is suited to rotation crops, but it needs intensive management to control erosion, conserve water, maintain fertility, and supply organic matter.

Wheeling silt loam, 6 to 12 percent slopes, moderately eroded (WdC2).—This soil usually occurs in narrow bands between terrace flats or on the walls of small stream valleys that cross the terraces. It is shallower than Wheeling silt loam, 0 to 3 percent slopes, and it has lost from one-fourth to three-fourths of its original surface soil. The mixing of subsoil with the surface soil has made the plow layer finer textured and less suitable for cultivation. Some fields have a few shallow gullies. Some small areas are severely eroded, and some are only slightly eroded. Runoff is medium to rapid. Some areas in this unit have a texture coarser than silt loam.

Use and management (Capability unit IIIe–1).—Most of this soil is cultivated. It is suitable for crops, but intensive conservation and long rotations are necessary to keep it productive. Erosion is a major problem. The most severely eroded areas should be farmed less intensively.

Wheeling silt loam, 12 to 18 percent slopes (WdD).—Most of this soil is located along the Susquehanna River near Columbia, where small streams have cut across the terraces. The profile is like that of Wheeling silt loam, 0 to 3 percent slopes. Runoff is rapid, but only one-fourth of the surface soil has been lost through sheet erosion.

Use and management (Capability unit IVe–1).—This soil can be cultivated in very long rotations if intensively managed to control erosion, conserve moisture, and maintain the supply of organic matter. It is best suited to permanent hay.

Wheeling silt loam, 12 to 18 percent slopes moderately eroded (WdD2).—This soil is shallower than Wheeling silt loam, 0 to 3 percent slopes, and it has lost from one-fourth to three-fourths of its original surface soil through sheet erosion. A few shallow gullies have formed in some fields. Runoff is rapid.

Use and management (Capability unit IVe–1).—This soil can be cultivated in very long rotations if it is intensively conserved. Permanent hay is the best

use for it. Preventing further erosion, conserving moisture, and maintaining the supply of organic matter are the principal management problems.

Whiteford Series

The Whiteford series contains deep well-drained soils derived from slate. Most areas are on ridges that have flattened tops and gently sloping sides. They are located in the southern part of the county, north and east of Peach Bottom Station.

These soils developed from weathered dark-gray to purplish-black slate. They contain many coarse fragments of slate. The native forest consisted of oaks and hickories.

The fertility is low, and moisture-holding capacity is low to moderate. Internal drainage is moderate.

The Whiteford soils are associated with the shallow, well-drained Cardiff soils in most places. Small areas of Chester, Elioak, Manor, Glenelg, and Glenville soils also occur in this general area.

Whiteford slaty silt loam, 3 to 8 percent slopes, moderately eroded (WeB2).—The following profile is typical of cultivated areas of this soil.

0 to 8 inches, dark-brown silt loam; weak fine to medium granular structure.
8 to 18 inches, dark-brown to yellowish-red silty clay loam; weak to moderate subangular blocky structure; contains 10 to 15 percent fragments of slate.
18 to 32 inches, dark-brown to dark reddish-brown silty clay loam; contains about 50 percent fragments of slate; grades into next layer.
32 to 36 inches +, dark-gray weathered slate mixed with dark reddish-brown silt.

From one-fourth to three-fourths of the original surface soil is gone as a result of sheet erosion. Subsoil is mixed into the plow layer, and the resulting surface layer is less absorbent than the original. Runoff is slow to medium.

Use and management (Capability unit IIe–4).—About 87 percent of this soil is cultivated, and 13 percent is wooded. This soil is droughty and erodible and contains little organic matter. It is suitable for cultivation, but simple conservation measures are needed. In some fields, long rotations and special practices to dispose of runoff are necessary.

Whiteford slaty silt loam, 8 to 15 percent slopes, moderately eroded (WeC2).—This soil is like Whiteford slaty silt loam, 3 to 8 percent slopes, moderately eroded. It has lost up to three-fourths of its surface soil, and some fields have a few shallow gullies. A few very small areas are severely eroded, and a few are uneroded. Runoff is medium to rapid. The fertility is low, and the moisture-holding capacity is low.

Use and management (Capability unit IIIe–5).—About 73 percent of this soil is in crops, 12 percent is in pasture, and 14 percent is in woods. This soil needs intensive management if cultivated. The chief management problems are improving the fertility and moisture-holding capacity, increasing the supply of organic matter, and diverting surface water.

Whiteford slaty silt loam, 15 to 25 percent slopes, moderately eroded (WeD2).—This soil is shallower than Whiteford slaty silt loam, 3 to 8 percent slopes, moderately eroded. A few shallow gullies have formed. Severe erosion has taken place in a few fields, but wooded areas are only slightly eroded. Runoff is rapid. The fertility is low.

Use and management (Capability unit IVe–3).—About 53 percent of this soil is used for crops, 20 percent for pasture, and 26 percent for trees. The danger of erosion, the low fertility, the loss of moisture, and the hazards of operating farm equipment all limit the use of this soil for crops. It is best suited to pasture or permanent hay.

Capability Groups

Capability grouping is a system of classification used to show the relative suitability of soils for crops, grazing, forestry, or wildlife. It is a practical grouping based on the needs and limitations of the soils, the risks of damage to them, and also their response to management. In this report, soils have been grouped on three levels above the soil mapping unit. They are the capability unit, the subclass, and the class.

The capability unit, which can also be called a management group of soils, is the lowest level of capability grouping. A capability unit is made up of soils similar in kind of management needed, in risk of damage, and in general suitability for use.

The next broader grouping, the subclass, is used to indicate the dominant kind of limitation. The latter symbol "e" means that the main limiting factor is risk of erosion if the plant cover is not maintained. The symbol "w" means that excess water retards plant growth or interferes with cultivation. The symbol "s" means that the soils are shallow, droughty, stony, or low in fertility.

The broadest grouping, the class, is identified by Roman numerals. All the soils in one class have limitations and management problems of about the same degree, but of different kinds as shown by the subclass. All the classes except class I may have one or more subclasses.

In classes I, II, and III are soils that are suitable for annual or periodic cultivation of annual or short-lived crops.

Class I soils are those that have the widest range of use and the least risk of damage. They are level or nearly level, productive, well drained, and easy to work. They can be cultivated with almost no risk of erosion and will remain productive if managed with normal care.

Class II soils can be cultivated regularly, but they do not have quite so wide a range of suitability as class I soils. Some class II soils are gently sloping and consequently need moderate care to prevent erosion. Other soils in class II may be slightly droughty, slightly wet, or somewhat limited in depth.

Class III soils can be cropped regularly, but they have a narrower range of use. They need even more careful management.

In class IV are soils that should be cultivated only occasionally or only under very careful management.

In classes V, VI, and VII are soils that normally should not be cultivated for annual or short-lived crops but can be used for pasture, for woodland, or for wildlife shelter.

Class V soils are nearly level and gently sloping, but they are droughty, wet, low in fertility, or otherwise unsuitable for cultivation. No class V soils were mapped in Lancaster County.

Class VI soils are not suitable for regularly cultivated crops because they are steep or droughty or otherwise limited. They are best suited for growing trees or pasture. They give fair to high yields of forage and fair to high yields of forest products. Some soils in class VI can, without damage, be cultivated enough so that fruit trees or forest trees can be set out or pasture crops seeded.

Class VII soils have characteristics that severely limit their use for pasture and, in some places, for woodland. Yields of forest products may be fair to high.

In class VIII are soils that have practically no agricultural use. Some areas have value for watershed protection, wildlife shelter, or scenery.

The soils of Lancaster County have been grouped into the following classes, subclasses, and units.

Class I.—Deep, nearly level, productive soils that have few or no permanent limitations; suitable for tilled crops and other uses.
- Unit I–1.—Nearly level, well-drained, deep, high-line soils of uplands.
- Unit I–2.—Nearly level, well-drained, deep, acid soils of uplands.
- Unit I–3.—Nearly level, well-drained, deep soils of flood plains.

Class II.—Soils that have moderate limitations if tilled; suitable for crops, pasture, and trees.
- Subclass IIe.—Gently sloping soils, subject to erosion if cover is not maintained.
  - Unit IIe–1.—Nearly level to gently sloping deep soils derived from limestone or influenced by calcareous materials.
  - Unit IIe–2.—Level to gently sloping, shallow soils developed from Conestoga limestone.
  - Unit IIe–3.—Level to gently sloping, deep soils developed from Conestoga limestone.
  - Unit IIe–4.—Nearly level to gently sloping, deep to moderately deep, acid, residual soils.
  - Unit IIe–5.—Nearly level to gently sloping, moderately deep to shallow, acid, residual soils.
  - Unit IIe–6.—Nearly level to gently sloping, deep, acid sandy loam soils that have low moisture-holding capacity.
- Subclass IIw.—Moderately wet soils.
  - Unit IIw–1.—Nearly level to gently sloping, moderately well drained, deep, acid, residual soils.
  - Unit IIw–2.—Nearly level to gently sloping, moderately well drained to somewhat poorly drained, deep, residual, colluvial, and terrace soils, influenced by limestone.
  - Unit IIw–3.—Nearly level to gently sloping, moderately well drained, deep soils of the flood plains.

Class III.—Soils that have severe limitations and require careful management if tilled; suitable for crops, pasture, and trees.
- Subclass IIIe.—Sloping soils that have high risk of erosion when tilled.
  - Unit IIIe–1.—Gently sloping to moderately sloping, well-drained, deep soils developed from limestone or influenced by calcareous material.
  - Unit IIIe–2.—Gently sloping to moderately sloping, well-drained, shallow soils developed from lime schist.
  - Unit IIIe–3.—Gently sloping to moderately sloping, deep soils developed from Conestoga limestone.
  - Unit IIIe–4.—Gently sloping to moderately sloping, well-drained, deep to moderately deep, acid soils.
  - Unit IIIe–5.—Gently sloping to moderately sloping, deep to moderately deep, acid, residual soils.
  - Unit IIIe–6.—Gently sloping to moderately sloping, well-drained, moderately deep to shallow, acid soils.
  - Unit IIIe–7.—Gently sloping to moderately sloping, moderately well drained, deep to shallow, acid soils.
  - Unit IIIe–8.—Gently sloping to moderately sloping, deep, sandy, acid soils that have low moisture-holding capacity.
- Subclass IIIw.—Wet soils that require artificial drainage if they are tilled.
  - Unit IIIw–1.—Gently sloping, poorly drained, moderately deep, acid soils.

Class IV.—Soils that have severe limitations if tilled; suitable for only limited or occasional cultivation, but suited to pasture or trees.
- Subclass IVe.—Soils severely limited by risk of erosion if cover is not maintained.
  - Unit IVe–1.—Sloping, well-drained, deep, eroded soils developed from or influenced by calcareous materials.
  - Unit IVe–2.—Strongly sloping, well-drained, shallow, eroded soils developed from Conestoga limestone.
  - Unit IVe–3.—Sloping, well-drained, deep or moderately deep, eroded, acid, residual soils.
  - Unit IVe–4.—Sloping, well-drained, moderately deep to shallow, eroded, acid soils.
  - Unit IVe–5.—Moderately sloping, poorly drained, moderately deep to shallow soils.
- Subclass IVw.—Soils severely limited by poor drainage.
  - Unit IVw–1.—Poorly drained to very poorly drained, acid soils.

Class VI.—Soils with moderate limitations for pasture or trees; not suited to tilled crops.
- Subclass VIe.—Soils moderately limited for pasture or trees by risk of erosion if cover is not maintained.
  - Unit VIe–1.—Strongly sloping, well-drained, deep, eroded soils influenced by calcareous materials.
  - Unit VIe–2.—Strongly sloping, deep to moderately deep, eroded, acid soils.

Unit VIe–3.—Strongly sloping or eroded, moderately deep to shallow, nonstony soils.
Subclass VIs.—Soils severely limited by stones and outcrops of rock.
Unit VIs–1.—Level to moderately sloping, naturally fertile, stony and ledgy soils.
Subclass VIw.—Soils severely limited by poor drainage.
Unit VIw–1.—Nearly level, poorly to very poorly drained soils of the flood plains.
Unit VIw–2.—Level to moderately sloping, poorly to very poorly drained, residual soils.
Class VII.—Soils severely limited for pasture or trees.
Subclass VIIe.—Soils limited by risk of erosion if cover is not maintained.
Unit VIIe–1.—Steep or very severely eroded, normally deep soils developed from calcareous materials.
Unit VIIe–2.—Steep or very severely eroded, deep to moderately deep, acid soils.
Unit VIIe–3.—Steep or very severely eroded, moderately deep to shallow soils and more gently sloping stony soils.
Subclass VIIw.—Soils severely limited by poor drainage.
Unit VIIw–1.—Level to moderately steep, poorly drained stony soils.
Class VIII.—Soils not suited to any agricultural use.
Subclass VIIIs.—Soils unsuitable for agriculture because of extreme stoniness.
Unit VIIIs–1.—Poorly drained, extremely stony soils.

In the following pages each capability unit is described briefly, the soils in each are listed, and some suggestions for the use and management of those soils are given.

Capability Unit I-1

This unit consists of deep, nearly level, well-drained, high-lime soils of the uplands. They are medium textured, moderately permeable, and moderately susceptible to erosion. The productivity is high and the moisture-storing capacity is high. These soils are moderately easy to till, except for areas of silty clay derived from pure limestones.

The soils in this unit are—

Duffield silt loam, 0 to 3 percent slopes.
Duffield gravelly silt loam, 0 to 3 percent slopes.
Elk gravelly silt loam, 0 to 3 percent slopes.
Hagerstown silt loam, 0 to 3 percent slopes.
Huntington silt loam, local alluvium, 0 to 3 percent slopes.
Murrill gravelly loam, 0 to 3 percent slopes.
Murrill loam, 0 to 3 percent slopes.
Wheeling silt loam, 0 to 3 percent slopes.

These soils are well suited to a wide range of crops. Under proper management they produce excellent yields of corn, tobacco, wheat, barley, tomatoes, hay, and pasture. Most of these soils are not suited to potatoes or other root crops. Ordinary good farming practices are sufficient to maintain the fertility and keep up the supply of organic matter. The rotation should be no more intensive than the following: A row crop, followed by a cover crop; another row crop; a winter grain with which a green-manure crop is seeded. On slopes of more than 2 percent, contour rows or field terraces can be used to prevent erosion and control surface water. Grassed waterways should be established in the natural drainageways.

Capability Unit I-2

These are deep, well-drained, nearly level, acid soils. They are moderately permeable, moderate to high in moisture-holding capacity, and moderately susceptible to erosion. Most of them are high in productivity, and most are easy to till.

The soils in this unit are—

Bedington silt loam, 0 to 3 percent slopes.
Birdsboro silt loam, 0 to 3 percent slopes.
Chester loam, 0 to 3 percent slopes.
Chester silt loam, 0 to 3 percent slopes.
Elioak silt loam, 0 to 3 percent slopes.

These soils are suitable for a wide range of crops. They are well suited to truck crops and orchards. The following rotation, or one less intensive, can be used: A row crop, followed by a cover crop; another row crop; a winter grain with which a green-manure crop is seeded. These soils respond well to fertilization and to practices that maintain the supply of organic matter. They are likely to need potash and, if alfalfa is grown, boron. To prevent erosion and conserve water, grassed waterways should be established in the natural drainageways, and slopes of more than 2 percent should be protected by contour stripcropping. Field terraces can also be used to control runoff.

Capability Unit I-3

This unit consists of nearly level bottom-land soils that are deep, well drained, and highly productive, but subject to occasional flooding. They are medium textured and are moderately high in water-holding capacity. Streambank erosion is a problem in some areas.

The soils in this unit are—

Congaree silt loam, 0 to 3 percent slopes.
Huntington fine sandy loam, 0 to 3 percent slopes.
Huntington silt loam, 0 to 3 percent slopes.

These soils are suited to a wide range of crops. They are especially well suited to corn, hay, and pasture. To maintain the organic-matter supply and keep the soils in good tilth, a rotation no more intensive than the following should be used: A row crop, followed by a cover crop; another row crop; a small grain with which a green-manure crop is seeded. Slopes of more than 2 percent should be farmed on the contour. Grassed waterways should be established in natural drainageways. It is especially important to keep cover crops on these soils during the seasons when floods are likely to occur.

Capability Unit IIe-1

These are deep, well-drained, nearly level to gently sloping, limestone soils. They are medium textured and moderately permeable. They are moderately susceptible to erosion. Some have lost up to three-fourths of their original surface soil. The productivity and the moisture-storing capacity are both high.

The soils in this unit are—

Duffield silt loam, 0 to 3 percent slopes, moderately eroded.
Duffield silt loam, 3 to 6 percent slopes.
Duffield silt loam, 3 to 6 percent slopes, moderately eroded.
Duffield gravelly silt loam, 0 to 3 percent slopes, moderately eroded.
Duffield gravelly silt loam, 3 to 6 percent slopes.
Duffield gravelly silt loam, 3 to 6 percent slopes, moderately eroded.
Elk gravelly silt loam, 3 to 6 percent slopes, moderately eroded.
Hagerstown silt loam, 0 to 3 percent slopes, moderately eroded.
Hagerstown silt loam, 3 to 6 percent slopes.
Hagerstown silt loam, 3 to 6 percent slopes, moderately eroded.
Murrill gravelly loam, 3 to 8 percent slopes.
Murrill gravelly loam, 3 to 8 percent slopes, moderately eroded.
Murrill loam, 3 to 8 percent slopes.
Murrill loam, 3 to 8 percent slopes, moderately eroded.
Wheeling silt loam, 3 to 6 percent slopes, moderately eroded.

These soils are suited to a wide range of crops, including tobacco and legume hay. They are not well suited to potatoes or other root crops. Management of these soils for long-term productivity requires use of fertilizers, maintenance of the organic-matter supply, conservation of soil moisture, maintenance of tilth, and control of erosion. The following rotation will supply organic matter and help maintain tilth: A row crop, followed by a cover crop; another row crop; a crop of winter grain; hay. Terracing fields, strip-cropping on the contour, and cultivating on the contour will control erosion and save moisture. Diversion terraces should be installed to protect long slopes or lower slopes. The natural drainageways should be sodded and provided with outlets to carry excess surface water away safely.

Capability Unit IIe-2

These are shallow, well-drained, gently sloping soils developed from micaceous limestone. They are highly erodible and have lost up to three-fourths of their original surface soil. They are medium textured and moderately permeable. The productivity is high but the water-holding capacity is low.

The soils in this unit are—

Hollinger silt loam, 3 to 8 percent slopes, moderately eroded.
Pequea silt loam, 3 to 8 percent slopes, moderately eroded.

These soils are only fairly well suited to general farm crops. They are best suited to deep-rooted legumes for hay. The rotation should not be more intensive than the following: A row crop; a crop of winter grain; 2 years of hay. Field terraces or contour strips are needed to conserve moisture. Contour cultivation may be enough on very short slopes. On very long slopes, diversion terraces are needed to prevent runoff from damaging the contour strips or terraces. Adequate outlets should be prepared and sodded before terraces are built. Grassed waterways should be established in the natural drainageways.

Capability Unit IIe-3

These are deep, well-drained, nearly level to gently sloping soils that developed from micaceous limestone. They are very susceptible to erosion, and some of them have lost as much as one-half of their original surface soil. The productivity is high, and the water-holding capacity is moderately high. Permeability is moderate.

The soils in this unit are—

Conestoga silt loam, 0 to 3 percent slopes.
Conestoga silt loam, 3 to 6 percent slopes.
Conestoga silt loam, 3 to 6 percent slopes, moderately eroded.
Letort silt loam, 0 to 3 percent slopes.
Letort silt loam, 3 to 6 percent slopes, moderately eroded.

These soils are well suited to a wide range of rotation crops, especially tobacco. They need management that will maintain fertility, supply organic matter, prevent erosion, and conserve moisture. The rotation should be no more intensive than the following: A row crop, followed by a cover crop; another row crop; a green-manure crop seeded in winter grain. Short slopes can be protected by contour cultivation. On longer slopes, contour strips or field terraces are needed. Diversion terraces should be constructed to protect very long slopes and areas where surface water accumulates. Outlets should be provided before terraces are built. Grassed waterways should be established in the natural drainageways.

Capability Unit IIe-4

This unit consists of deep to moderately deep, well-drained, nearly level to gently sloping, acid soils. They are moderately to highly susceptible to erosion. Some of them have lost up to three-fourths of their original surface soil. The productivity is medium to high. The moisture-holding capacity is moderate to high. These soils are easy to work.

The soils in this unit are—

Bedington silt loam, 3 to 8 percent slopes, moderately eroded.
Birdsboro silt loam, 3 to 6 percent slopes, moderately eroded.
Brecknock silt loam, 0 to 3 percent slopes.
Brecknock silt loam, 3 to 8 percent slopes, moderately eroded.
Brecknock slaty silt loam, 0 to 3 percent slopes.
Brecknock slaty silt loam, 3 to 8 percent slopes.
Brecknock slaty silt loam, 3 to 8 percent slopes, moderately eroded.
Chester loam, 3 to 6 percent slopes.
Chester loam, 3 to 6 percent slopes, moderately eroded.
Chester silt loam, 3 to 6 percent slopes.
Chester silt loam, 3 to 6 percent slopes, moderately eroded.
Edgemont channery loam, 0 to 3 percent slopes.
Edgemont channery loam, 3 to 8 percent slopes.
Edgemont channery loam, 3 to 8 percent slopes, moderately eroded.
Edgemont channery silt loam, 0 to 3 percent slopes.
Edgemont channery silt loam, 3 to 8 percent slopes.
Edgemont channery silt loam, 3 to 8 percent slopes, moderately eroded.
Edgemont loam, 0 to 3 percent slopes.
Edgemont loam, 3 to 8 percent slopes.
Edgemont loam, 3 to 8 percent slopes, moderately eroded.
Elioak silt loam, 3 to 6 percent slopes.
Elioak silt loam, 3 to 6 percent slopes, moderately eroded.
Glenelg silt loam, 3 to 6 percent slopes, moderately eroded.
Lansdale gravelly loam, 0 to 3 percent slopes.
Lansdale gravelly loam, 3 to 8 percent slopes, moderately eroded.
Lansdale loam, 0 to 3 percent slopes.
Lansdale loam, 3 to 8 percent slopes.
Lansdale loam, 3 to 8 percent slopes, moderately eroded.
Montalto channery silt loam, 0 to 3 percent slopes.

Montalto channery silt loam, 3 to 8 percent slopes.
Neshaminy silt loam, 0 to 3 percent slopes.
Neshaminy silt loam, 3 to 6 percent slopes.
Whiteford slaty silt loam, 3 to 8 percent slopes, moderately eroded.

These soils are well suited to general rotation crops if they are managed so as to control erosion, conserve moisture, maintain fertility, supply organic matter, and preserve the tilth. The rotation should be no more intensive than the following: A row crop, followed by a cover crop; another row crop; a crop of winter grain; and hay. A less intensive 3-year rotation, consisting of a row crop, winter wheat, and hay, is better.

These soils respond well to generous applications of fertilizer. They are likely to need potash and, if alfalfa is grown, boron. Field terraces or contour strips are needed to conserve moisture and prevent erosion. Contour cultivation is enough protection for very short slopes. On long slopes, diversion terraces are needed to keep runoff from washing out the terrace systems or contour strips. Outlets should be provided before terraces are built. Sod waterways should be established in the natural drainageways.

Capability Unit IIe-5

This unit consists of moderately deep to shallow, well-drained, gently sloping to nearly level, acid soils. They developed from acid shale, sandstone, or schist. They are moderately to highly susceptible to erosion, and some of them have already lost three-fourths of their original surface soil. They are medium textured and very permeable. The water-holding capacity is medium to low. The productivity is moderate.

The soils in this unit are—

Berks shaly silt loam, 0 to 3 percent slopes.
Berks shaly silt loam, 3 to 8 percent slopes.
Berks shaly silt loam, 3 to 8 percent slopes, moderately eroded.
Berks silt loam, brown subsoil, 0 to 3 percent slopes.
Berks silt loam, brown subsoil, 3 to 8 percent slopes.
Berks silt loam, brown subsoil, 3 to 8 percent slopes, moderately eroded.
Cardiff slaty silt loam, 0 to 3 percent slopes.
Cardiff slaty silt loam, 3 to 8 percent slopes, moderately eroded.
Manor channery loam, 3 to 8 percent slopes, moderately eroded.
Manor channery silt loam, 3 to 8 percent slopes.
Manor channery silt loam, 3 to 8 percent slopes, moderately eroded.
Manor silt loam, 3 to 8 percent slopes, moderately eroded.
Penn gravelly loam, 0 to 3 percent slopes.
Penn gravelly loam, 3 to 8 percent slopes.
Penn gravelly loam, 3 to 8 percent slopes, moderately eroded.
Penn gravelly silt loam, 0 to 3 percent slopes.
Penn gravelly silt loam, 3 to 8 percent slopes.
Penn gravelly silt loam, 3 to 8 percent slopes, moderately eroded.
Penn loam, 0 to 3 percent slopes.
Penn loam, 3 to 8 percent slopes, moderately eroded.
Penn silt loam, 0 to 3 percent slopes.
Penn silt loam, 0 to 3 percent slopes, moderately eroded.
Penn silt loam, 3 to 8 percent slopes.
Penn silt loam, 3 to 8 percent slopes, moderately eroded.
Penn-Lansdale gravelly loams, 0 to 3 percent slopes.
Penn-Lansdale gravelly loams, 3 to 8 percent slopes, moderately eroded.
Penn-Lansdale loams, 0 to 3 percent slopes.
Penn-Lansdale loams, 3 to 8 percent slopes, moderately eroded.

These soils are fairly well suited to general rotation crops, but they are a little too droughty to be good for bluegrass pasture. Fertilizer and lime should be applied. Conservation measures are needed to prevent and control erosion, maintain good tilth, and conserve moisture. A 3-year rotation, consisting of a row crop, a crop of winter grain, and hay, will check erosion and build up the supply of organic matter. Field terraces or contour strips control runoff, conserve water, and prevent erosion. Contour cultivation is enough protection for short slopes. Very long slopes should be protected by diversion terraces to keep accumulated runoff from damaging terraces or contour strips. Adequate outlets should be ready before diversion terraces are built. Grassed waterways should be established in natural drainageways and old gullies.

Capability Unit IIe-6

This unit consists of deep, well-drained, nearly level to gently sloping, acid soils. They are moderately susceptible to erosion. Some of them have lost as much as half of their original surface soil. These soils are rapidly permeable and have a low water-holding capacity. They are moderately productive and have a deep rooting zone.

The soils in this unit are—

Chester channery sandy loam, 0 to 3 percent slopes.
Chester channery sandy loam, 3 to 6 percent slopes.
Chester channery sandy loam, 3 to 6 percent slopes, moderately eroded.
Lansdale sandy loam, 0 to 3 percent slopes.
Lansdale sandy loam, 3 to 8 percent slopes.
Lansdale sandy loam, 3 to 8 percent slopes, moderately eroded.
Lewisberry gravelly sandy loam, 0 to 3 percent slopes.
Lewisberry gravelly sandy loam, 3 to 8 percent slopes, moderately eroded.

These soils are best suited to deep-rooted crops, such as alfalfa and orchard fruits. They need management that will control erosion, maintain fertility, supply organic matter, and conserve moisture. To maintain the supply of organic matter, a rotation no more intensive than the following should be used: A row crop, followed by a cover crop; another row crop; a crop of winter grain; 2 years of hay. A less intensive rotation, consisting of one row crop, one crop of winter grain, and hay, would be better. Most fields need to be terraced or stripcropped on the contour to conserve moisture and control runoff. On short slopes, contour cultivation gives enough protection. Long slopes need diversion terraces to protect contour strips and terrace systems from concentrations of surface water. Outlets should be established and in good condition before terraces are built. Sod waterways should be established and maintained in natural depressions where surface water collects.

Capability Unit IIw-1

This unit consists of deep, moderately well drained, level or gently sloping, acid soils. They are moderately susceptible to erosion, but they have not lost more than one-half of their original surface soil. They are medium textured, moderately permeable, and have a

high water-holding capacity. The productivity, is moderately high, but the soils are cold and wet until late in the spring.

The soils in this unit are—

Blairton silt loam, 0 to 3 percent slopes.
Blairton silt loam, 3 to 8 percent slopes.
Edgemont silt loam, moderately well drained variant, 0 to 3 percent slopes.
Glenville silt loam, 0 to 3 percent slopes.
Glenville silt loam, 3 to 6 percent slopes.
Readington loam, 0 to 3 percent slopes.
Readington loam, 3 to 8 percent slopes.

These soils will produce general farm crops, but they are best suited to hay or pasture. They are not suited to potatoes, winter grain, or alfalfa. To maintain the supply of organic matter, a rotation no more intensive than the following should be used: A row crop, followed by a cover crop; another row crop; a small grain; 2 years of hay. A less intensive rotation, consisting of a row crop, a small grain, and 2 years of hay, would be better. Forage crops should consist of moisture-tolerant grasses and legumes. Lime and fertilizer are commonly required on these soils.

Drainage terraces or strips will help to remove excess surface and subsurface water without causing erosion. Diversion terraces can be built to intercept runoff from higher land nearby. Waterways should be sodded and outlets established before terraces are built. Tile drains can be used to remove subsurface water if adequate outlets are available. Flat land can be bedded if other means of drainage are not practical.

Capability Unit IIw-2

This unit consists of deep, moderately well drained to somewhat poorly drained, nearly level to gently sloping soils. They are moderately susceptible to erosion, but have not lost more than one-half of their original surface soil through erosion. The texture is medium, the permeability is moderate, and the water-holding capacity is high. These soils are highly productive, but they are somewhat wet in the spring.

The soils in this unit are—

Lawrence silt loam, 0 to 3 percent slopes.
Lindside silt loam, local alluvium, 0 to 3 percent slopes.
Lindside silt loam, local alluvium, 3 to 6 percent slopes.
Sciotoville silt loam, 0 to 3 percent slopes.
Sciotoville silt loam, 3 to 6 percent slopes.

These soils are best suited to moisture-tolerant grasses and legumes for hay or pasture. They are not suited to alfalfa, winter grain, or potatoes because they are too wet in the spring. The rotation should not be more intensive than the following: A row crop, followed by a cover crop; another row crop; a small grain; and hay.

The principal management problem is removing surface and subsurface water without causing erosion. Drainage-type terraces or graded strips are needed. Runoff water from higher land should be intercepted by diversion terraces. Outlets and grassed waterways should be built and sodded before terraces are constructed. Flat areas that are difficult to drain by other means can be bedded.

Capability Unit IIw-3

This unit consists of deep, moderately well drained, nearly level soils of the flood plains. These soils developed from acid and calcareous materials. They have not lost more than one-fourth of their surface soil through erosion. Occasional flooding erodes the streambanks and washes soil from the fields. Crops are damaged by new deposits of soil material. These soils are medium textured and have a moderate water-holding capacity. The productivity is moderately high.

The soils in this unit are—

Chewacla silt loam, 0 to 3 percent slopes.
Lindside silt loam, 0 to 3 percent slopes.
Rowland and Bermudian silt loams, 0 to 3 percent slopes.

These soils are best suited to pasture or hay. The moderately high water table keeps the lower subsoil waterlogged and limits the depth of the rooting zone. Moisture-tolerant plants can be grown, but not potatoes, alfalfa, or orchard crops.

To maintain the supply of organic matter, a rotation no more intensive than the following should be used: A row crop, followed by a cover crop; a crop of spring grain; 1 year of hay.

A major management problem is removing surface and subsurface water without causing erosion. In most places, open ditches or tile can be used for subsurface drainage. Diversion terraces may be needed to intercept surface water so that it will not accumulate in low areas. Outlets and waterways should be graded and well sodded before terraces are constructed or graded strips installed. Fields that are too wet to cultivate and difficult to drain should be used for pasture or meadow.

The Bermudian soils that are mapped with Rowland soils can be managed in the same way as the soils in capability unit I–3 if the areas are large enough to make separate management practical.

Capability Unit IIIe-1

This unit consists of deep, well-drained, sloping, limestone soils. They are moderately susceptible to erosion, and they have lost up to three-fourths of their original surface soil. They are medium textured and moderately permeable. They hold moisture well. The productivity is high.

The soils in this unit are—

Duffield gravelly silt loam, 6 to 12 percent slopes, moderately eroded.
Duffield silt loam, 6 to 12 percent slopes.
Duffield silt loam, 6 to 12 percent slopes, moderately eroded.
Elk gravelly silt loam, 6 to 12 percent slopes, moderately eroded.
Hagerstown silt loam, 6 to 12 percent slopes, moderately eroded.
Murrill gravelly loam, 8 to 15 percent slopes.
Murrill gravelly loam, 8 to 15 percent slopes, moderately eroded.
Murrill loam, 8 to 15 percent slopes, moderately eroded.
Wheeling silt loam, 6 to 12 percent slopes, moderately eroded.

These soils are excellent for hay and pasture. If protected from erosion, they are suitable for rotation crops. Corn and tobacco can be grown, but these soils are not well suited to potatoes or other root crops.

The principal management requirements are control of erosion, maintenance of fertility, and conservation of organic matter and moisture. A rotation like the following will supply organic matter and make the soil more resistant to erosion: A row crop; a winter grain; 2 years of hay. Diversion terraces are needed on long slopes to protect the systems of terraces and contour strips from damage by runoff. On shorter slopes, contour strips and field terraces provide enough protection. Waterways and outlets should be sodded.

Capability Unit IIIe-2

This unit consists of shallow, well-drained, gently to moderately sloping soils that developed from micaceous limestone. They are very highly erodible and have already lost up to three-fourths of their original surface soil. They are medium textured and moderately permeable. The water-holding capacity is low. The productivity is high.

The soils in this unit are—

Hollinger silt loam, 8 to 15 percent slopes, moderately eroded.
Pequea silt loam, 8 to 15 percent slopes, moderately eroded.

These soils are fairly well suited to general crops but are best suited to deep-rooted legumes. The rotation should not be more intensive than the following: A row crop; a winter grain; 2 years of hay. Controlling erosion and conserving moisture and organic matter are the main management problems. Contour strips or field terraces are needed. Diversion terraces should be constructed to control runoff. Waterways and outlets should be sodded before the terraces are built. On very short slopes, contour cultivation may give sufficient protection.

Capability Unit IIIe-3

This unit consists of deep, well-drained, gently sloping to moderately sloping soils that have developed from micaceous limestone. They are very susceptible to erosion. Most of them have lost as much as three-fourths of their original surface soil. They have moderate permeability and moderately high water-holding capacity. They are productive.

The soils in this unit are—

Conestoga silt loam, 6 to 12 percent slopes.
Conestoga silt loam, 6 to 12 percent slopes, moderately eroded.
Letort silt loam, 6 to 12 percent slopes, moderately eroded.

These soils are suited to a wide range of farm and truck crops. They are well suited to tobacco. They need management that will prevent further erosion, preserve tilth, and maintain the supply of organic matter. The rotation should not be more intensive than the following: A row crop; a winter grain; 2 years of hay. On long slopes, diversion terraces are needed to check runoff. Contour strips or field terraces will help conserve moisture. Safe outlets for water should be provided before terraces are constructed. Grassed waterways should be established in natural drainageways and old gullies.

Capability Unit IIIe-4

The only soil in this unit is Lawrence silt loam, 3 to 6 percent slopes, moderately eroded. It is a deep, moderately well drained to somewhat poorly drained, moderately sloping soil that developed from limestone. It is moderately susceptible to erosion and has already lost up to three-fourths of its original surface soil. It is medium textured and has a high water-holding capacity. It is only moderately permeable. A tight layer in the subsoil slows the movement of water and causes frost heaving in winter. The productivity is high.

This soil is best suited to hay and pasture. It is fairly well suited to general crops. It is not suited to winter grain, potatoes, or alfalfa. The principal management needs are drainage, erosion control, and maintenance of the organic-matter supply. The rotation should not be more intensive than the following: A row crop, followed by a cover crop; a small grain; 2 years of hay.

Drainage-type terraces, graded strips, or graded crop rows will improve drainage. Diversion terraces should be installed on long slopes to prevent damage to strips or terraces by accumulated surface water. Safe outlets should be established before terraces are constructed. Sod waterways should be shaped and seeded before graded strips or graded rows are installed. If the grade and the cover are sufficient, a tile drainage system can be installed.

Capability Unit IIIe-5

This unit consists of deep to moderately deep, well-drained, gently sloping to moderately sloping, acid soils. They are moderately to highly susceptible to erosion. Most of them have lost up to three-fourths of their original surface soil. They are medium textured and moderately permeable. Their moisture-holding capacity is moderate to high, and their productivity is medium to high.

The soils in this unit are—

Brecknock silt loam, 8 to 15 percent slopes, moderately eroded.
Brecknock slaty silt loam, 8 to 15 percent slopes, moderately eroded.
Chester loam, 6 to 12 percent slopes.
Chester loam, 6 to 12 percent slopes, moderately eroded.
Chester silt loam, 6 to 12 percent slopes.
Chester silt loam, 6 to 12 percent slopes, moderately eroded.
Edgemont channery loam, 8 to 15 percent slopes.
Edgemont channery loam, 8 to 15 percent slopes, moderately eroded.
Edgemont channery silt loam, 8 to 15 percent slopes.
Edgemont channery silt loam, 8 to 15 percent slopes, moderately eroded.
Edgemont loam, 8 to 15 percent slopes.
Edgemont loam, 8 to 15 percent slopes, moderately eroded.
Elioak silt loam, 6 to 12 percent slopes.
Elioak silt loam, 6 to 12 percent slopes, moderately eroded.
Glenelg silt loam, 6 to 12 percent slopes, moderately eroded.
Lansdale gravelly loam, 8 to 15 percent slopes, moderately eroded.
Lansdale loam, 8 to 15 percent slopes, moderately eroded.
Montalto channery silt loam, 3 to 8 percent slopes, moderately eroded.
Montalto channery silt loam, 8 to 15 percent slopes.
Montalto channery silt loam, 8 to 15 percent slopes, moderately eroded.

Neshaminy silt loam, 3 to 6 percent slopes, moderately eroded.
Neshaminy silt loam, 6 to 12 percent slopes.
Neshaminy silt loam, 6 to 12 percent slopes, moderately eroded.
Whiteford slaty silt loam, 8 to 15 percent slopes, moderately eroded.

These soils are suitable for the crops commonly grown in the county. They respond well to applications of fertilizer. They may need potash or boron if alfalfa is grown. Good management includes fertilization, control of erosion, conservation of moisture and organic matter, and maintenance of tilth. The rotation should be no more intensive than the following: A row crop; a winter grain; hay.

Field terraces are needed on the steeper or more intensively cropped slopes. Contour stripcropping can be used on the more gently sloping or less intensively cropped fields. On long slopes, the terraces or strips should be protected by diversion terraces. Outlets and grassed waterways should be shaped and sodded before field or diversion terraces are built.

Some of the shallower shaly and slaty soils in this unit are better suited to grass or orchards than to general crops. New orchards should be planted on contour lines or on rudimentary terraces. To prevent erosion, runoff can be diverted by terraces.

Capability Unit IIIe-6

This unit consists of moderately deep to shallow, well-drained, medium-textured, gently sloping to moderately sloping soils that developed mostly from acid sandstone and shale. They are moderately to highly susceptible to erosion, and most of them have lost up to three-fourths of their original surface soil. They are moderately productive. Their water-holding capacity is low to medium. The permeability varies.

The soils in this unit are—

Berks shaly silt loam, 8 to 15 percent slopes, moderately eroded.
Berks silt loam, brown subsoil, 8 to 15 percent slopes, moderately eroded.
Cardiff slaty silt loam, 8 to 15 percent slopes, moderately eroded.
Manor channery loam, 8 to 15 percent slopes.
Manor channery loam, 8 to 15 percent slopes, moderately eroded.
Manor channery silt loam, 8 to 15 percent slopes.
Manor channery silt loam, 8 to 15 percent slopes, moderately eroded.
Manor silt loam, 8 to 15 percent slopes.
Manor silt loam, 8 to 15 percent slopes, moderately eroded.
Penn gravelly loam, 8 to 15 percent slopes.
Penn gravelly loam, 8 to 15 percent slopes, moderately eroded.
Penn gravelly silt loam, 8 to 15 percent slopes.
Penn gravelly silt loam, 8 to 15 percent slopes, moderately eroded.
Penn loam, 8 to 15 percent slopes, moderately eroded.
Penn silt loam, 8 to 15 percent slopes.
Penn silt loam, 8 to 15 percent slopes, moderately eroded.
Penn-Lansdale gravelly loams, 8 to 15 percent slopes, moderately eroded.
Penn-Lansdale loams, 8 to 15 percent slopes.
Penn-Lansdale loams, 8 to 15 percent slopes, moderately eroded.

These soils are fairly well suited to rotation crops but are a little too droughty for bluegrass pasture. They require management practices that will control erosion, conserve moisture, maintain fertility, and supply organic matter. A rotation consisting of a row crop, a winter grain, and 2 years of hay will supply organic matter and increase resistance to erosion.

Contour strips or field terraces are needed to conserve moisture. On long slopes, runoff should be intercepted by diversion terraces before enough water accumulates to damage the terrace systems or wash out the contour strips. Safe outlets for water should be shaped and seeded before terraces are built. Sod waterways should be provided in old gullies and in depressions where runoff accumulates.

Capability Unit IIIe-7

This unit consists of deep to shallow, moderately well drained to somewhat poorly drained, nearly level to moderately sloping, medium-textured, acid soils. They are moderately susceptible to erosion, and they have already lost up to three-fourths of their original surface soil. They are moderately permeable and have a high water-holding capacity. Heaving in winter may be caused by a tight layer in the subsoil or by a seasonally high water table. The productivity is moderately high.

The soils in this unit are—

Aldino gravelly silt loam, 3 to 8 percent slopes, moderately eroded.
Aldino gravelly silt loam, 8 to 15 percent slopes, moderately eroded.
Blairton silt loam, 3 to 8 percent slopes, moderately eroded.
Blairton silt loam, 8 to 15 percent slopes, moderately eroded.
Glenville silt loam, 3 to 6 percent slopes, moderately eroded.
Glenville silt loam, 6 to 12 percent slopes, moderately eroded.
Lehigh silt loam, 3 to 8 percent slopes, moderately eroded.
Lehigh slaty silt loam, 3 to 8 percent slopes, moderately eroded.
Lehigh slaty silt loam, 8 to 15 percent slopes, moderately eroded.
Readington loam, 3 to 8 percent slopes, moderately eroded.
Readington loam, 8 to 15 percent slopes, moderately eroded.

These soils are fairly well suited to moisture-tolerant crops, but they are not suited to winter grain, alfalfa, or potatoes. The rotation should be no more intensive than the following: A row crop, a small grain, 2 years of hay. Lime and fertilizer are needed.

Both drainage and erosion control are necessary. Graded rows, graded strips, or drainage-type terraces will help to control erosion. On the more nearly level areas, drainage can be improved by bedding or terracing. Diversion terraces should be used to intercept runoff. Tile drains can be used to intercept subsurface water where there is sufficient grade and cover. Safe outlets should be provided before diversion or field terraces are constructed. Grassed waterways should be shaped and well sodded before graded strips or graded rows are installed.

Capability Unit IIIe-8

This unit consists of deep, well-drained, nearly level to moderately sloping acid soils. They are moderately susceptible to erosion, and some of them have lost up to three-fourths of their original surface soil. These soils are rapidly permeable and have a low water-

holding capacity. They are moderately productive. The rooting zone is deep.

The soils in this unit are—

Chester channery sandy loam, 6 to 12 percent slopes.
Chester channery sandy loam, 6 to 12 percent slopes, moderately eroded.
Lansdale sandy loam, 8 to 15 percent slopes.
Lewisberry gravelly sandy loam, 8 to 15 percent slopes, moderately eroded.

These soils are suited to deep-rooted crops, such as alfalfa and orchard fruits. They need management that will prevent erosion, maintain tilth, maintain fertility, supply organic matter, and conserve moisture. The rotation should not be more intensive than the following: A row crop, a winter grain; 2 years of hay.

Field terraces or contour crop strips should be used. Short slopes can be cultivated on the contour. Long slopes will need diversion terraces to keep the strips or terraces from washing out. Outlets should be established before terraces are built. Grassed waterways should be provided in natural drainageways and depressions.

Orchards should be laid out, planted, and cultivated on the contour. Each row should be a terrace that will hold water on the soil. The trees should be in line up and down the hill to permit good air drainage.

Capability Unit IIIw-1

Only one soil, Lehigh silt loam, 0 to 3 percent slopes, is in this capability unit. This is a moderately deep, level to nearly level, moderately well drained to somewhat poorly drained, acid soil. The productivity is low. The surface texture is medium, but the lower subsoil is firm enough to make the permeability slow. This soil tends to be wet in spring and fall. It becomes cloddy and hard to till if it is worked when too wet. Water may stand on it long enough to damage crops.

This soil is fair for general rotation crops. It is better suited to hay or pasture. Only moisture-tolerant crops should be grown. Lime and fertilizer are needed.

Drainage is the most important management problem. For the better drained fields, a rotation no more intensive than the following is suitable: A row crop followed by a cover crop; another row crop; a small grain; 2 years of hay. Drainage-type terraces, graded rows, or graded strips help to prevent erosion and improve the surface drainage. Long slopes should be protected by diversion terraces. Outlets and waterways should be shaped and well sodded before terraces are built or graded strips or rows installed. Open ditches or tile systems can be used to drain wet spots or seep areas if there is enough grade for drainage and enough cover for tile.

Capability Unit IVe-1

This unit consists of deep, well-drained, strongly sloping to hilly soils. They developed from limestone or were influenced by calcareous materials. They have lost part or all of their original surface soil through moderate or severe erosion. These soils are medium textured and moderately permeable.

The soils in this unit are—

Conestoga silt loam, 3 to 6 percent slopes, severely eroded.
Conestoga silt loam, 6 to 12 percent slopes, severely eroded.
Conestoga silt loam, 12 to 18 percent slopes, moderately eroded.
Duffield silt loam, 3 to 6 percent slopes, severely eroded.
Duffield silt loam, 6 to 12 percent slopes, severely eroded.
Duffield silt loam, 12 to 18 percent slopes.
Duffield silt loam, 12 to 18 percent slopes, moderately eroded.
Duffield gravelly silt loam, 6 to 12 percent slopes, severely eroded.
Duffield gravelly silt loam, 12 to 18 percent slopes, moderately eroded.
Hagerstown silt loam, 12 to 18 percent slopes, moderately eroded.
Letort silt loam, 6 to 12 percent slopes, severely eroded.
Letort silt loam, 12 to 18 percent slopes, moderately eroded.
Murrill gravelly loam, 3 to 8 percent slopes, severely eroded.
Murrill gravelly loam, 15 to 25 percent slopes, moderately eroded.
Wheeling silt loam, 12 to 18 percent slopes.
Wheeling silt loam, 12 to 18 percent slopes, moderately eroded.

These soils are best suited to permanent hay or pasture, but they can be cultivated occasionally. The rotation should be no more intensive than the following: A row crop, a winter grain; 3 years of hay. Long-term hay seeded with a small grain is a better rotation for these soils.

Intensive conservation is needed to control runoff, reduce erosion, conserve moisture, maintain fertility, and supply organic matter. Contour strips and field terraces are needed if the soil is cultivated. Hayfields and pastures should be reseeded in contour strips. Diversion terraces with suitable outlets should be used to intercept runoff on long slopes. Grassed waterways should be established in natural drainageways.

Capability Unit IVe-2

These are shallow, well-drained, gently to strongly sloping soils developed from micaceous limestone. They are highly susceptible to erosion. They have lost up to three-fourths of their original surface soil, and in a few places even more. They are medium textured, moderately permeable, and rather droughty.

The soils in this unit are—

Hollinger silt loam, 15 to 25 percent slopes, moderately eroded.
Pequea silt loam, 15 to 25 percent slopes, moderately eroded.

These soils are best suited to long-term hay or pasture of drought-resistant grasses and legumes. They should be protected by vegetation most of the time. If they are cultivated, the rotation should be no more intensive than the following: A small grain, followed by 5 years of hay. Cultivation should be done in contour strips. Long slopes should be protected by diversion terraces. Outlets and waterways should be shaped and seeded before the diversion terraces are constructed. Grassed waterways should be established in old gullies and in natural depressions and drainageways.

Special care is needed to prevent erosion while hayfields and pastures are being reseeded. As many undisturbed strips of hay as possible should be left be-

tween renovated strips. If practical, the seedbed should be prepared by disking instead of plowing.

Capability Unit IVe-3

This unit consists mostly of deep, well-drained, gently sloping to strongly sloping, acid soils. Most of them are highly susceptible to erosion. Part or all of the original surface layer has already been washed away. These soils are medium textured and moderately permeable.

The soils in this unit are—

Brecknock slaty silt loam, 15 to 25 percent slopes.
Brecknock slaty silt loam, 15 to 25 percent slopes, moderately eroded.
Chester loam, 6 to 12 percent slopes, severely eroded.
Chester loam, 12 to 18 percent slopes.
Chester loam, 12 to 18 percent slopes, moderately eroded.
Chester silt loam, 3 to 6 percent slopes, severely eroded.
Chester silt loam, 6 to 12 percent slopes, severely eroded.
Chester silt loam, 12 to 18 percent slopes.
Chester silt loam, 12 to 18 percent slopes, moderately eroded.
Edgemont channery loam, 3 to 8 percent slopes, severely eroded.
Edgemont channery loam, 15 to 25 percent slopes.
Edgemont channery loam, 15 to 25 percent slopes, moderately eroded.
Edgemont channery silt loam, 3 to 8 percent slopes, severely eroded.
Edgemont channery silt loam, 15 to 25 percent slopes.
Edgemont channery silt loam, 15 to 25 percent slopes, moderately eroded.
Edgemont loam, 15 to 25 percent slopes, moderately eroded.
Elioak silt loam, 6 to 12 percent slopes, severely eroded.
Elioak silt loam, 12 to 18 percent slopes, moderately eroded.
Glenelg silt loam, 6 to 12 percent slopes, severely eroded.
Glenelg silt loam, 12 to 18 percent slopes, moderately eroded.
Lansdale gravelly loam, 15 to 25 percent slopes, moderately eroded.
Lansdale loam, 15 to 25 percent slopes.
Montalto channery silt loam, 15 to 25 percent slopes.
Montalto channery silt loam, 15 to 25 percent slopes, moderately eroded.
Neshaminy silt loam, 6 to 12 percent slopes, severely eroded.
Whiteford slaty silt loam, 15 to 25 percent slopes, moderately eroded.

Because of the risk of erosion, many areas of these soils should be retired to permanent hay or pasture. Some areas are suited to orchards. These soils should be cultivated only in very long rotations and under careful management to control erosion and conserve moisture. The most intensive rotation that should be used is the following: A row crop; a winter grain; 4 years of hay. Lime and fertilizer are required.

All cultivation should be in contour strips. Long slopes should be protected by diversion terraces to intercept runoff. Safe outlets should be established before terraces are constructed. Sod waterways should be established in the natural drainageways. Severely eroded spots or old gullies can be graded and then mulched and seeded to get a thick stand of grass.

Hayfields should be reseeded in contour strips, with as many undisturbed strips as possible between renovated strips. If practical, these soils should be prepared for reseeding by disking instead of plowing.

New orchards should be laid out on level terraces, to conserve moisture and soil. Trees should be in line up and down the hill to improve the air drainage.

Capability Unit IVe-4

This unit consists of moderately deep to shallow, well-drained, gently sloping to strongly sloping, acid soils developed from acid shale, sandstone, or schist. They are moderately to highly susceptible to erosion. They have lost part or all of their original surface soil. They are medium textured and very permeable. The water-holding capacity is medium to low.

The soils in this unit are—

Berks shaly silt loam, 8 to 15 percent slopes, severely eroded.
Berks shaly silt loam, 15 to 25 percent slopes.
Berks shaly silt loam, 15 to 25 percent slopes, moderately eroded.
Berks silt loam, brown subsoil, 3 to 8 percent slopes, severely eroded.
Berks silt loam, brown subsoil, 15 to 25 percent slopes, moderately eroded.
Cardiff slaty silt loam, 15 to 25 percent slopes, moderately eroded.
Manor channery loam, 15 to 25 percent slopes.
Manor channery loam, 15 to 25 percent slopes, moderately eroded.
Manor channery silt loam, 3 to 8 percent slopes, severely eroded.
Manor channery silt loam, 15 to 25 percent slopes.
Manor channery silt loam, 15 to 25 percent slopes, moderately eroded.
Manor silt loam, 15 to 25 percent slopes.
Manor silt loam, 15 to 25 percent slopes, moderately eroded.
Penn gravelly loam, 3 to 8 percent slopes, severely eroded.
Penn gravelly loam, 15 to 25 percent slopes, moderately eroded.
Penn gravelly silt loam, 3 to 8 percent slopes, severely eroded.
Penn gravelly silt loam, 15 to 25 percent slopes.
Penn gravelly silt loam, 15 to 25 percent slopes, moderately eroded.
Penn loam, 3 to 8 percent slopes, severely eroded.
Penn-Lansdale gravelly loams, 15 to 25 percent slopes, moderately eroded.

These soils are best suited to permanent hay. They should be cultivated as seldom as possible because they erode easily. Lime and fertilizer requirements are fairly high. A cultivated crop should be followed by a winter grain and 5 years of hay. Diversion terraces, field terraces, and contour strips should be used. Outlets and waterways should be shaped and well sodded before terraces are built.

Hayfields should be reseeded in contour strips, with as many undisturbed strips as posible between renovated strips. Where practical, these soils should be prepared for reseeding by disking rather than by plowing. Severely eroded areas and old gullies can be graded, mulched, and seeded to get a thick stand.

New orchards should be laid out on contour terraces to conserve moisture and soil. The trees should be in line up and down the hill to permit good air drainage.

Capability Unit IVe-5

This unit consists of poorly to very poorly drained, medium-textured, moderately sloping soils that have lost up to three-fourths of their original surface soil through erosion. Permeability is slow because there is a hardpan or a heavy claypan in the subsoil. The water table is near the surface, and the soils are waterlogged part of the time. The productivity is low.

The soils in this unit are—

Croton loam, 8 to 15 percent slopes, moderately eroded.
Croton silt loam, 6 to 12 percent slopes, moderately eroded.

These soils are best suited to pasture of moisture-tolerant grasses and legumes. They need lime and fertilizer. They must be drained and also protected from erosion. Diversion terraces can be used to intercept surface and subsurface water. Pastures should be reseeded in graded strips, with as many undisturbed strips as possible between renovated strips. Waterways and outlets should be established and well sodded before terraces are built or graded strips installed. Tile drains can be installed in some areas if there are ditches or streams for outlets.

Capability Unit IVw-1

This unit consists of poorly to very poorly drained, medium-textured, gently sloping to level soils. Some of them have lost up to three-fourths of their original surface soil. Permeability is slow because there is a hardpan or heavy claypan in the subsoil. The water table is high, and the soils are waterlogged at certain seasons. The productivity is low.

The soils in this unit are—

Croton loam, 0 to 3 percent slopes.
Croton loam, 3 to 8 percent slopes, moderately eroded.
Croton silt loam, 0 to 3 percent slopes.
Croton silt loam, 3 to 6 percent slopes.
Croton silt loam, 3 to 6 percent slopes, moderately eroded.

These soils are too wet to be good for crops. If drained, limed, and fertilized, they are suited to moisture-tolerant grasses and legumes for pasture or hay. Open ditches or bedding systems will help to remove surface water. Tile drains are not always successful because of inadequate cover and lack of convenient outlets. Fields should be protected from runoff from higher ground by diversion terraces. In some places drainage-type terraces can be used. Safe outlets for water should be constructed and sodded over before terraces or graded strips are installed. When pastures are renovated, the grassed waterways should not be disturbed.

Capability Unit VIe-1

This unit consists of steep soils that are subject to severe erosion. They are at least moderately deep. The available moisture-holding capacity is fairly good. These soils are medium textured and moderately permeable. They contain lime.

The soils in this unit are—

Conestoga silt loam, 12 to 18 percent slopes, severely eroded.
Conestoga silt loam, 18 to 25 percent slopes, moderately eroded.
Duffield silt loam, 12 to 18 percent slopes, severely eroded.
Letort silt loam, 18 to 25 percent slopes, moderately eroded.

These soils should be used for permanent pasture or for woods. They need careful management to control erosion. Pastures should be reseeded in contour strips, with as many strips of undisturbed grass between renovated strips as possible. Where practical a trashy seedbed should be prepared by disking. Old gullies should be sloped, mulched, and seeded. Diversion terraces should be established to intercept runoff on long slopes. Grassed waterways should be left in sod when old pastures are renovated.

Capability Unit VIe-2

This unit consists of steep or severely to very severely eroded soils. They vary in depth, drainage, acidity, productivity, texture, erodibility, permeability, and water-holding capacity.

The soils in this unit are—

Brecknock slaty silt loam, 25 to 35 percent slopes.
Edgemont channery loam, 8 to 15 percent slopes, severely eroded.
Edgemont channery loam, 25 to 35 percent slopes.
Edgemont channery loam, 25 to 35 percent slopes, moderately eroded.
Edgemont channery silt loam, 8 to 15 percent slopes, severely eroded.
Edgemont loam, 8 to 15 percent slopes, severely eroded.
Elioak silt loam, 12 to 18 percent slopes, severely eroded.
Glenelg channery sandy loam, 6 to 12 percent slopes, severely eroded.
Glenelg silt loam, 18 to 25 percent slopes.
Glenelg silt loam, 18 to 25 percent slopes, moderately eroded.
Lansdale gravelly loam, 8 to 15 percent slopes, severely eroded.
Lehigh slaty silt loam, 15 to 25 percent slopes, moderately eroded.
Lewisberry gravelly sandy loam, 15 to 25 percent slopes, moderately eroded.

These soils are not suited to cultivated crops. They should be retired to grass and tilled as little as possible. They are best suited to pasture or woods.

Diversion terraces should be built on the gently sloping to moderately sloping areas to control runoff and erosion. Diversion terraces are also needed above the heads of gullies to prevent further erosion. Safe outlets for water should be completed before the diversion terraces are constructed.

Pastures should be reseeded only when necessary. They should be renovated in contour strips, with undisturbed strips between the reseeded strips. Where practical, they should be disked instead of plowed. New orchards should be laid out on the contour to conserve moisture and prevent erosion.

Capability Unit VIe-3

This unit consists of moderately deep to shallow, well-drained, steep or severely eroded soils, most of which developed from acid sandstone and shale. Their texture, erodibility, and permeability vary considerably. All of them are droughty.

The soils in this unit are—

Berks shaly silt loam, 25 to 35 percent slopes.
Berks shaly silt loam, 25 to 35 percent slopes, moderately eroded.
Cardiff slaty silt loam, 25 to 35 percent slopes.
Hollinger silt loam, 25 to 35 percent slopes.
Manor channery silt loam, 8 to 15 percent slopes, severely eroded.
Manor soils, 25 to 40 percent slopes.
Manor soils, 25 to 40 percent slopes, moderately eroded.
Manor silt loam, 8 to 15 percent slopes, severely eroded.
Penn gravelly loam, 8 to 15 percent slopes, severely eroded.
Penn gravelly silt loam, 8 to 15 percent slopes, severely eroded.
Penn loam, 8 to 15 percent slopes, severely eroded.

Penn soils, 25 to 35 percent slopes, moderately eroded.
Penn silt loam, 8 to 15 percent slopes, severely eroded.
Pequea silt loam, 15 to 25 percent slopes, severely eroded.
Pequea silt loam, 25 to 35 percent slopes, moderately eroded.
Steinsburg gravelly loam, 8 to 15 percent slopes, severely eroded.
Steinsburg gravelly loam, 25 to 35 percent slopes.

These soils are best suited to pasture. They should be kept in grass and tilled as seldom as possible. Diversion terraces should be built on the gently sloping to moderately sloping areas and above the heads of gullies. Safe outlets for the water should be completed before the diversion terraces are constructed. Pastures should be reseeded only when necessary. They should be prepared for reseeding by disking in contour strips, leaving undisturbed areas between renovated strips.

Capability Unit VIs-1

This unit consists of deep, well-drained, nearly level to moderately sloping, stony soils. They are moderately permeable and have a high water-holding capacity. They are productive but they are stony to very stony.

The soils in this unit are—

Chester stony loam, 0 to 6 percent slopes.
Chester stony loam, 6 to 12 percent slopes.
Montalto very stony silt loam, 0 to 8 percent slopes.
Montalto very stony silt loam, 8 to 15 percent slopes.

These soils are too stony to be cultivated, but they are of limited use for pasture or for woods. They should be seeded to tall grasses and legumes. Removing the stones from the surface will make it possible to improve the pastures.

Capability Unit VIw-1

This unit consists of poorly drained to very poorly drained, level to gently sloping soils of the flood plains. These soils vary considerably in productivity, texture, permeability, and moisture-holding capacity. They have a high water table and are frequently flooded. The rooting zone is shallow. Deposition of alluvium is more common than erosion, although some stream gouging and bank erosion occur.

The soils in this unit are—

Alluvial land.
Bowmansville silt loam, 0 to 6 percent slopes.
Melvin silt loam, 0 to 3 percent slopes.
Wehadkee silt loam, 0 to 3 percent slopes.

These soils should be kept in permanent sod. They are best suited to pasture of moisture-tolerant grasses and legumes.

Drainage is needed to remove surface water and lower the water table. If there is enough grade, drainage can be improved by open ditches or bedding systems. Tile can be used for subsurface drainage if there is enough cover for the tile. Diversion ditches or terraces can be used to intercept runoff from higher soils nearby. Safe outlets should be provided before the diversions are constructed. Drainageways should be kept in sod when pastures are being renovated.

Capability Unit VIw-2

This unit consists of poorly drained to very poorly drained, medium-textured, nearly level to moderately sloping residual soils. They are slowly permeable and have a high water table. Their productivity is low.

The soils in this unit are—

Watchung silt loam, 0 to 3 percent slopes.
Watchung silt loam, 3 to 8 percent slopes.
Watchung silt loam, 3 to 8 percent slopes, moderately eroded.

These soils are fairly well suited to pasture. The principal management problem is removing surface and subsurface water without causing erosion. Diversion terraces should be built to intercept runoff above the wet areas. Drainage of level or gently sloping fields can be improved by bedding systems or by drainage-type terraces. In some locations open ditches can be used for both surface and subsurface drainage. Safe outlets for surplus water should be prepared before diversion ditches or terraces are built. Waterways should be kept in grass to prevent erosion.

Tile drainage can be used in some places, but it is not generally practical because of the heavy, slowly permeable subsoil.

Capability Unit VIIe-1

This unit consists of steep, well-drained soils underlain by limestone. Their moisture-storing capacity is fair to good.

The soils in this unit are—

Duffield silt loam, 18 to 30 percent slopes.
Hagerstown silt loam, 18 to 25 percent slopes, moderately eroded.

These soils need a protective cover of trees. They produce good timber if they are properly managed.

Capability Unit VIIe-2

This unit consists of very steep or severely eroded acid soils. Some of them are stony. They hold moisture fairly well.

The soils in this unit are—

Aldino gravelly silt loam, 15 to 25 percent slopes, severely eroded.
Chester stony loam, 12 to 18 percent slopes.
Chester stony loam, 18 to 25 percent slopes.
Montalto channery silt loam, 25 to 35 percent slopes.
Montalto very stony silt loam, 15 to 25 percent slopes.
Montalto very stony silt loam, 25 to 35 percent slopes.

These soils should produce good stands of timber if properly managed. Unforested areas should be planted to trees suitable for pulpwood, for timber, or for decorative uses. Small areas should be planted to shrubs to provide shelter for wildlife and protection against erosion. These woodlands should be protected from fire and from grazing. To get sustained yields, selective cutting should be planned. Merchantable timber should be marked by a forester before cutting starts.

Capability Unit VIIe-3

The soils in this unit are steep, stony, or severely eroded or droughty.

The soils in this unit are—

Berks shaly silt loam, 15 to 25 percent slopes, severely eroded.
Berks shaly silt loam, 25 to 35 percent slopes, severely eroded.
Brecknock stony silt loam, 0 to 8 percent slopes.
Brecknock stony silt loam, 8 to 15 percent slopes.
Edgemont channery loam, 15 to 25 percent slopes, severely eroded.
Edgemont channery loam, 25 to 35 percent slopes, severely eroded.
Edgemont channery silt loam, 15 to 25 percent slopes, severely eroded.
Edgemont loam, 15 to 25 percent slopes, severely eroded.
Edgemont very stony loam, 0 to 8 percent slopes.
Edgemont very stony loam, 8 to 15 percent slopes.
Edgemont very stony loam, 15 to 25 percent slopes.
Edgemont very stony loam, 25 to 40 percent slopes.
Glenelg channery sandy loam, 12 to 18 percent slopes, severely eroded.
Glenelg channery sandy loam, 18 to 25 percent slopes, severely eroded.
Glenelg silt loam, 12 to 18 percent slopes, severely eroded.
Glenelg silt loam, 18 to 25 percent slopes, severely eroded.
Lansdale gravelly loam, 15 to 25 percent slopes, severely eroded.
Lansdale gravelly loam, 25 to 40 percent slopes.
Lansdale stony sandy loam, 0 to 8 percent slopes.
Lansdale stony sandy loam, 8 to 15 percent slopes.
Lansdale stony sandy loam, 15 to 25 percent slopes.
Lansdale stony sandy loam, 25 to 35 percent slopes.
Lewisberry stony sandy loam, 0 to 8 percent slopes.
Lewisberry stony sandy loam, 8 to 15 percent slopes.
Lewisberry stony sandy loam, 15 to 25 percent slopes.
Lewisberry stony sandy loam, 25 to 40 percent slopes.
Manor soils, 15 to 25 percent slopes, severely eroded.
Manor soils, 25 to 40 percent slopes, severely eroded.
Manor stony loam, 0 to 8 percent slopes.
Manor stony loam, 8 to 15 percent slopes.
Manor stony loam, 8 to 15 percent slopes, moderately eroded.
Manor stony loam, 15 to 25 percent slopes.
Manor stony loam, 15 to 25 percent slopes, moderately eroded.
Manor stony loam, 25 to 40 percent slopes.
Montalto extremely stony silt loam, 0 to 8 percent slopes.
Montalto extremely stony silt loam, 8 to 15 percent slopes.
Montalto extremely stony silt loam, 15 to 25 perecent slopes.
Montalto extremely stony silt loam, 25 to 35 percent slopes.
Penn gravelly loam, 15 to 25 percent slopes, severely eroded.
Penn gravelly silt loam, 15 to 25 percent slopes, severely eroded.
Penn soils, 25 to 35 percent slopes, severely eroded.
Penn stony silt loam, 0 to 8 percent slopes.
Penn stony silt loam, 8 to 15 percent slopes.
Penn stony silt loam, 8 to 15 percent slopes, moderately eroded.
Penn stony silt loam, 15 to 25 percent slopes.
Penn stony silt loam, 15 to 25 percent slopes, moderately eroded.
Penn stony silt loam, 25 to 35 percent slopes.
Pequea silt loam, 25 to 35 percent slopes, severely eroded.
Steinsburg gravelly loam, 15 to 25 percent slopes, severely eroded.

Fair yields of pulpwood can be produced with good management. The woodlands should be protected from fire and from grazing. Selective cutting should be practiced to assure sustained yields. Salable timber should be marked by a forester before cutting starts.

Unforested areas should be planted to suitable trees. Small areas should be planted to shrubs that will support wildlife, and protect the soil from erosion.

Capability Unit VIIw-1

This unit consists of poorly drained stony soils. They are—

Aldino stony silt loam, 3 to 8 percent slopes.
Aldino stony silt loam, 8 to 15 percent slopes.
Aldino stony silt loam, 15 to 25 percent slopes.
Watchung very stony silt loam, 0 to 8 percent slopes.

These soils are too wet to make good pasture. In most places they are too wet for trees, but some areas can be planted to suitable trees and shrubs. The native vegetation should be encouraged and should be protected from fire and grazing. Light cuttings of mature trees can be made under the supervision of a forester. Some areas are suitable habitats for marsh wildlife.

Capability Unit VIIIs-1

This unit consists of Riverwash and of extremely stony areas. These areas are of little value for timber and of no value for crops or pasture. They may provide shelter for wildlife or protection for watersheds. The native vegetation should be encouraged. Some areas can be planted to suitable trees or shrubs; these areas should be protected from fire and grazing.

Productivity Ratings

The soils of Lancaster County vary considerably in productivity. Some consistently produce high yields of cultivated crops, and others are better suited to less intensive use.

The actual yields in tons or bushels per acre vary on the same soils, depending on variations in management, weather, crop varieties, and diseases. The relative productivity is not the same for all crops when comparing two soils.

One of the most productive soils in the county is Duffield silt loam, 0 to 3 percent slopes. The other soils have been rated by comparing them with this soil. In table 4, a value of 100 has been assigned to the average annual yield per acre of each common crop on Duffield silt loam, 0 to 3 percent slopes, under the ordinary level of management generally followed by farmers of the county during the 5 years from 1952 through 1956. The soils of the county are listed alphabetically, and the percentage of the standard yield that is likely from each soil under the same conditions is listed as a productivity rating. The productivity rating for each soil for a given crop will tend to remain constant as long as changes in management, plant breeding, fertilization, and economic conditions affect all soils alike.

The yields given are not presumed to be the maximum obtainable. Yields may be greater during years of favorable rainfall or on the better managed farms. Yields from Duffield silt loam, 0 to 3 percent slopes, are likely to increase as new methods and crop varieties are developed, and yields from the other soils will change in proportion.

TABLE 4.—*Ratings showing the relative productivity of soils in Lancaster County, Pa., for common crops*

[The productivity rating is the percentage of a standard yield for each crop that can be obtained on a given soil under a specified level of management. The standard yield, rated at 100, is the average yield per acre obtained on Duffield silt loam, 0 to 3 percent slopes, for the 5-year period 1952 through 1956. Where no rating is given, the soil is not considered suitable for that crop]

Soil name	Corn	Wheat	Barley	Hay		Pasture		To-bacco	Toma-toes	Pota-toes	Lima beans	Peas	Or-chard	Oak and yellow-poplar
				Clover and tim-othy	Alfalfa	Tall grass-legume	Blue-grass-clover							
	(100 = 80 bu. per acre)[1]	(100 = 38 bu. per acre)	(100 = 60 bu. per acre)	(100 = 2.5 tons per acre)	(100 = 3.5 tons per acre)	(100 = 180 cow-acre-days)[2]	(100 = 90 cow-acre-days)[2]	(100 = 1700 lb. per acre)	(100 = 10 tons per acre)	(100 = 300 bu. per acre)	(100 = 1800 lb. per acre)	(100 = 2800 lb. per acre)	[3]	[3]
Aldino gravelly silt loam, 3 to 8 percent slopes, moderately eroded	35	40	------	50	------	60	60	------	------	------	------	------	------	Medium.
Aldino gravelly silt loam, 8 to 15 percent slopes, moderately eroded	33	45	------	50	------	60	60	------	------	------	------	------	------	Medium.
Aldino gravelly silt loam, 15 to 25 percent slopes, severely eroded	30	35	------	45	------	40	40	------	------	------	------	------	------	Low.
Aldino stony silt loam, 3 to 8 percent slopes	------	------	------	------	------	------	60	------	------	------	------	------	------	Medium.
Aldino stony silt loam, 8 to 15 percent slopes	------	------	------	------	------	------	60	------	------	------	------	------	------	Medium.
Aldino stony silt loam, 15 to 25 percent slopes	------	------	------	------	------	------	60	------	------	------	------	------	------	Low.
Alluvial land:														
Undrained	------	------	------	------	------	------	20	------	------	------	------	------	------	Medium.
Drained	55	40	------	------	------	70	80	------	------	------	------	------	------	Medium.
Bedington silt loam, 0 to 3 percent slopes	85	87	87	87	80	87	80	80	80	85	95	90	100	High.
Bedington silt loam, 3 to 8 percent slopes, moderately eroded	80	85	85	85	80	85	78	78	75	82	95	90	95	High.
Berks shaly silt loam, 0 to 3 percent slopes	60	85	85	85	70	85	70	65	67	70	80	90	80	High.
Berks shaly silt loam, 3 to 8 percent slopes	58	83	83	83	68	83	68	63	65	65	80	90	80	High.
Berks shaly silt loam, 3 to 8 percent slopes, moderately eroded	55	80	80	80	65	80	65	60	63	60	78	85	78	High.
Berks shaly silt loam, 8 to 15 percent slopes, moderately eroded	50	75	75	75	60	75	60	------	60	50	75	80	75	High.
Berks shaly silt loam, 8 to 15 percent slopes, severely eroded	40	60	60	60	40	40	35	------	------	------	------	------	65	High.
Berks shaly silt loam, 15 to 25 percent slopes	45	70	70	70	55	60	55	------	55	------	------	------	75	High.
Berks shaly silt loam, 15 to 25 percent slopes, moderately eroded	35	65	65	65	48	45	40	------	------	------	------	------	70	High.
Berks shaly silt loam, 15 to 25 percent slopes, severely eroded	20	40	40	50	30	35	30	------	------	------	------	------	60	High.
Berks shaly silt loam, 25 to 35 percent slopes	------	------	------	------	------	45	40	------	------	------	------	------	65	Medium.
Berks shaly silt loam, 25 to 35 percent slopes, moderately eroded	------	------	------	------	------	40	35	------	------	------	------	------	60	Medium.
Berks shaly silt loam, 25 to 35 percent slopes, severely eroded	------	------	------	------	------	30	25	------	------	------	------	------	55	Medium.
Berks silt loam, brown subsoil, 0 to 3 percent slopes	65	85	85	85	75	85	70	75	75	75	80	90	90	High.
Berks silt loam, brown subsoil, 3 to 8 percent slopes	65	85	85	85	75	85	70	75	75	75	80	90	90	High.
Berks silt loam, brown subsoil, 3 to 8 percent slopes, moderately eroded	60	80	80	80	70	80	65	70	70	70	80	90	90	High.
Berks silt loam, brown subsoil, 3 to 8 percent slopes, severely eroded	55	78	78	78	65	78	60	60	63	65	78	85	80	High.

TABLE 4.—*Ratings showing the relative productivity of soils in Lancaster County, Pa.*—Continued

Soil name	Corn	Wheat	Barley	Hay		Pasture		To-bacco	Toma-toes	Pota-toes	Lima beans	Peas	Or-chard	Oak and yellow-poplar
				Clover and tim-othy	Alfalfa	Tall grass-legume	Blue-grass-clover							
	(100 = 80 bu. per acre)[1]	(100 = 38 bu. per acre)	(100 = 60 bu. per acre)	(100 = 2.5 tons per acre)	(100 = 3.5 tons per acre)	(100 = 180 cow-acre-days)[2]	(100 = 90 cow-acre-days)[2]	(100 = 1700 lb. per acre)	(100 = 10 tons per acre)	(100 = 300 bu. per acre)	(100 = 1800 lb. per acre)	(100 = 2800 lb. per acre)	[3]	[3]
Berks silt loam, brown subsoil, 8 to 15 percent slopes, moderately eroded	55	78	78	78	65	78	60	55	63	55	78	85	80	High.
Berks silt loam, brown subsoil, 15 to 25 percent slopes, moderately eroded	40	70	70	70	55	70	55	------	------	------	------	------	75	High.
Birdsboro silt loam, 0 to 3 percent slopes	90	95	90	90	80	95	90	85	90	90	------	------	------	High.
Birdsboro silt loam, 3 to 6 percent slopes, moderately eroded	85	95	90	85	80	90	85	80	85	90	------	------	------	High.
Blairton silt loam, 0 to 3 percent slopes	70	50	30	75	40	80	80	------	60	------	------	------	------	High.
Blairton silt loam, 3 to 8 percent slopes	75	55	35	80	50	80	85	------	65	------	------	------	------	High.
Blairton silt loam, 3 to 8 percent slopes, moderately eroded	70	50	30	80	45	75	80	------	65	------	------	------	------	High.
Blairton silt loam, 8 to 15 percent slopes, moderately eroded	65	45	27	75	40	70	75	------	60	------	------	------	------	High.
Bowmansville silt loam, 0 to 6 percent slopes:														
Undrained	------	------	------	------	------	70	75	------	------	------	------	------	------	High.
Drained	80	90	80	90	78	90	90	75	90	85	------	75	------	------
Brecknock silt loam, 0 to 3 percent slopes	60	80	75	85	75	85	70	70	90	75	80	85	90	High.
Brecknock silt loam, 3 to 8 percent slopes, moderately eroded	55	75	70	80	70	75	65	65	65	60	75	80	80	High.
Brecknock silt loam, 8 to 15 percent slopes, moderately eroded	40	65	60	70	63	70	60	60	55	55	65	75	75	High.
Brecknock slaty silt loam, 0 to 3 percent slopes	58	80	80	90	78	88	85	72	85	85	80	80	90	High.
Brecknock slaty silt loam, 3 to 8 percent slopes	56	78	73	85	75	83	70	67	70	75	80	75	85	High.
Brecknock slaty silt loam, 3 to 8 percent slopes, moderately eroded	53	75	70	63	70	75	70	62	65	65	75	75	85	High.
Brecknock slaty silt loam, 8 to 15 percent slopes, moderately eroded	50	68	60	70	63	70	60	60	55	55	65	70	80	High.
Brecknock slaty silt loam, 15 to 25 percent slopes	45	65	58	70	63	65	55	------	50	50	------	------	75	High.
Brecknock slaty silt loam, 15 to 25 percent slopes, moderately eroded	40	60	55	65	60	60	50	------	50	------	------	------	75	High.
Brecknock slaty silt loam, 25 to 35 percent slopes	------	------	------	------	------	50	40	------	------	------	------	------	------	High.
Brecknock stony silt loam, 0 to 8 percent slopes	------	------	------	------	------	------	75	------	------	------	------	------	------	High.
Brecknock stony silt loam, 8 to 15 percent slopes	------	------	------	------	------	------	65	------	------	------	------	------	------	High.
Cardiff slaty silt loam, 0 to 3 percent slopes	65	85	85	85	75	85	70	75	75	75	80	90	90	High.
Cardiff slaty silt loam, 3 to 8 percent slopes, moderately eroded	60	80	80	80	70	80	65	70	70	70	80	90	90	High.
Cardiff slaty silt loam, 8 to 15 percent slopes, moderately eroded	55	75	75	78	65	78	60	60	63	65	78	85	80	High.
Cardiff slaty silt loam, 15 to 25 percent slopes, moderately eroded	40	70	70	70	60	70	55	55	63	55	78	80	75	High.
Cardiff slaty silt loam, 25 to 35 percent slopes	------	------	------	------	------	60	45	------	------	------	------	------	------	High.

TABLE 4.—*Ratings showing the relative productivity of soils in Lancaster County, Pa.*—Continued

Soil name	Corn	Wheat	Barley	Hay		Pasture		To-bacco	Toma-toes	Pota-toes	Lima beans	Peas	Or-chard	Oak and yellow-poplar
				Clover and tim-othy	Alfalfa	Tall grass-legume	Blue-grass-clover							
	(100 = 80 bu. per acre)[1]	(100 = 38 bu. per acre)	(100 = 60 bu. per acre)	(100 = 2.5 tons per acre)	(100 = 3.5 tons per acre)	(100 = 180 cow-acre-days)[2]	(100 = 90 cow-acre-days)[2]	(100 = 1700 lb. per acre)	(100 = 10 tons per acre)	(100 = 300 bu. per acre)	(100 = 1800 lb. per acre)	(100 = 2800 lb. per acre)	[3]	[3]
Chester channery sandy loam, 0 to 3 percent slopes	95	100	100	98	98	95	92	95	95	100	95	98	100	High.
Chester channery sandy loam, 3 to 6 percent slopes	90	98	98	95	95	93	90	95	95	98	95	95	100	High.
Chester channery sandy loam, 3 to 6 percent slopes, moderately eroded	87	95	95	92	93	90	85	90	90	95	90	90	98	High.
Chester channery sandy loam, 6 to 12 percent slopes	85	95	95	95	95	93	80	92	95	90	93	95	100	High.
Chester channery sandy loam, 6 to 12 percent slopes, moderately eroded	80	90	90	90	90	88	75	85	85	85	85	90	95	High.
Chester loam, 0 to 3 percent slopes	98	100	100	100	98	100	97	100	100	100	100	100	100	High
Chester loam, 3 to 6 percent slopes	95	98	98	98	98	98	95	98	98	98	98	98	100	High.
Chester loam, 3 to 6 percent slopes, moderately eroded	95	95	95	95	95	95	90	95	95	95	95	98	100	High.
Chester loam, 6 to 12 percent slopes	94	95	95	98	97	98	90	95	95	95	90	95	100	High.
Chester loam, 6 to 12 percent slopes, moderately eroded	88	90	90	94	92	94	87	90	90	90	85	90	100	High.
Chester loam, 6 to 12 percent slopes, severely eroded	80	80	80	85	87	85	80	80	80	80	80	85	90	High.
Chester loam, 12 to 18 percent slopes	85	85	84	90	94	90	75	90	85	85	85	90	95	High.
Chester loam, 12 to 18 percent slopes, moderately eroded	80	80	78	85	90	85	70	85	80	80	80	85	95	High.
Chester silt loam, 0 to 3 percent slopes	98	100	100	100	98	100	98	100	100	100	100	100	100	High.
Chester silt loam, 3 to 6 percent slopes	95	98	98	100	98	100	95	98	98	98	98	98	100	High.
Chester silt loam, 3 to 6 percent slopes, moderately eroded	95	95	95	98	95	98	90	95	95	95	95	98	100	High.
Chester silt loam, 3 to 6 percent slopes, severely eroded	86	90	90	90	90	90	85	85	90	90	85	90	100	High.
Chester silt loam, 6 to 12 percent slopes	95	95	95	100	98	98	95	95	95	95	90	95	100	High.
Chester silt loam, 6 to 12 percent slopes, moderately eroded	90	90	90	95	93	95	90	90	90	90	85	90	100	High.
Chester silt loam, 6 to 12 percent slopes, severely eroded	80	80	80	90	87	90	80	80	80	80	80	85	95	High.
Chester silt loam, 12 to 18 percent slopes	85	85	85	95	95	95	85	90	85	85	85	87	95	High.
Chester silt loam, 12 to 18 percent slopes, moderately eroded	80	80	80	90	90	90	80	85	85	80	80	85	95	High.
Chester stony loam, 0 to 6 percent slopes	------	------	------	------	------	------	80	------	------	------	------	------	90	High.
Chester stony loam, 6 to 12 percent slopes	------	------	------	------	------	------	70	------	------	------	------	------	90	High.
Chester stony loam, 12 to 18 percent slopes	------	------	------	------	------	------	60	------	------	------	------	------	85	High.
Chester stony loam, 18 to 25 percent slopes	------	------	------	------	------	------	------	------	------	------	------	------	------	High.
Chewacla silt loam, 0 to 3 percent slopes	70	45	25	70	------	95	95	------	------	------	------	------	------	High.
Conestoga silt loam, 0 to 3 percent slopes	100	100	100	100	100	100	100	100	100	100	100	100	100	High.
Conestoga silt loam, 3 to 6 percent slopes	100	100	100	100	100	100	100	100	100	100	100	100	100	High.

TABLE 4.—*Ratings showing the relative productivity of soils in Lancaster County, Pa.*—Continued

Soil name	Corn	Wheat	Barley	Hay		Pasture		To-bacco	Toma-toes	Pota-toes	Lima beans	Peas	Or-chard	Oak and yellow-poplar
				Clover and tim-othy	Alfalfa	Tall grass-legume	Blue-grass-clover							
	(100 = 80 bu. per acre)[1]	(100 = 38 bu. per acre)	(100 = 60 bu. per acre)	(100 = 2.5 tons per acre)	(100 = 3.5 tons per acre)	(100 = 180 cow-acre-days)[2]	(100 = 90 cow-acre-days)[2]	(100 = 1700 lb. per acre)	(100 = 10 tons per acre)	(100 = 300 bu. per acre)	(100 = 1800 lb. per acre)	(100 = 2800 lb. per acre)	[3]	[3]
Conestoga silt loam, 3 to 6 percent slopes, moderately eroded	98	98	98	100	100	99	98	98	98	98	98	98	100	High.
Conestoga silt loam, 3 to 6 percent slopes, severely eroded	90	90	90	95	95	90	85	85	90	90	85	90	100	High.
Conestoga silt loam, 6 to 12 percent slopes	95	95	95	100	98	98	95	95	95	95	95	95	100	High.
Conestoga silt loam, 6 to 12 percent slopes, moderately eroded	90	90	90	95	100	95	90	92	90	90	90	90	95	High.
Conestoga silt loam, 6 to 12 percent slopes, severely eroded	80	83	83	85	90	85	80	87	80	85	80	85	90	High.
Conestoga silt loam, 12 to 18 percent slopes, moderately eroded	80	85	85	90	90	85	82	80	75	85	85	85	95	High.
Conestoga silt loam, 12 to 18 percent slopes, severely eroded	70	80	80	85	85	80	75	75	70	78	78	80	87	High.
Conestoga silt loam, 18 to 25 percent slopes, moderately eroded	------	------	------	------	------	------	70	------	------	------	------	------	------	High.
Congaree silt loam, 0 to 3 percent slopes	100	95	90	100	90	100	100	90	90	100	80	100	------	High.
Croton loam, 0 to 3 percent slopes	35	------	------	50	------	55	60	------	------	------	------	------	------	High.
Croton loam, 3 to 8 percent slopes, moderately eroded	42	------	------	55	------	60	65	------	------	------	------	------	------	High.
Croton loam, 8 to 15 percent slopes, moderately eroded	30	------	------	50	------	55	55	------	------	------	------	------	------	High.
Croton silt loam, 0 to 3 percent slopes	35	------	------	50	------	55	60	------	------	------	------	------	------	High.
Croton silt loam, 3 to 6 percent slopes	45	------	------	55	------	62	65	------	------	------	------	------	------	High.
Croton silt loam, 3 to 6 percent slopes, moderately eroded	42	------	------	50	------	58	55	------	------	------	------	------	------	High.
Croton silt loam, 6 to 12 percent slopes, moderately eroded	30	------	------	45	------	50	55	------	------	------	------	------	------	High.
Duffield gravelly silt loam, 0 to 3 percent slopes	97	97	97	100	100	100	100	97	97	97	97	97	100	High.
Duffield gravelly silt loam, 0 to 3 percent slopes, moderately eroded	95	95	95	95	97	97	97	95	95	95	95	95	95	High.
Duffield gravelly silt loam, 3 to 6 percent slopes	95	95	95	95	97	95	95	95	95	95	95	95	95	High.
Duffield gravelly silt loam, 3 to 6 percent slopes, moderately eroded	93	93	93	95	97	95	95	93	93	93	93	93	93	High.
Duffield gravelly silt loam, 6 to 12 percent slopes, moderately eroded	93	93	93	93	95	93	93	90	90	90	90	90	93	High.
Duffield gravelly silt loam, 6 to 12 percent slopes, severely eroded	90	90	90	93	93	93	93	87	87	87	87	87	93	High.
Duffield gravelly silt loam, 12 to 18 percent slopes, moderately eroded	85	85	85	88	90	88	83	80	80	80	80	80	85	High.
Duffield silt loam, 0 to 3 percent slopes	100	100	100	100	100	100	100	100	100	100	100	100	100	High.
Duffield silt loam, 0 to 3 percent slopes, moderately eroded	98	98	98	98	98	98	98	98	98	98	98	98	98	High.
Duffield silt loam, 3 to 6 percent slopes	98	98	98	98	100	98	98	98	98	98	98	98	98	High.
Duffield silt loam, 3 to 6 percent slopes, moderately eroded	98	98	98	98	100	98	98	98	99	98	98	98	98	High.
Duffield silt loam, 3 to 6 percent slopes, severely eroded	95	95	95	95	97	95	95	90	87	90	87	87	97	High.
Duffield silt loam, 6 to 12 percent slopes	95	95	95	95	97	95	95	90	87	90	87	87	97	High.

TABLE 4.—*Ratings showing the relative productivity of soils in Lancaster County, Pa.*—Continued

Soil name	Corn	Wheat	Barley	Hay		Pasture		To-bacco	Toma-toes	Pota-toes	Lima beans	Peas	Or-chard	Oak and yellow-poplar
				Clover and tim-othy	Alfalfa	Tall grass-legume	Blue-grass-clover							
	(100 = 80 bu. per acre)[1]	(100 = 38 bu. per acre)	(100 = 60 bu. per acre)	(100 = 2.5 tons per acre)	(100 = 3.5 tons per acre)	(100 = 180 cow-acre-days)[2]	(100 = 90 cow-acre-days)[2]	(100 = 1700 lb. per acre)	(100 = 10 tons per acre)	(100 = 300 bu. per acre)	(100 = 1800 lb. per acre)	(100 = 2800 lb. per acre)	(3)	(3)
Duffield silt loam, 6 to 12 percent slopes, moderately eroded	93	93	93	95	97	95	95	88	85	87	85	85	95	High.
Duffield silt loam, 6 to 12 percent slopes, severely eroded	90	90	90	93	95	93	93	85	80	83	80	80	90	High.
Duffield silt loam, 12 to 18 percent slopes	87	87	87	87	90	87	87	85	83	85	83	83	90	High.
Duffield silt loam, 12 to 18 percent slopes, moderately eroded	85	85	85	87	90	87	87	85	83	85	83	83	97	High.
Duffield silt loam, 12 to 18 percent slopes, severely eroded	80	80	80	83	87	83	83	75	75	75	75	75	87	High.
Duffield silt loam, 18 to 30 percent slopes	------	------	------	70	80	70	70	------	------	------	------	------	80	High.
Edgemont channery loam, 0 to 3 percent slopes	75	78	78	78	78	78	78	78	75	80	75	75	85	High.
Edgemont channery loam, 3 to 8 percent slopes	73	75	75	75	75	75	75	75	73	78	73	73	85	High.
Edgemont channery loam, 3 to 8 percent slopes, moderately eroded	70	73	73	73	73	73	73	73	70	75	70	70	85	High.
Edgemont channery loam, 3 to 8 percent slopes, severely eroded	65	70	70	70	70	70	70	70	65	65	65	65	83	High.
Edgemont channery loam, 8 to 15 percent slopes	65	67	67	67	67	67	67	65	65	67	65	65	80	High.
Edgemont channery loam, 8 to 15 percent slopes, moderately eroded	60	65	65	65	65	65	65	60	60	65	60	60	80	High.
Edgemont channery loam, 8 to 15 percent slopes, severely eroded	55	57	57	60	60	60	60	55	50	55	50	50	75	High.
Edgemont channery loam, 15 to 25 percent slopes	55	57	57	60	60	60	60	55	50	55	50	50	75	High.
Edgemont channery loam, 15 to 25 percent slopes, moderately eroded	50	53	53	55	55	55	55	45	40	45	40	40	70	High.
Edgemont channery loam, 15 to 25 percent slopes, severely eroded	40	45	45	50	50	50	50	40	40	40	35	35	65	Medium.
Edgemont channery loam, 25 to 35 percent slopes	------	------	------	------	------	50	50	------	------	------	------	------	60	Medium.
Edgemont channery loam, 25 to 35 percent slopes, moderately eroded	------	------	------	------	------	45	45	------	------	------	------	------	60	Medium.
Edgemont channery loam, 25 to 35 percent slopes, severely eroded	------	------	------	------	------	40	40	------	------	------	------	------	55	Medium.
Edgemont channery silt loam, 0 to 3 percent slopes	75	78	78	78	78	78	78	78	75	80	75	75	85	High.
Edgemont channery silt loam, 3 to 8 percent slopes	73	75	75	75	75	75	75	75	73	78	73	73	85	High.
Edgemont channery silt loam, 3 to 8 percent slopes, moderately eroded	70	73	73	73	73	73	73	73	70	75	70	70	85	High.
Edgemont channery silt loam, 3 to 8 percent slopes, severely eroded	65	70	70	70	70	70	70	70	65	65	65	65	83	High.
Edgemont channery silt loam, 8 to 15 percent slopes	65	67	67	67	67	67	67	65	65	67	65	65	80	High.
Edgemont channery silt loam, 8 to 15 percent slopes, moderately eroded	60	65	65	65	65	65	65	60	60	65	60	60	80	High.
Edgemont channery silt loam, 8 to 15 percent slopes, severely eroded	55	57	57	60	60	60	60	55	50	55	50	50	75	High.

TABLE 4.—*Ratings showing the relative productivity of soils in Lancaster County, Pa.*—Continued

Soil name	Corn	Wheat	Barley	Hay		Pasture		To-bacco	Toma-toes	Pota-toes	Lima beans	Peas	Or-chard	Oak and yellow-poplar
				Clover and tim-othy	Alfalfa	Tall grass-legume	Blue-grass-clover							
	(100 = 80 bu. per acre)[1]	(100 = 38 bu. per acre)	(100 = 60 bu. per acre)	(100 = 2.5 tons per acre)	(100 = 3.5 tons per acre)	(100 = 180 cow-acre-days)[2]	(100 = 90 cow-acre-days)[2]	(100 = 1700 lb. per acre)	(100 = 10 tons per acre)	(100 = 300 bu. per acre)	(100 = 1800 lb. per acre)	(100 = 2800 lb. per acre)	[3]	[3]
Edgemont channery silt loam, 15 to 25 percent slopes	55	57	57	60	60	60	60	55	50	55	50	50	75	High.
Edgemont channery silt loam, 15 to 25 percent slopes, moderately eroded	50	53	53	55	55	55	55	45	40	45	40	40	70	High.
Edgemont channery silt loam, 15 to 25 percent slopes, severely eroded	40	45	45	50	50	50	50	40	40	40	35	35	65	Medium.
Edgemont loam, 0 to 3 percent slopes	73	75	75	75	75	75	75	75	80	80	80	80	85	High.
Edgemont loam, 3 to 8 percent slopes	70	73	73	73	73	73	73	73	80	80	80	80	85	High.
Edgemont loam, 3 to 8 percent slopes, moderately eroded	67	70	70	70	70	70	70	70	75	75	75	75	85	High.
Edgemont loam, 8 to 15 percent slopes	67	70	70	70	70	70	70	70	75	75	75	75	83	High.
Edgemont loam, 8 to 15 percent slopes, moderately eroded	65	67	67	67	67	67	67	67	70	70	70	70	83	High.
Edgemont loam, 8 to 15 percent slopes, severely eroded	60	60	60	60	60	60	60	60	65	65	65	65	80	High.
Edgemont loam, 15 to 25 percent slopes, moderately eroded	55	55	55	55	55	55	55	55	60	60	60	60	80	High.
Edgemont loam, 15 to 25 percent slopes, severely eroded	45	45	45	45	45	45	45	45	50	50	50	50	65	Medium.
Edgemont silt loam, moderately well drained variant, 0 to 3 percent slopes	80	78	78	80	------	80	80	------	70	65	70	70	------	High.
Edgemont very stony loam, 0 to 8 percent slopes	------	------	------	------	------	------	------	------	------	------	------	------	------	Medium.
Edgemont very stony loam, 8 to 15 percent slopes	------	------	------	------	------	------	------	------	------	------	------	------	------	Medium.
Edgemont very stony loam, 15 to 25 percent slopes	------	------	------	------	------	------	------	------	------	------	------	------	------	Medium.
Edgemont very stony loam, 25 to 40 percent slopes	------	------	------	------	------	------	------	------	------	------	------	------	------	Low.
Elioak silt loam, 0 to 3 percent slopes	95	100	100	100	98	98	95	98	100	100	100	100	100	High.
Elioak silt loam, 3 to 6 percent slopes	92	98	98	100	98	98	95	98	98	98	98	98	100	High.
Elioak silt loam, 3 to 6 percent slopes, moderately eroded	90	92	92	98	95	95	90	95	95	95	95	95	100	High.
Elioak silt loam, 6 to 12 percent slopes	90	90	90	100	98	98	95	96	96	96	90	96	100	High.
Elioak silt loam, 6 to 12 percent slopes, moderately eroded	85	85	85	95	95	90	85	90	90	90	85	90	95	High.
Elioak silt loam, 6 to 12 percent slopes, severely eroded	75	80	80	85	85	85	80	85	85	85	80	85	90	High.
Elioak silt loam, 12 to 18 percent slopes, moderately eroded	80	83	83	90	90	90	85	86	86	86	80	80	90	High.
Elioak silt loam, 12 to 18 percent slopes, severely eroded	70	75	75	80	80	80	70	80	80	84	75	75	85	High.
Elk gravelly silt loam, 0 to 3 percent slopes	95	100	100	100	100	95	93	100	95	100	100	100	------	High.
Elk gravelly silt loam, 3 to 6 percent slopes, moderately eroded	90	98	98	98	98	90	90	95	90	95	95	98	100	High.
Elk gravelly silt loam, 6 to 12 percent slopes, moderately eroded	85	88	88	90	90	85	80	90	88	90	90	93	95	High.

TABLE 4.—*Ratings showing the relative productivity of soils in Lancaster County, Pa.*—Continued

Soil name	Corn	Wheat	Barley	Hay		Pasture		To-bacco	Toma-toes	Pota-toes	Lima beans	Peas	Or-chard	Oak and yellow-poplar
				Clover and tim-othy	Alfalfa	Tall grass-legume	Blue-grass-clover							
	(100 = 80 bu. per acre)[1]	(100 = 38 bu. per acre)	(100 = 60 bu. per acre)	(100 = 2.5 tons per acre)	(100 = 3.5 tons per acre)	(100 = 180 cow-acre-days)[2]	(100 = 90 cow-acre-days)[2]	(100 = 1700 lb. per acre)	(100 = 10 tons per acre)	(100 = 300 bu. per acre)	(100 = 1800 lb. per acre)	(100 = 2800 lb. per acre)	[3]	[3]
Glenelg channery sandy loam, 6 to 12 percent slopes, severely eroded	70	80	80	75	75	75	65	60	75	80	85	90	85	High.
Glenelg channery sandy loam, 12 to 18 percent slopes, severely eroded	48	70	70	65	65	63	55	50	65	68	70	75	75	High.
Glenelg channery sandy loam, 18 to 25 percent slopes, severely eroded	------	------	------	------	------	------	30	------	------	------	------	------	------	Medium.
Glenelg silt loam, 3 to 6 percent slopes, moderately eroded	75	87	87	87	80	87	80	80	85	85	95	95	95	High.
Glenelg silt loam, 6 to 12 percent slopes, moderately eroded	70	80	80	78	78	78	70	70	80	80	87	90	87	High.
Glenelg silt loam, 6 to 12 percent slopes, severely eroded	60	75	74	70	70	70	65	60	75	70	80	80	80	High.
Glenelg silt loam, 12 to 18 percent slopes, moderately eroded	65	75	74	72	72	73	65	60	75	75	84	82	85	High.
Glenelg silt loam, 12 to 18 percent slopes, severely eroded	50	70	70	68	65	65	60	55	70	68	78	75	75	High.
Glenelg silt loam, 18 to 25 percent slopes	40	60	60	65	68	68	55	50	65	65	70	70	90	High.
Glenelg silt loam, 18 to 25 percent slopes, moderately eroded	------	------	------	------	------	------	50	------	------	------	------	------	85	High.
Glenelg silt loam, 18 to 25 percent slopes, severely eroded	------	------	------	------	------	------	------	------	------	------	------	------	------	Medium.
Glenville silt loam, 0 to 3 percent slopes	80	50	35	75	40	80	80	------	65	------	------	------	------	High.
Glenville silt loam, 3 to 6 percent slopes	85	60	40	82	50	85	87	------	70	------	------	------	------	High.
Glenville silt loam, 3 to 6 percent slopes, moderately eroded	80	55	35	78	45	80	80	------	65	------	------	------	------	High.
Glenville silt loam, 6 to 12 percent slopes, moderately eroded	75	50	30	75	40	75	78	------	60	------	------	------	------	High.
Hagerstown silt loam, 0 to 3 percent slopes	100	100	100	100	100	100	100	100	100	90	100	95	100	High.
Hagerstown silt loam, 0 to 3 percent slopes, moderately eroded	95	95	95	95	95	95	95	95	85	85	90	85	98	High.
Hagerstown silt loam, 3 to 6 percent slopes	98	98	98	98	100	98	98	98	95	90	95	90	98	High.
Hagerstown silt loam, 3 to 6 percent slopes, moderately eroded	87	90	90	95	93	95	95	90	90	80	85	85	98	High.
Hagerstown silt loam, 6 to 12 percent slopes, moderately eroded	85	85	85	85	93	85	90	80	83	80	83	83	95	High.
Hagerstown silt loam, 12 to 18 percent slopes, moderately eroded	80	80	80	80	90	80	80	75	78	75	75	75	90	High.
Hagerstown silt loam, 18 to 25 percent slopes, moderately eroded	------	------	------	70	80	75	70	------	------	------	------	------	85	High.
Hollinger silt loam, 3 to 8 percent slopes, moderately eroded	73	87	87	87	90	87	87	83	83	80	83	83	95	High.
Hollinger silt loam, 8 to 15 percent slopes, moderately eroded	67	83	83	83	85	83	83	75	75	75	75	75	90	High.
Hollinger silt loam, 15 to 25 percent slopes, moderately eroded	60	70	70	80	80	80	80	70	70	70	70	70	80	High.
Hollinger silt loam, 25 to 35 percent slopes	------	------	------	70	75	70	70	------	------	------	------	------	------	High.
Huntington fine sandy loam, 0 to 3 percent slopes	100	------	------	100	------	100	100	100	100	------	100	100	------	High.
Huntington silt loam, 0 to 3 percent slopes	100	------	------	100	------	100	100	100	100	------	100	100	------	High.

TABLE 4.—*Ratings showing the relative productivity of soils in Lancaster County, Pa.*—Continued

Soil name	Corn	Wheat	Barley	Hay		Pasture		To-bacco	Toma-toes	Pota-toes	Lima beans	Peas	Or-chard	Oak and yellow-poplar
				Clover and tim-othy	Alfalfa	Tall grass-legume	Blue-grass-clover							
	(100 = 80 bu. per acre)[1]	(100 = 38 bu. per acre)	(100 = 60 bu. per acre)	(100 = 2.5 tons per acre)	(100 = 3.5 tons per acre)	(100 = 180 cow-acre-days)[2]	(100 = 90 cow-acre-days)[2]	(100 = 1700 lb. per acre)	(100 = 10 tons per acre)	(100 = 300 bu. per acre)	(100 = 1800 lb. per acre)	(100 = 2800 lb. per acre)	(3)	(3)
Huntington silt loam, local alluvium, 0 to 3 percent slopes	100	100	100	100	100	100	100	100	100	100	95	100	100	High.
Lansdale gravelly loam, 0 to 3 percent slopes	63	80	80	80	73	75	75	73	73	75	73	73	90	High.
Lansdale gravelly loam, 3 to 8 percent slopes, moderately eroded	60	75	75	77	70	73	73	70	70	75	70	70	90	High.
Lansdale gravelly loam, 8 to 15 percent slopes, moderately eroded	57	70	70	75	65	70	70	65	65	70	65	65	85	High.
Lansdale gravelly loam, 8 to 15 percent slopes, severely eroded	47	65	65	70	60	65	65	60	60	65	60	60	80	High.
Lansdale gravelly loam, 15 to 25 percent slopes, moderately eroded	55	60	60	65	55	60	60	55	55	60	55	55	75	High.
Lansdale gravelly loam, 15 to 25 percent slopes, severely eroded	45	50	50	50	45	50	50	45	45	50	45	45	70	High.
Lansdale gravelly loam, 25 to 40 percent slopes	------	------	------	35	35	35	35	------	------	------	------	------	60	Medium.
Lansdale loam, 0 to 3 percent slopes	73	75	75	75	73	75	75	73	73	75	73	73	87	High.
Lansdale loam, 3 to 8 percent slopes	73	75	75	75	73	75	75	73	73	73	73	73	87	High.
Lansdale loam, 3 to 8 percent slopes, moderately eroded	70	73	73	73	70	73	73	70	70	75	70	70	85	High.
Lansdale loam, 8 to 15 percent slopes, moderately eroded	65	70	70	70	65	70	70	65	65	70	65	65	85	High.
Lansdale loam, 15 to 25 percent slopes	60	63	63	65	60	65	65	63	63	65	63	63	80	High.
Lansdale sandy loam, 0 to 3 percent slopes	65	70	70	70	60	70	70	65	70	75	70	70	83	High.
Lansdale sandy loam, 3 to 8 percent slopes	63	67	67	67	60	67	67	63	67	73	67	67	83	High.
Lansdale sandy loam, 3 to 8 percent slopes, moderately eroded	60	65	65	65	57	65	65	60	63	70	63	63	80	High.
Lansdale sandy loam, 8 to 15 percent slopes	50	60	60	60	57	60	60	50	50	65	50	50	75	High.
Lansdale stony sandy loam, 0 to 8 percent slopes	------	------	------	------	------	------	------	------	------	------	------	------	------	High.
Lansdale stony sandy loam, 8 to 15 percent slopes	------	------	------	------	------	------	------	------	------	------	------	------	------	High.
Lansdale stony sandy loam, 15 to 25 percent slopes	------	------	------	------	------	------	------	------	------	------	------	------	------	High.
Lansdale stony sandy loam, 25 to 35 percent slopes	------	------	------	------	------	------	------	------	------	------	------	------	------	Medium.
Lawrence silt loam, 0 to 3 percent slopes	65	45	45	83	------	85	80	------	------	------	------	------	------	High.
Lawrence silt loam, 3 to 6 percent slopes, moderately eroded	70	50	50	87	------	90	83	------	------	------	------	------	------	High.
Lehigh silt loam, 0 to 3 percent slopes	45	40	40	57	------	60	55	------	------	------	------	------	------	Medium.
Lehigh silt loam, 3 to 8 percent slopes, moderately eroded	47	43	43	60	------	63	57	------	------	------	------	------	------	Medium.
Lehigh slaty silt loam, 3 to 8 percent slopes, moderately eroded	45	40	40	60	------	63	57	------	------	------	------	------	------	Medium.
Lehigh slaty silt loam, 8 to 15 percent slopes, moderately eroded	40	37	37	55	------	57	55	------	------	------	------	------	------	Medium.

TABLE 4.—*Ratings showing the relative productivity of soils in Lancaster County, Pa.*—Continued

Soil name	Corn	Wheat	Barley	Hay		Pasture		To-bacco	Toma-toes	Pota-toes	Lima beans	Peas	Or-chard	Oak and yellow-poplar
				Clover and tim-othy	Alfalfa	Tall grass-legume	Blue-grass-clover							
	(100 = 80 bu. per acre)[1]	(100 = 38 bu. per acre)	(100 = 60 bu. per acre)	(100 = 2.5 tons per acre)	(100 = 3.5 tons per acre)	(100 = 180 cow-acre-days)[2]	(100 = 90 cow-acre-days)[2]	(100 = 1700 lb. per acre)	(100 = 10 tons per acre)	(100 = 300 bu. per acre)	(100 = 1800 lb. per acre)	(100 = 2800 lb. per acre)	[3]	[3]
Lehigh slaty silt loam, 15 to 25 percent slopes, moderately eroded	30	35	35	45	------	47	45	------	------	------	------	------	------	Medium.
Letort silt loam, 0 to 3 percent slopes	100	100	100	100	100	100	100	100	100	100	100	100	100	High.
Letort silt loam, 3 to 6 percent slopes, moderately eroded	95	95	95	97	97	97	------	95	95	93	95	95	97	High.
Letort silt loam, 6 to 12 percent slopes, moderately eroded	90	90	90	95	95	95	------	90	90	90	90	90	95	High.
Letort silt loam, 6 to 12 percent, slopes, severely eroded	80	85	85	90	90	90	------	85	80	80	80	80	90	High.
Letort silt loam, 12 to 18 percent slopes, moderately eroded	70	80	80	85	85	85	85	75	70	70	70	70	80	High.
Letort silt loam, 18 to 25 percent slopes, moderately eroded	55	65	65	80	80	80	80	------	------	------	------	------	------	High.
Lewisberry gravelly sandy loam, 0 to 3 percent slopes	73	80	80	75	73	75	75	73	73	75	70	80	87	High.
Lewisberry gravelly sandy loam, 3 to 8 percent slopes, moderately eroded	65	73	73	70	65	70	65	67	65	65	65	70	80	High.
Lewisberry gravelly sandy loam, 8 to 15 percent slopes, moderately eroded	65	70	70	70	60	65	55	62	60	60	60	65	75	High.
Lewisberry gravelly sandy loam, 15 to 25 percent slopes, moderately eroded	55	60	60	60	55	60	45	60	55	57	50	55	70	High.
Lewisberry stony sandy loam, 0 to 8 percent slopes	------	------	------	------	------	------	60	------	------	------	------	------	------	High.
Lewisberry stony sandy loam, 8 to 15 percent slopes	------	------	------	------	------	------	55	------	------	------	------	------	------	High.
Lewisberry stony sandy loam, 15 to 25 percent slopes	------	------	------	------	------	------	------	------	------	------	------	------	------	High.
Lewisberry stony sandy loam, 25 to 40 percent slopes	------	------	------	------	------	------	------	------	------	------	------	------	------	Medium.
Lindside silt loam, 0 to 3 percent slopes	80	50	30	80	50	80	85	------	------	------	------	------	------	High.
Lindside silt loam, local alluvium, 0 to 3 percent slopes	85	60	50	85	70	90	90	70	75	50	75	70	------	High.
Lindside silt loam, local alluvium, 3 to 6 percent slopes	90	75	55	90	75	95	95	80	83	60	85	80	60	High.
Manor channery loam, 3 to 8 percent slopes, moderately eroded	70	83	83	85	75	84	72	75	75	75	80	92	90	High.
Manor channery loam, 8 to 15 percent slopes	65	80	80	80	75	80	65	70	70	75	80	87	85	High.
Manor channery loam, 8 to 15 percent slopes, moderately eroded	60	78	78	78	70	78	60	60	63	67	75	85	80	High.
Manor channery loam, 15 to 25 percent slopes	55	67	67	75	70	72	55	------	------	------	------	------	------	High.
Manor channery loam, 15 to 25 percent slopes, moderately eroded	50	60	60	65	65	65	50	------	------	------	------	------	------	High.
Manor channery silt loam, 3 to 8 percent slopes	73	85	85	86	78	86	75	77	80	80	85	95	90	High.
Manor channery silt loam, 3 to 8 percent slopes, moderately eroded	70	83	83	85	75	84	72	75	75	75	80	92	90	High.
Manor channery silt loam, 3 to 8 percent slopes, severely eroded	60	78	78	78	70	78	60	65	65	70	75	85	80	High.
Manor channery silt loam, 8 to 15 percent slopes	65	80	80	80	75	80	65	70	70	75	80	87	85	High.

TABLE 4.—*Ratings showing the relative productivity of soils in Lancaster County, Pa.*—Continued

Soil name	Corn	Wheat	Barley	Hay		Pasture		To-bacco	Toma-toes	Pota-toes	Lima beans	Peas	Or-chard	Oak and yellow-poplar
				Clover and tim-othy	Alfalfa	Tall grass-legume	Blue-grass-clover							
	(100 = 80 bu. per acre)[1]	(100 = 38 bu. per acre)	(100 = 60 bu. per acre)	(100 = 2.5 tons per acre)	(100 = 3.5 tons per acre)	(100 = 180 cow-acre-days)[2]	(100 = 90 cow-acre-days)[2]	(100 = 1700 lb. per acre)	(100 = 10 tons per acre)	(100 = 300 bu. per acre)	(100 = 1800 lb. per acre)	(100 = 2800 lb. per acre)	[3]	[3]
Manor channery silt loam, 8 to 15 percent slopes, moderately eroded	60	78	78	78	70	78	60	60	63	67	75	85	80	High.
Manor channery silt loam, 8 to 15 percent slopes, severely eroded	50	65	65	68	65	68	50	50	55	60	65	75	75	High.
Manor channery silt loam, 15 to 25 percent slopes	55	67	67	70	70	72	55	------	------	------	------	75	77	High.
Manor channery silt loam, 15 to 25 percent slopes, moderately eroded	50	60	60	65	65	65	50	------	------	------	------	70	70	High.
Manor silt loam, 3 to 8 percent slopes, moderately eroded	70	83	83	85	75	84	72	75	75	75	80	92	90	High.
Manor silt loam, 8 to 15 percent slopes	65	80	80	80	75	80	65	70	70	75	80	87	85	High.
Manor silt loam, 8 to 15 percent slopes, moderately eroded	60	78	78	78	70	78	60	60	63	67	75	85	80	High.
Manor silt loam, 8 to 15 percent slopes, severely eroded	50	65	65	68	65	68	50	50	55	60	65	75	75	High.
Manor silt loam, 15 to 25 percent slopes	55	67	67	70	70	72	55	------	------	------	------	75	77	High.
Manor silt loam, 15 to 25 percent slopes, moderately eroded	50	60	60	65	65	65	50	------	------	------	------	70	70	High.
Manor soils, 15 to 25 percent slopes, severely eroded	------	------	------	------	------	------	------	------	------	------	------	------	------	High.
Manor soils, 25 to 40 percent slopes	------	------	------	------	------	------	45	------	------	------	------	------	------	High.
Manor soils, 25 to 40 percent slopes, moderately eroded	------	------	------	------	------	------	40	------	------	------	------	------	------	High.
Manor soils, 25 to 40 percent slopes, severely eroded	------	------	------	------	------	------	------	------	------	------	------	------	------	Medium.
Manor stony loam, 0 to 8 percent slopes	------	------	------	------	------	------	------	------	------	------	------	------	------	High.
Manor stony loam, 8 to 15 percent slopes	------	------	------	------	------	------	------	------	------	------	------	------	------	High.
Manor stony loam, 8 to 15 percent slopes, moderately eroded	------	------	------	------	------	------	------	------	------	------	------	------	------	High.
Manor stony loam, 15 to 25 percent slopes	------	------	------	------	------	------	------	------	------	------	------	------	------	High.
Manor stony loam, 15 to 25 percent slopes, moderately eroded	------	------	------	------	------	------	------	------	------	------	------	------	------	High.
Manor stony loam, 25 to 40 percent slopes	------	------	------	------	------	------	------	------	------	------	------	------	------	Medium.
Melvin silt loam, 0 to 3 percent slopes	------	------	------	------	------	------	75	------	------	------	------	------	------	High.
Montalto channery silt loam, 0 to 3 percent slopes	100	100	95	100	100	100	95	100	98	85	95	95	100	High.
Montalto channery silt loam, 3 to 8 percent slopes	90	95	90	95	98	95	90	98	95	80	90	90	100	High.
Montalto channery silt loam, 3 to 8 percent slopes, moderately eroded	80	85	85	85	90	90	80	85	85	70	80	80	95	High.
Montalto channery silt loam, 8 to 15 percent slopes	85	87	87	90	85	90	75	90	90	75	75	85	90	High.
Montalto channery silt loam, 8 to 15 percent slopes, moderately eroded	75	80	80	80	80	85	70	80	80	70	70	75	85	High.
Montalto channery silt loam, 15 to 25 percent slopes	65	70	70	75	70	75	60	------	------	------	------	------	75	High.

TABLE 4.—*Ratings showing the relative productivity of soils in Lancaster County, Pa.*—Continued

Soil name	Corn	Wheat	Barley	Hay		Pasture		Tobacco	Tomatoes	Potatoes	Lima beans	Peas	Orchard	Oak and yellow-poplar
				Clover and timothy	Alfalfa	Tall grass-legume	Bluegrass-clover							
	(100 = 80 bu. per acre)[1]	(100 = 38 bu. per acre)	(100 = 60 bu. per acre)	(100 = 2.5 tons per acre)	(100 = 3.5 tons per acre)	(100 = 180 cow-acre-days)[2]	(100 = 90 cow-acre-days)[2]	(100 = 1700 lb. per acre)	(100 = 10 tons per acre)	(100 = 300 bu. per acre)	(100 = 1800 lb. per acre)	(100 = 2800 lb. per acre)	[3]	[3]
Montalto channery silt loam, 15 to 25 percent slopes, moderately eroded					60	65	50						70	High.
Montalto channery silt loam, 25 to 35 percent slopes														High.
Montalto extremely stony silt loam, 0 to 8 percent slopes														Medium.
Montalto extremely stony silt loam, 8 to 15 percent slopes														Medium.
Montalto extremely stony silt loam, 15 to 25 percent slopes														Low.
Montalto extremely stony silt loam, 25 to 35 percent slopes														Low.
Montalto very stony silt loam, 0 to 8 percent slopes													80	High.
Montalto very stony silt loam, 8 to 15 percent slopes													80	High.
Montalto very stony silt loam, 15 to 25 percent slopes													70	High.
Montalto very stony silt loam, 25 to 35 percent slopes													60	Medium.
Murrill gravelly loam, 0 to 3 percent slopes	95	95	95	95	97	95	95	95	95	95	95	95	100	High.
Murrill gravelly loam, 3 to 8 percent slopes	93	93	93	93	97	93	93	93	93	93	93	93	100	High.
Murrill gravelly loam, 3 to 8 percent slopes, moderately eroded	90	90	90	90	95	90	90	90	90	90	90	90	97	High.
Murrill gravelly loam, 3 to 8 percent slopes, severely eroded	83	85	85	85	93	85	85	80	80	83	80	80	93	High.
Murrill gravelly loam, 8 to 15 percent slopes	80	83	83	85	90	85	85	80	80	83	80	80	93	High.
Murrill gravelly loam, 8 to 15 percent slopes, moderately eroded	75	80	80	83	87	83	83	70	70	73	70	70	90	High.
Murrill gravelly loam, 15 to 25 percent slopes, moderately eroded	70	70	70	80	85	80	80						85	High.
Murrill loam, 0 to 3 percent slopes	97	97	97	97	97	97	97	97	100	100	97	100	100	High.
Murrill loam, 3 to 8 percent slopes	95	95	95	95	95	95	95	95	95	97	95	97	100	High.
Murrill loam, 3 to 8 percent slopes, moderately eroded	93	93	93	93	93	93	93	93	93	95	93	95	97	High.
Murrill loam, 8 to 15 percent slopes, moderately eroded	80	80	80	87	87	87	87	85	85	90	85	90	93	High.
Neshaminy silt loam, 0 to 3 percent slopes	97	97	97	100	100	100	100	97	97	97	97	97	100	High.
Neshaminy silt loam, 3 to 6 percent slopes	95	95	95	97	97	97	97	95	95	95	95	95	100	High.
Neshaminy silt loam, 3 to 6 percent slopes, moderately eroded	93	93	93	95	95	95	95	93	93	93	93	93	95	High.
Neshaminy silt loam, 6 to 12 percent slopes	90	90	90	93	93	93	93	87	87	90	87	87	95	High.
Neshaminy silt loam, 6 to 12 percent slopes, moderately eroded	85	87	87	90	90	90	90	85	85	87	85	85	93	High.
Neshaminy silt loam, 6 to 12 percent slopes, severely eroded	75	75	75	80	83	80	80	70	70	75	70	70	85	High.
Penn gravelly loam, 0 to 3 percent slopes	60	80	80	80	70	80	70	70	70	77	70	70	90	High.
Penn gravelly loam, 3 to 8 percent slopes	57	77	77	77	67	77	67	67	67	75	67	67	90	High.

TABLE 4.—*Ratings showing the relative productivity of soils in Lancaster County, Pa.*—Continued

Soil name	Corn	Wheat	Barley	Hay		Pasture		To-bacco	Toma-toes	Pota-toes	Lima beans	Peas	Or-chard	Oak and yellow-poplar
				Clover and tim-othy	Alfalfa	Tall grass-legume	Blue-grass-clover							
	(100 = 80 bu. per acre)[1]	(100 = 38 bu. per acre)	(100 = 60 bu. per acre)	(100 = 2.5 tons per acre)	(100 = 3.5 tons per acre)	(100 = 180 cow-acre-days)[2]	(100 = 90 cow-acre-days)[2]	(100 = 1700 lb. per acre)	(100 = 10 tons per acre)	(100 = 300 bu. per acre)	(100 = 1800 lb. per acre)	(100 = 2800 lb. per acre)	[3]	[3]
Penn gravelly loam, 3 to 8 percent slopes, moderately eroded	55	75	75	75	67	75	65	67	67	73	67	67	87	High.
Penn gravelly loam, 3 to 8 percent slopes, severely eroded	45	70	70	70	60	70	60	63	60	65	60	60	80	High.
Penn gravelly loam, 8 to 15 percent slopes	45	70	70	70	60	70	60	63	60	65	60	60	80	High.
Penn gravelly loam, 8 to 15 percent slopes, moderately eroded	40	65	65	67	57	67	57	60	57	60	57	57	77	High.
Penn gravelly loam, 8 to 15 percent slopes, severely eroded	35	57	57	63	53	63	50	50	50	55	50	50	75	High.
Penn gravelly loam, 15 to 25 percent slopes, moderately eroded	------	------	------	60	50	60	40	------	------	------	------	------	70	Medium.
Penn gravelly loam, 15 to 25 percent slopes, severely eroded	------	------	------	50	45	47	40	------	------	------	------	------	60	Medium.
Penn gravelly silt loam, 0 to 3 percent slopes	65	85	85	85	73	85	70	75	75	77	75	75	90	High.
Penn gravelly silt loam, 3 to 8 percent slopes	63	83	83	85	73	85	70	73	73	73	73	73	90	High.
Penn gravelly silt loam, 3 to 8 percent slopes, moderately eroded	60	80	80	83	70	83	67	70	70	70	70	70	95	High.
Penn gravelly silt loam, 3 to 8 percent slopes, severely eroded	53	75	75	75	65	75	60	65	65	65	65	65	85	High.
Penn gravelly silt loam, 8 to 15 percent slopes	53	75	75	75	65	75	60	60	65	65	65	65	85	High.
Penn gravelly silt loam, 8 to 15 percent slopes, moderately eroded	50	70	70	73	63	73	55	57	63	63	63	63	80	High.
Penn gravelly silt loam, 8 to 15 percent slopes, severely eroded	40	60	60	70	55	70	50	50	57	57	------	------	75	High.
Penn gravelly silt loam, 15 to 25 percent slopes	------	------	------	70	55	67	50	------	------	------	------	------	75	High.
Penn gravelly silt loam, 15 to 25 percent slopes, moderately eroded	------	------	------	60	53	65	47	------	------	------	------	------	70	High.
Penn gravelly silt loam, 15 to 25 percent slopes, severely eroded	------	------	------	50	50	60	40	------	------	------	------	------	60	Medium.
Penn loam, 0 to 3 percent slopes	63	80	80	80	70	80	70	70	70	77	70	70	90	High.
Penn loam, 3 to 8 percent slopes, moderately eroded	57	75	75	75	65	75	65	65	65	73	73	73	85	High.
Penn loam, 3 to 8 percent slopes, severely eroded	50	70	70	67	57	67	57	53	53	70	70	70	75	High.
Penn loam, 8 to 15 percent slopes, moderately eroded	47	70	70	65	55	65	55	50	50	67	67	67	70	High.
Penn loam, 8 to 15 percent slopes, severely eroded	40	60	60	63	53	63	53	40	40	55	55	55	60	High.
Penn silt loam, 0 to 3 percent slopes	67	83	83	87	75	87	75	77	80	80	80	80	90	High.
Penn silt loam, 0 to 3 percent slopes, moderately eroded	65	80	80	85	73	85	63	75	77	77	77	77	90	High.
Penn silt loam, 3 to 8 percent slopes	63	77	77	83	70	83	70	73	75	75	75	75	85	High.
Penn silt loam, 3 to 8 percent slopes, moderately eroded	60	75	75	80	67	80	67	70	73	73	73	73	83	High.
Penn silt loam, 8 to 15 percent slopes	60	73	73	77	65	77	65	67	70	70	70	70	80	High.
Penn silt loam, 8 to 15 percent slopes, moderately eroded	57	70	70	75	63	75	63	65	67	67	67	67	77	High.
Penn silt loam, 8 to 15 percent slopes, severely eroded	53	60	60	67	60	67	60	55	57	57	57	57	65	High.

TABLE 4.—*Ratings showing the relative productivity of soils in Lancaster County, Pa.*—Continued

Soil name	Corn	Wheat	Barley	Hay		Pasture		To-bacco	Toma-toes	Pota-toes	Lima beans	Peas	Or-chard	Oak and yellow-poplar
				Clover and tim-othy	Alfalfa	Tall grass-legume	Blue-grass-clover							
	(100 = 80 bu. per acre)[1]	(100 = 38 bu. per acre)	(100 = 60 bu. per acre)	(100 = 2.5 tons per acre)	(100 = 3.5 tons per acre)	(100 = 180 cow-acre-days)[2]	(100 = 90 cow-acre-days)[2]	(100 = 1700 lb. per acre)	(100 = 10 tons per acre)	(100 = 300 bu. per acre)	(100 = 1800 lb. per acre)	(100 = 2800 lb. per acre)	[3]	[3]
Penn soils, 25 to 35 percent slopes, moderately eroded	------	------	------	------	------	------	45	------	------	------	------	------	------	Medium.
Penn soils, 25 to 35 percent slopes, severely eroded	------	------	------	------	------	------	------	------	------	------	------	------	------	Low.
Penn stony silt loam, 0 to 8 percent slopes	------	------	------	------	------	------	------	------	------	------	------	------	------	High.
Penn stony silt loam, 8 to 15 percent slopes	------	------	------	------	------	------	------	------	------	------	------	------	------	High.
Penn stony silt loam, 8 to 15 percent slopes, moderately eroded	------	------	------	------	------	------	------	------	------	------	------	------	------	High.
Penn stony silt loam, 15 to 25 percent slopes	------	------	------	------	------	------	------	------	------	------	------	------	------	High.
Penn stony silt loam, 15 to 25 percent slopes, moderately eroded	------	------	------	------	------	------	------	------	------	------	------	------	------	High.
Penn stony silt loam, 25 to 35 percent slopes	------	------	------	------	------	------	------	------	------	------	------	------	------	Medium.
Penn-Lansdale gravelly loams, 0 to 3 percent slopes	70	75	75	70	70	70	70	70	70	73	70	75	85	High.
Penn-Lansdale gravelly loams, 3 to 8 percent slopes, moderately eroded	67	70	70	67	67	67	67	65	65	70	65	70	80	High.
Penn-Lansdale gravelly loams, 8 to 15 percent slopes, moderately eroded	60	63	63	65	65	65	65	55	55	67	55	65	75	High.
Penn-Lansdale gravelly loams, 15 to 25 percent slopes, moderately eroded	40	50	50	55	55	55	55	40	40	60	40	55	65	Medium.
Penn-Lansdale loams, 0 to 3 percent slopes	73	78	78	75	80	80	75	73	73	78	73	80	90	High.
Penn-Lansdale loams, 3 to 8 percent slopes, moderately eroded	70	73	73	70	75	75	70	75	70	75	70	75	90	High.
Penn-Lansdale loams, 8 to 15 percent slopes	65	75	75	65	70	70	65	70	65	70	85	80	95	High.
Penn-Lansdale loams, 8 to 15 percent slopes, moderately eroded	80	72	72	60	65	65	60	65	55	65	80	70	80	High.
Pequea silt loam, 3 to 8 percent slopes, moderately eroded	72	86	86	87	87	86	80	80	80	85	78	85	90	High.
Pequea silt loam, 8 to 15 percent slopes, moderately eroded	67	83	83	75	80	75	75	75	75	80	73	80	85	High.
Pequea silt loam, 15 to 25 percent slopes, moderately eroded	60	70	70	70	85	70	70	60	60	75	70	75	80	High.
Pequea silt loam, 15 to 25 percent slopes, severely eroded	50	65	65	65	70	65	60	60	55	65	65	65	70	High.
Pequea silt loam, 25 to 35 percent slopes, moderately eroded	------	------	------	------	------	------	------	------	------	------	------	------	------	High.
Pequea silt loam, 25 to 35 percent slopes, severely eroded	------	------	------	------	------	------	------	------	------	------	------	------	------	Medium
Readington loam, 0 to 3 percent slopes	65	50	30	75	40	80	80	------	60	------	------	------	------	High.
Readington loam, 3 to 8 percent slopes	70	60	40	80	50	85	90	------	65	------	------	------	------	High.
Readington loam, 3 to 8 percent slopes, moderately eroded	65	55	35	75	45	80	85	------	60	------	------	------	------	High.
Readington loam, 8 to 15 percent slopes, moderately eroded	60	50	30	70	40	75	80	------	55	------	------	------	------	High.
Riverwash	------	------	------	------	------	------	------	------	------	------	------	------	------	Low.
Rowland and Bermudian silt loams, 0 to 3 percent slopes	------	------	------	------	------	90	90	------	------	------	------	------	------	High.
Sciotoville silt loam, 0 to 3 percent slopes	80	50	35	80	40	80	85	------	65	------	------	------	------	High.

TABLE 4.—*Ratings showing the relative productivity of soils in Lancaster County, Pa.*—Continued

Soil name	Corn	Wheat	Barley	Hay		Pasture		To-bacco	Toma-toes	Pota-toes	Lima beans	Peas	Or-chard	Oak and yellow-poplar
				Clover and tim-othy	Alfalfa	Tall grass-legume	Blue-grass-clover							
	(100 = 80 bu. per acre)[1]	(100 = 38 bu. per acre)	(100 = 60 bu. per acre)	(100 = 2.5 tons per acre)	(100 = 3.5 tons per acre)	(100 = 180 cow-acre-days)[2]	(100 = 90 cow-acre-days)[2]	(100 = 1700 lb. per acre)	(100 = 10 tons per acre)	(100 = 300 bu. per acre)	(100 = 1800 lb. per acre)	(100 = 2800 lb. per acre)	[3]	[3]
Sciotoville silt loam, 3 to 6 percent slopes	85	60	40	85	50	85	87	------	70	------	------	------	------	High.
Steinsburg gravelly loam, 8 to 15 percent slopes, severely eroded	30	50	50	50	50	50	40	------	------	30	------	------	------	Medium.
Steinsburg gravelly loam, 15 to 25 percent slopes, severely eroded	------	------	------	------	------	------	------	------	------	------	------	------	------	Medium.
Steinsburg gravelly loam, 25 to 35 percent slopes	------	------	------	------	------	------	------	------	------	------	------	------	------	Low.
Watchung silt loam, 0 to 3 percent slopes	35	------	------	50	------	------	60	------	------	------	------	------	------	High.
Watchung silt loam, 3 to 8 percent slopes	40	------	------	55	------	------	65	------	------	------	------	------	------	High.
Watchung silt loam, 3 to 8 percent slopes, moderately eroded	35	------	------	50	------	------	50	------	------	------	------	------	------	High.
Watchung very stony silt loam, 0 to 8 percent slopes	------	------	------	------	------	------	75	------	------	------	------	------	------	High.
Wehadkee silt loam, 0 to 3 percent slopes	------	------	------	------	------	85	90	------	------	------	------	------	------	High.
Wheeling silt loam, 0 to 3 percent slopes	100	100	100	100	100	100	100	100	100	100	100	100	100	High.
Wheeling silt loam, 3 to 6 percent slopes, moderately eroded	95	95	95	98	98	98	95	98	95	98	95	98	100	High.
Wheeling silt loam, 6 to 12 percent slopes, moderately eroded	90	90	90	95	95	95	90	95	95	95	90	95	95	High.
Wheeling silt loam, 12 to 18 percent slopes	83	90	90	90	90	90	85	90	90	90	85	90	95	High.
Wheeling silt loam, 12 to 18 percent slopes, moderately eroded	80	85	85	85	85	85	80	80	85	87	80	87	90	High.
Whiteford slaty silt loam, 3 to 8 percent slopes, moderately eroded	78	80	80	82	75	83	70	75	75	80	85	85	95	High.
Whiteford slaty silt loam, 8 to 15 percent slopes, moderately eroded	68	70	70	75	70	78	65	70	70	70	75	75	85	High.
Whiteford slaty silt loam, 15 to 25 percent slopes, moderately eroded	50	60	60	65	65	70	50	------	------	------	------	------	75	High.

[1] If used for silage, the standard yield is 14 tons per acre.

[2] "Cow-acre-days" expresses the carrying capacity of pasture as the number of days 1 acre will graze 1 animal unit without injury to the pasture. An animal unit is 1 cow, steer, or horse, 5 hogs, or 7 sheep.

[3] Standard yield not given. Rating indicates relative suitability of the soil for this crop.

Engineering Properties of Soils

This soil survey report contains information which can be used by engineers to—

1. Make soil and land-use studies that will aid in the selection and development of industrial, business, residential, and recreational sites.

2. Make preliminary estimates of runoff and erosion, for use in designing drainage structures and planning dams and other structures for water and soil conservation.

3. Make preliminary evaluations of soil and ground conditions that will aid in selecting highway and airport locations and in planning detailed soil surveys for the intended locations.

4. Locate sand and gravel for use in structures and rock for crushing.

5. Correlate performance of engineering structures with soil mapping units, and thus develop information that will be useful in designing and maintaining the structures.

6. Determine the suitability of soil units for cross-country movements of vehicles and construction equipment.

7. Supplement information obtained from other published maps and reports and aerial photographs,

for the purpose of making soil maps and reports that can be readily used by engineers.

The mapping and descriptive reports are somewhat generalized, however, and should be used only in planning more detailed field surveys to determine the in-place condition of the soil at the site of the proposed engineering construction.

Some of the terms used by the soil scientist may be unfamiliar to the engineer, and some words—for example, soil, clay, silt, sand, aggregate, and granular—have special meanings in soil science. Most of these terms, as well as other special terms that are used in the soil survey report, are defined in the glossary.

Some of the engineering information can be obtained from the soil map. It will often be necessary, however, to refer to other parts of the report. The following sections should be most helpful: Descriptions of the Soils, Geology, and Classification of Soils of Lancaster County.

The engineering data and recommendations given in table 8 are based on the soil test data in table 5 and information in other sections of the report.

The drainage characteristics and the position of the water table affect the suitability of a soil as a source of borrow material.

Poorly and very poorly drained soils that occur in valleys and in some upland areas are likely to contain highly organic material, which should be removed from the roadway section and replaced with suitable material. In low-lying areas that are frequently flooded, roads should be built on embankments, and the pavement surface should be at least 3 feet above the water table.

In the moderately well drained to poorly drained soils, earthwork is difficult when the water table is high or during prolonged wet periods. The best time to work in these areas is during July and August. Seepage along the backslopes of cuts in these soils may result in slumping of the overlying material. If the water table is high beneath a road pavement, freezing and thawing in the saturated subgrade may cause differential volume changes that will break up the pavement. These areas, therefore, should be closely inspected to determine where the road grade should be located in relation to the water table, and whether there is a need for interceptor drains or underdrains.

Engineering Classification Systems

Two systems for classification of soils are in general use among engineers. Both will be used in this report. These classification systems are explained in the P C A Soil Primer (*14*).

A.A.S.H.O. classification system

Most highway engineers classify soil materials in accordance with the system approved by the American Association of State Highway Officials (*1*). In this system, classification is based on field performance of highways. All soil materials are classified in seven principal groups. The groups range from A–1 (gravelly soils of high bearing capacity, the best soils for subgrades) to A–7 (clay soils having low strength when wet, the poorest soils for subgrade). Within each group, the relative engineering value of the soil material is indicated by a group index number. Group indexes range from 0 for the best materials to 20 for the poorest. The group index number is in parentheses after the soil group symbol. The classification of the soils of Lancaster County according to the A.A.S.H.O. system is shown in table 7.

Unified classification system

Some engineers prefer to use the Unified soil classification system established by the Waterways Experiment Station, Corps of Engineers (*19*). This system is based on identification of soils according to their texture and plasticity and their performance as engineering construction materials. Soil materials are identified as coarse grained (8 classes), fine grained (6 classes), or highly organic. The classification of the soils of the county according to the Unified system is given in table 7.

Soil Data Related to Engineering

Soil samples from six of the principal soil series of Lancaster County were tested by standard procedures to help evaluate the soils for engineering purposes. The results of these tests and the classification of each sample according to both the A.A.S.H.O. and the Unified systems are given in table 5.

Table 6 lists the symbols and names of all the map units in the county and gives a brief description of selected characteristics such as depth, drainage, stoniness, topographic position, parent material, and depth to water table. Unified engineering classification symbols for the soil materials are estimated on the basis of field observations and of interpretations from data in table 5.

Table 7 gives the estimated physical properties for the principal layers of the soils of each series. The layers are classified separately according to the A.A.S.H.O. and the Unified systems.

At many construction sites, major variations in the soil may occur within the depth of the proposed excavation, and several soil units may occur within a short distance. The soil map, the detailed descriptions of the soils, and the engineering data and recommendations given in table 8 should be used to plan detailed surveys of soils at construction sites. Table 8 lists some of the characteristics of the soil series that may influence the selection, design, or treatment needed in engineering work related to highways or soil and water conservation. It should be used as a guide to potential hazards or characteristics that require special precautions in planning, design, or construction. The sections on Suitability for Irrigation and Suitability for Pond Construction should be used with the related information in table 8.

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TABLE 5.—*Engineering test data*[1] *for soil samples*

Soil name and location	Parent material	Bureau of Public Roads report number	Depth	Horizon	Estimated percentage larger than 3 inches discarded in field sampling	Mechanical analysis[2] Percentage			
						3 in.	2 in.	1½ in.	1 in.
			Inches						
Chester silt loam:									
2 miles E. and 1 mile S. of Ninepoints.	Schist	S30806	3 to 10	A_2				100	96
		S30807	19 to 27	B_{22}					100
		S30808	38 to 50+	C			100	99	95
0.75 mile NE. of Bartville	Schist	S30803	4 to 11	A_2					100
		S30804	18 to 27	B_{22}				100	97
		S30805	50 to 70+	C			100	92	89
Conestoga silt loam:									
0.5 mile E. of New Danville	Limestone	S30791	3 to 11	A_2					
		S30792	20 to 30	B_{22}					
		S30793	43 to 56+	C					
1 mile NE. of Manorville	Metamorphic micaceous limestone	S30794	4 to 10	A_2					
		S30795	23 to 29	B_{22}					
		S30796	34 to 45+	C					
Duffield silt loam:									
1.25 mile NE. of Landis Valley	Limestone	S30773	4 to 13	A_2					100
		S30774	19 to 26	B_{22}					
		S30775	37 to 49	B_3					
0.75 mile SE. of Bareville	Limestone	S30776	5 to 14	A_2				100	99
		S30777	28 to 34	B_{22}					100
		S30778	43 to 56	C				100	99
Edgemont channery loam:									
2 miles SE. of Strasburg	Quartzite	S30797	2 to 12	A_2	(6)			100	99
		S30798	18 to 25	B_2	40	100	93	88	82
		S30799	25 to 32	B_3	55	100	95	88	83
Edgemont loam:									
4 miles SE. of Strasburg	Quartzite	S30800	2 to 12	A_2	12	100	97	97	96
		S30801	16 to 24	B_2	45	100	95	94	93
		S30802	24 to 32+	C	75	100			81
Lansdale loam:									
1.12 mile N. of Rheems	Triassic sandstone	S30782	5 to 13	A_2					
		S30783	17 to 26	B_2				100	98
		S30784	32 to 37	C			100	94	90
0.5 mile N. of Mastersonville	Triassic sandstone, conglomerate, and arkose.	S30785	7 to 11	A_2				100	99
		S30786	15 to 19	B_{21}			100	90	89
		S30787	24 to 32	B_3			100	94	90
Montalto very stony silt loam:									
1.5 miles NW. of Newville	Diabase	S30779	2 to 11	A_2	(6)				
		S30780	19 to 26	B_{22}	(6)				
		S30781	35 to 51	B_3	(6)				
0.62 mile ESE. of Bellaire	Diabase	S30788	4 to 8	A_2	(6)	100	85	82	78
		S30789	18 to 32	B_{22}	(6)		100	97	97
		S30790	48 to 60+	C	(6)		100	98	98

[1] Tests performed by the Bureau of Public Roads in accordance with standard procedures of the American Association of State Highway Officials (A.A.S.H.O.).

[2] Mechanical analyses according to the American Association of State Highway Officials Designation T:88-54. Results by this procedure frequently may differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the A.A.S.H.O. procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 mm. in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 mm. in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this

taken from 12 soil profiles, Lancaster County, Pa.

Mechanical analysis[2]											Liquid limit	Plasticity index	Moisture-density		Classification	
passing sieve—[3]							Percentage smaller than—[3]									
¾ in.	⅜ in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.			Maximum dry density	Optimum moisture content	A.A.S.H.O.[4]	Unified[5]
													Lb. per cu. ft.	*Percent*		
93	83	75	70	64	62	55	53	43	27	18	41	11	100	21	A–7–5(4)	ML.
98	93	90	86	79	76	67	64	52	28	21	38	13	110	17	A–6(8)	ML-CL.
91	86	81	72	58	53	40	37	27	16	10	28	1	120	13	A–4(1)	SM.
99	96	94	92	89	87	79	75	62	38	26	39	11	104	20	A–6(8)	ML.
96	94	93	91	86	84	74	71	57	39	31	44	17	109	19	A–7–6(11)	ML-CL.
88	85	82	78	71	67	54	52	40	30	26	47	16	104	20	A–7–5(7)	ML.
-----	-----	100	98	96	95	88	84	67	35	22	33	8	105	18	A–4(8)	ML-CL.
-----	-----	100	99	97	96	90	87	68	42	33	45	20	107	18	A–7–6(13)	ML-CL.
-----	100	99	98	96	95	86	82	66	52	44	50	22	104	21	A–7–6(15)	ML-CL.
100	99	98	97	93	91	85	81	68	40	24	42	10	98	22	A–5(8)	ML.
-----	100	99	98	94	93	89	86	74	47	31	52	18	100	23	A–7–5(14)	MH.
-----	100	99	98	95	94	83	78	63	36	21	48	14	100	23	A–7–5(11)	ML.
99	98	97	96	94	93	90	87	65	34	23	31	8	109	16	A–4(8)	ML-CL.
100	99	98	95	91	90	86	83	68	48	39	46	22	108	18	A–7–6(14)	CL.
100	99	98	97	94	93	90	87	74	51	41	47	21	107	19	A–7–6(14)	ML-CL.
99	98	98	97	96	95	92	89	72	35	21	37	8	99	21	A–4(8)	ML.
99	99	98	97	95	94	89	85	70	48	37	46	22	108	18	A–7–6(14)	CL.
98	97	97	96	94	93	86	81	62	45	37	44	20	106	19	A–7–6(13)	CL.
97	95	94	90	84	79	39	32	21	14	10	(7)	(7)	114	12	A–4(1)	SM.
80	79	78	72	63	58	26	20	14	9	8	(7)	(7)	122	11	A–2–4(0)	SM.
82	79	76	70	58	54	24	17	11	7	6	(7)	(7)	121	10	A–2–4(0)	SM.
93	88	86	82	74	65	30	26	20	10	8	(7)	(7)	117	12	A–2–4(0)	SM.
91	90	86	75	58	54	27	19	12	7	6	(7)	(7)	124	9	A–2–4(0)	SM.
78	76	74	65	49	46	21	15	11	5	4	(7)	(7)	122	10	A–1–b(0)	SM.
100	99	98	96	84	78	64	58	44	25	15	27	4	112	14	A–4(6)	ML-CL.
96	96	96	94	79	72	59	53	41	26	19	31	11	118	13	A–6(5)	CL.
88	87	87	85	71	60	40	35	26	16	12	23	5	123	11	A–4(1)	SM-SC.
97	92	89	86	70	60	46	41	32	19	13	27	6	116	13	A–4(2)	SM-SC.
88	85	82	78	60	53	41	37	29	19	14	29	10	121	12	A–4(1)	SC.
87	84	81	75	72	70	66	63	52	32	21	28	9	121	11	A–4(6)	CL.
-----	-----	100	99	96	95	91	89	68	39	27	35	10	106	18	A–4(8)	ML-CL.
-----	-----	-----	100	98	97	93	91	78	63	54	71	34	94	27	A–7–5(20)	MH.
-----	-----	-----	100	99	99	95	92	82	67	59	75	31	85	31	A–7–5(20)	MH.
77	76	76	76	58	49	32	27	20	16	11	42	12	99	21	A–2–7(0)	SM.
97	97	97	97	96	95	92	90	80	59	46	68	31	94	26	A–7–5(20)	MH.
98	98	98	98	97	96	89	85	72	52	41	63	22	89	29	A–7–5(17)	MH.

table are not suitable for use in naming texture classes for soils.

[3] Based on total material smaller than 3 inches.

[4] Based on Standard Specifications for Highway Materials and Methods of Sampling and Testing (Pt. 1): The Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes, A.A.S.H.O. Designation: M 145–49.

[5] Based on the Unified Soil Classification System, Technical Memorandum No. 3–357, Vol. 1, Waterways Experiment Station, Corps of Engineers, March 1953.

[6] Soil normally contains some stones larger than 3 inches in size.

[7] Nonplastic.

TABLE 6.—*Soil map units and selected characteristics significant to engineering*

Map symbol	Name	Depth to bedrock	Selected characteristics significant to engineering
		Inches	
AaB2	Aldino gravelly silt loam, 3 to 8 percent slopes, moderately eroded.	14 to 24	Somewhat poorly drained to poorly drained upland soils, formed from serpentine. Mainly CL to bedrock. Acid. Water table 0 to 24 inches from surface in some seasons.
AaC2	Aldino gravelly silt loam, 8 to 15 percent slopes, moderately eroded.	14 to 24	
AaD3	Aldino gravelly silt loam, 15 to 25 percent slopes, severely eroded.	8 to 16	
AbB	Aldino stony silt loam, 3 to 8 percent slopes	16 to 24	Somewhat poorly drained to poorly drained upland soils, formed from serpentine. Contains numerous boulders. Mainly CL to bedrock. Acid. Water table 0 to 24 inches from surface in some seasons.
AbC	Aldino stony silt loam, 8 to 15 percent slopes	16 to 24	
AbD	Aldino stony silt loam, 15 to 25 percent slopes	0 to 24	
Ac	Alluvial land	36 or more	Poorly drained flood-plain soils. Classification varies from OL to SC to bedrock. Acidity varies. Water table 0 to 24 inches from surface. Frequently flooded.
BaA	Bedington silt loam, 0 to 3 percent slopes	36 to 42	Well-drained upland soils, formed from shale. Mainly CL to bedrock. Acid. Water table more than 3 feet below surface.
BaB2	Bedington silt loam, 3 to 8 percent slopes, moderately eroded.	30 to 40	
BbA	Berks shaly silt loam, 0 to 3 percent slopes	20 to 24	Well-drained upland soils, formed from shale. Mainly GC to bedrock. Acid. Water table more than 3 feet below surface.
BbB	Berks shaly silt loam, 3 to 8 percent slopes	18 to 24	
BbB2	Berks shaly silt loam, 3 to 8 percent slopes, moderately eroded.	12 to 20	
BbC2	Berks shaly silt loam, 8 to 15 percent slopes, moderately eroded.	12 to 18	
BbC3	Berks shaly silt loam, 8 to 15 percent slopes, severely eroded.	8 to 16	
BbD	Berks shaly silt loam, 15 to 25 percent slopes	16 to 24	
BbD2	Berks shaly silt loam, 15 to 25 percent slopes, moderately eroded.	14 to 20	
BbD3	Berks shaly silt loam, 15 to 25 percent slopes, severely eroded.	8 to 16	
BbE	Berks shaly silt loam, 25 to 35 percent slopes	14 to 20	
BbE2	Berks shaly silt loam, 25 to 35 percent slopes, moderately eroded.	12 to 16	
BbE3	Berks shaly silt loam, 25 to 35 percent slopes, severely eroded.	8 to 14	
BcA	Berks silt loam, brown subsoil, 0 to 3 percent slopes	24 to 40	Well-drained upland soils, formed from shale. Mainly GC to bedrock. Acid. Water table more than 3 feet below surface.
BcB	Berks silt loam, brown subsoil, 3 to 8 percent slopes	24 to 40	
BcB2	Berks silt loam, brown subsoil, 3 to 8 percent slopes, moderately eroded.	16 to 32	
BcB3	Berks silt loam, brown subsoil, 3 to 8 percent slopes, severely eroded.	10 to 26	
BcC2	Berks silt loam, brown subsoil, 8 to 15 percent slopes, moderately eroded.	20 to 30	
BcD2	Berks silt loam, brown subsoil, 15 to 25 percent slopes, moderately eroded.	20 to 30	
BdA	Birdsboro silt loam, 0 to 3 percent slopes	60 or more	Well-drained terrace soils, formed from stream-deposited materials. ML to SM to depths of 60 inches or more. Occasionally flooded. Acid. Water table more than 3 feet below surface.
BdB2	Birdsboro silt loam, 3 to 6 percent slopes, moderately eroded.	60 or more	
BeA	Blairton silt loam, 0 to 3 percent slopes	32 to 48	Moderately well-drained soils, formed from shale. Mainly CL and GC to bedrock. Acid. Water table 20 to 36 inches from surface in some seasons.
BeB	Blairton silt loam, 3 to 8 percent slopes	30 to 40	
BeB2	Blairton silt loam, 3 to 8 percent slopes, moderately eroded.	24 to 36	
BeC2	Blairton silt loam, 8 to 15 percent slopes, moderately eroded.	20 to 30	
BfA	Bowmansville silt loam, 0 to 6 percent slopes	36 or more	Poorly drained flood-plain soil, formed from alluvium derived from sandstone, siltstone, and shale. Mainly CH to SM to bedrock. Acid. Variable depth to bedrock. Frequently flooded. Water table 0 to 24 inches from surface.
BgA	Brecknock silt loam, 0 to 3 percent slopes	30 to 40	Well-drained upland soils, formed from porcelainite or hard shale. Mainly GC to bedrock. Acid. Water table more than 3 feet below surface.
BgB2	Brecknock silt loam, 3 to 8 percent slopes, moderately eroded.	28 to 36	
BgC2	Brecknock silt loam, 8 to 15 percent slopes, moderately eroded.	24 to 34	

TABLE 6.—*Soil map units and selected characteristics significant to engineering*—Continued

Map symbol	Name	Depth to bedrock	Selected characteristics significant to engineering
		Inches	
BhA	Brecknock slaty silt loam, 0 to 3 percent slopes	30 to 40	Well-drained upland soils, formed from porcelainite or hard shale. Mainly GC to bedrock. Acid. Water table more than 3 feet below surface.
BhB	Brecknock slaty silt loam, 3 to 8 percent slopes	24 to 30	
BhB2	Brecknock slaty silt loam, 3 to 8 percent slopes, moderately eroded.	22 to 30	
BhC2	Brecknock slaty silt loam, 8 to 15 percent slopes, moderately eroded.	20 to 30	
BhD	Brecknock slaty silt loam, 15 to 25 percent slopes	22 to 30	
BhD2	Brecknock slaty silt loam, 15 to 25 percent slopes, moderately eroded.	18 to 24	
BhE	Brecknock slaty silt loam, 25 to 35 percent slopes	18 to 24	
BkA	Brecknock stony silt loam, 0 to 8 percent slopes	30 to 40	Well-drained upland soils, formed from porcelainite or hard shale. Mainly GC to bedrock. Acid. Water table more than 3 feet below surface.
BkC	Brecknock stony silt loam, 8 to 15 percent slopes	24 to 30	
CaA	Cardiff slaty silt loam, 0 to 3 percent slopes	30 to 36	Well-drained upland soils, formed from phyllite. Mainly GC to bedrock. Acid. Water table more than 3 feet below surface.
CaB2	Cardiff slaty silt loam, 3 to 8 percent slopes, moderately eroded.	24 to 36	
CaC2	Cardiff slaty silt loam, 8 to 15 percent slopes, moderately eroded.	24 to 30	
CaD2	Cardiff slaty silt loam, 15 to 25 percent slopes, moderately eroded.	20 to 28	
CaE	Cardiff slaty silt loam, 25 to 35 percent slopes	18 to 24	
CbA	Chester channery sandy loam, 0 to 3 percent slopes	36 to 120 or more.	Well-drained upland soils, formed from schist and gneiss. Mainly SM to bedrock. Acid. Water table more than 3 feet below surface.
CbB	Chester channery sandy loam, 3 to 6 percent slopes	36 to 120 or more.	
CbB2	Chester channery sandy loam, 3 to 6 percent slopes, moderately eroded.	36 to 120 or more.	
CbC	Chester channery sandy loam, 6 to 12 percent slopes	36 to 120 or more.	
CbC2	Chester channery sandy loam, 6 to 12 percent slopes, moderately eroded.	30 to 120 or more.	
CcA	Chester loam, 0 to 3 percent slopes	36 to 120 or more.	Well-drained upland soils, formed from schist and gneiss. Mainly SM and ML to bedrock. Acid. Water table more than 3 feet below surface.
CcB	Chester loam, 3 to 6 percent slopes	36 to 120 or more.	
CcB2	Chester loam, 3 to 6 percent slopes, moderately eroded	36 to 120 or more.	
CcC	Chester loam, 6 to 12 percent slopes	36 to 120 or more.	
CcC2	Chester loam, 6 to 12 percent slopes, moderately eroded.	36 to 120 or more.	
CcC3	Chester loam, 6 to 12 percent slopes, severely eroded	30 to 120 or more.	
CcD	Chester loam, 12 to 18 percent slopes	36 to 120 or more.	
CcD2	Chester loam, 12 to 18 percent slopes, moderately eroded.	36 to 120 or more.	
CdA	Chester silt loam, 0 to 3 percent slopes	36 to 120 or more.	Well-drained upland soils, formed from schist and gneiss. Mainly ML and CL to bedrock. Acid. Water table more than 3 feet below surface.
CdB	Chester silt loam, 3 to 6 percent slopes	36 to 120 or more.	
CdB2	Chester silt loam, 3 to 6 percent slopes, moderately eroded.	36 to 120 or more.	
CdB3	Chester silt loam, 3 to 6 percent slopes, severely eroded.	36 to 120 or more.	
CdC	Chester silt loam, 6 to 12 percent slopes	36 to 120 or more.	
CdC2	Chester silt loam, 6 to 12 percent slopes, moderately eroded.	36 to 120 or more.	
CdC3	Chester silt loam, 6 to 12 percent slopes, severely eroded.	30 to 120 or more.	
CdD	Chester silt loam, 12 to 18 percent slopes	36 to 120 or more.	
CdD2	Chester silt loam, 12 to 18 percent slopes, moderately eroded.	36 to 120 or more.	

TABLE 6.—*Soil map units and selected characteristics significant to engineering*—Continued

Map symbol	Name	Depth to bedrock	Selected characteristics significant to engineering
		Inches	
CeA	Chester stony loam, 0 to 6 percent slopes	36 to 120 or more.	Well-drained stony upland soils, formed from schist and gneiss. Mainly SM and ML to bedrock. Acid. Water table more than 3 feet below surface.
CeC	Chester stony loam, 6 to 12 percent slopes	36 to 120 or more.	
CeD	Chester stony loam, 12 to 18 percent slopes	36 to 120 or more.	
CeE	Chester stony loam, 18 to 25 percent slopes	36 to 120 or more.	
CfA	Chewalca silt loam, 0 to 3 percent slopes	36 or more	Moderately well drained flood-plain soil, formed from alluvium derived from schist and gneiss. Mainly ML or MH to depths of 3 feet or more. Acidity varies. Frequently flooded.
CgA	Conestoga silt loam, 0 to 3 percent slopes	36 to 96 or more.	Deep well-drained upland soils, formed from micaceous limestone. Mainly ML and CL to bedrock. Acid surface soil, calcareous substratum. Water table more than 3 feet below surface.
CgB	Conestoga silt loam, 3 to 6 percent slopes	36 to 96 or more.	
CgB2	Conestoga silt loam, 3 to 6 percent slopes, moderately eroded.	36 to 96 or more.	
CgB3	Conestoga silt loam, 3 to 6 percent slopes, severely eroded.	36 to 96 or more.	
CgC	Conestoga silt loam, 6 to 12 percent slopes	36 to 96 or more.	
CgC2	Conestoga silt loam, 6 to 12 percent slopes, moderately eroded.	36 to 96 or more.	
CgC3	Conestoga silt loam, 6 to 12 percent slopes, severely eroded.	36 to 84	
CgD2	Conestoga silt loam, 12 to 18 percent slopes, moderately eroded.	36 to 84	
CgD3	Conestoga silt loam, 12 to 18 percent slopes, severely eroded.	36 to 72	
CgE2	Conestoga silt loam, 18 to 25 percent slopes, moderately eroded.	36 to 72	
CmA	Congaree silt loam, 0 to 3 percent slopes	36 or more	Well-drained flood-plain soil, formed from alluvium from schist and gneiss. Mainly ML or SM to depths of 36 inches or more. Acid. Water table more than 3 feet below surface. Frequently flooded.
ChA	Croton loam, 0 to 3 percent slopes	24 to 40	Poorly drained upland soils, formed from shale, siltstone, and sandstone. Mainly SC to CL to bedrock. Acid. Water table 0 to 20 inches from surface.
ChB2	Croton loam, 3 to 8 percent slopes, moderately eroded	24 to 36	
ChC2	Croton loam, 8 to 15 percent slopes, moderately eroded	20 to 30	
CkA	Croton silt loam, 0 to 3 percent slopes	24 to 40	Poorly drained upland soils, formed from shale, siltstone, and sandstone. Mainly CL to ML to bedrock. Acid. Water table 0 to 20 inches from surface in some seasons.
CkB	Croton silt loam, 3 to 6 percent slopes	24 to 36	
CkB2	Croton silt loam, 3 to 6 percent slopes, moderately eroded.	24 to 30	
CkC2	Croton silt loam, 6 to 12 percent slopes, moderately eroded.	18 to 24	
DaA	Duffield gravelly silt loam, 0 to 3 percent slopes	36 to 96 or more.	Deep, well-drained upland soils, formed from impure cherty or flinty limestone. Mainly ML or CL to bedrock. Acid surface soil. Water table usually very deep.
DaA2	Duffield gravelly silt loam, 0 to 3 percent slopes, moderately eroded.	36 to 96 or more.	
DaB	Duffield gravelly silt loam, 3 to 6 percent slopes	36 to 96 or more.	
DaB2	Duffield gravelly silt loam, 3 to 6 percent slopes, moderately eroded.	36 to 96 or more.	
DaC2	Duffield gravelly silt loam, 6 to 12 percent slopes, moderately eroded.	36 to 96 or more.	
DaC3	Duffield gravelly silt loam, 6 to 12 percent slopes, severely eroded.	36 to 84	
DaD2	Duffield gravelly silt loam, 12 to 18 percent slopes, moderately eroded.	36 to 84	

TABLE 6.—*Soil map units and selected characteristics significant to engineering*—Continued

Map symbol	Name	Depth to bedrock	Selected characteristics significant to engineering
		Inches	
DbA	Duffield silt loam, 0 to 3 percent slopes	36 to 96 or more.	Deep, well-drained upland soils, formed from impure limestone. Mainly ML or CL to bedrock. Acid surface soil. Water table usually very deep.
DbA2	Duffield silt loam, 0 to 3 percent slopes, moderately eroded.	36 to 96 or more.	
DbB	Duffield silt loam, 3 to 6 percent slopes	36 to 96 or more.	
DbB2	Duffield silt loam, 3 to 6 percent slopes, moderately eroded.	36 to 96 or more.	
DbB3	Duffield silt loam, 3 to 6 percent slopes, severely eroded.	36 to 96 or more.	
DbC	Duffield silt loam, 6 to 12 percent slopes	36 to 96 or more.	
DbC2	Duffield silt loam, 6 to 12 percent slopes, moderately eroded.	36 to 96 or more.	
DbC3	Duffield silt loam, 6 to 12 percent slopes, severely eroded.	36 to 84	
DbD	Duffield silt loam, 12 to 18 percent slopes	36 to 84	
DbD2	Duffield silt loam, 12 to 18 percent slopes, moderately eroded.	36 to 84	
DbD3	Duffield silt loam, 12 to 18 percent slopes, severely eroded.	36 to 72	
DbE	Duffield silt loam, 18 to 30 percent slopes	36 to 72	
EaA	Edgemont channery loam, 0 to 3 percent slopes	36 to 48	Deep, well-drained upland soils, formed from quartzite. Contain many angular rock fragments up to 6 inches long. Mainly SM to bedrock. Acid. Water table more than 3 feet below surface.
EaB	Edgemont channery loam, 3 to 8 percent slopes	36 to 40	
EaB2	Edgemont channery loam, 3 to 8 percent slopes, moderately eroded.	30 to 36	
EaB3	Edgemont channery loam, 3 to 8 percent slopes, severely eroded.	30 to 36	
EaC	Edgemont channery loam, 8 to 15 percent slopes	30 to 36	
EaC2	Edgemont channery loam, 8 to 15 percent slopes, moderately eroded.	28 to 32	
EaC3	Edgemont channery loam, 8 to 15 percent slopes, severely eroded.	26 to 30	
EaD	Edgemont channery loam, 15 to 25 percent slopes	30 to 36	
EaD2	Edgemont channery loam, 15 to 25 percent slopes, moderately eroded.	26 to 30	
EaD3	Edgemont channery loam, 15 to 25 percent slopes, severely eroded.	24 to 30	
EaE	Edgemont channery loam, 25 to 35 percent slopes	24 to 36	
EaE2	Edgemont channery loam, 25 to 35 percent slopes, moderately eroded.	22 to 30	
EaE3	Edgemont channery loam, 25 to 35 percent slopes, severely eroded.	20 to 26	
EbA	Edgemont channery silt loam, 0 to 3 percent slopes	36 to 48	Deep, well-drained upland soils, formed from quartzite. Contain many angular rock fragments up to 6 inches long. Mainly SM to bedrock. Acid. Water table more than 3 feet below surface.
EbB	Edgemont channery silt loam, 3 to 8 percent slopes	36 to 40	
EbB2	Edgemont channery silt loam, 3 to 8 percent slopes, moderately eroded.	30 to 36	
EbB3	Edgemont channery silt loam, 3 to 8 percent slopes, severely eroded.	28 to 32	
EbC	Edgemont channery silt loam, 8 to 15 percent slopes	30 to 36	
EbC2	Edgemont channery silt loam, 8 to 15 percent slopes, moderately eroded.	28 to 32	
EbC3	Edgemont channery silt loam, 8 to 15 percent slopes, severely eroded.	26 to 30	
EbD	Edgemont channery silt loam, 15 to 25 percent slopes	30 to 36	
EbD2	Edgemont channery silt loam, 15 to 25 percent slopes, moderately eroded.	26 to 30	
EbD3	Edgemont channery silt loam, 15 to 25 percent slopes, severely eroded.	24 to 28	

TABLE 6.—*Soil map units and selected characteristics significant to engineering*—Continued

Map symbol	Name	Depth to bedrock	Selected characteristics significant to engineering
		Inches	
EcA	Edgemont loam, 0 to 3 percent slopes	36 to 48	Deep, well-drained upland soils, formed from quartzite. Mainly SM to bedrock. Acid. Water table more than 3 feet below surface.
EcB	Edgemont loam, 3 to 8 percent slopes	36 to 40	
EcB2	Edgemont loam, 3 to 8 percent slopes, moderately eroded.	30 to 34	
EcC	Edgemont loam, 8 to 15 percent slopes	30 to 36	
EcC2	Edgemont loam, 8 to 15 percent slopes, moderately eroded.	28 to 32	
EcC3	Edgemont loam, 8 to 15 percent slopes, severely eroded.	26 to 30	
EcD2	Edgemont loam, 15 to 25 percent slopes, moderately eroded.	24 to 30	
EcD3	Edgemont loam, 15 to 25 percent slopes, severely eroded.	20 to 28	
EdA	Edgemont silt loam, moderately well drained variant, 0 to 3 percent slopes.	30 to 48	Moderately well drained upland soil, formed from quartzite. Mainly SM or ML to bedrock. Acid. Water table 20 to 36 inches from surface in some seasons.
EfA	Edgemont very stony loam, 0 to 8 percent slopes	36 to 48	Deep, well-drained, very stony soils, formed from quartzite. Mainly SM to bedrock. Acid. Water table more than 3 feet below surface.
EfC	Edgemont very stony loam, 8 to 15 percent slopes	30 to 36	
EfD	Edgemont very stony loam, 15 to 25 percent slopes	24 to 30	
EfE	Edgemont very stony loam, 25 to 40 percent slopes	20 to 30	
EgA	Elioak silt loam, 0 to 3 percent slopes	36 to 144 or more.	Deep, well-drained upland soils, formed from schist. Mainly ML or CL to bedrock. Acid. Water table usually deep.
EgB	Elioak silt loam, 3 to 6 percent slopes	36 to 120	
EgB2	Elioak silt loam, 3 to 6 percent slopes, moderately eroded.	36 to 110	
EgC	Elioak silt loam, 6 to 12 percent slopes	36 to 100	
EgC2	Elioak silt loam, 6 to 12 percent slopes, moderately eroded.	36 to 90	
EgC3	Elioak silt loam, 6 to 12 percent slopes, severely eroded.	36 to 48	
EgD2	Elioak silt loam, 12 to 18 percent slopes, moderately eroded.	36 to 72	
EgD3	Elioak silt loam, 12 to 18 percent slopes, severely eroded.	36 to 48	
EhA	Elk gravelly silt loam, 0 to 3 percent slopes	36 to 72 or more.	Well-drained terrace soils, formed from mixed stream-deposited materials. Mainly ML and SM to depths of 36 to 72 or more inches. Acidity varies. Water table more than 3 feet below surface. Seldom flooded.
EhB2	Elk gravelly silt loam, 3 to 6 percent slopes, moderately eroded.	36 to 60 or more.	
EhC2	Elk gravelly silt loam, 6 to 12 percent slopes, moderately eroded.	36 to 60 or more.	
GaC3	Glenelg channery sandy loam, 6 to 12 percent slopes, severely eroded.	30 to 48	Moderately deep, well-drained soils, formed from schist and gneiss. Contain rock fragments up to 6 inches long. Mainly ML or CL to bedrock. Acid. Water table usually deep.
GaD3	Glenelg channery sandy loam, 12 to 18 percent slopes, severely eroded.	24 to 36	
GaE3	Glenelg channery sandy loam, 18 to 25 percent slopes, severely eroded.	20 to 30	
GbB2	Glenelg silt loam, 3 to 6 percent slopes, moderately eroded.	30 to 120 or more.	Moderately deep, well-drained soils, formed from schist and gneiss. Mainly ML or CL to bedrock. Acid. Water table usually deep.
GbC2	Glenelg silt loam, 6 to 12 percent slopes, moderately eroded.	24 to 120 or more.	
GbC3	Glenelg silt loam, 6 to 12 percent slopes, severely eroded.	20 to 120 or more.	
GbD2	Glenelg silt loam, 12 to 18 percent slopes, moderately eroded.	24 to 120 or more.	
GbD3	Glenelg silt loam, 12 to 18 percent slopes, severely eroded.	20 to 120 or more.	
GbE	Glenelg silt loam, 18 to 25 percent slopes	24 to 120 or more.	
GbE2	Glenelg silt loam, 18 to 25 percent slopes, moderately eroded.	24 to 120 or more.	
GbE3	Glenelg silt loam, 18 to 25 percent slopes, severely eroded.	20 to 120 or more.	

TABLE 6.—*Soil map units and selected characteristics significant to engineering*—Continued

Map symbol	Name	Depth to bedrock	Selected characteristics significant to engineering
		Inches	
GcA	Glenville silt loam, 0 to 3 percent slopes	48 to 120 or more.	Moderately well drained soils, formed from schist and gneiss. Mainly ML or CL to bedrock. Acid. Water table 20 to 30 inches from surface in some seasons.
GcB	Glenville silt loam, 3 to 6 percent slopes	48 to 120 or more.	
GcB2	Glenville silt loam, 3 to 6 percent slopes, moderately eroded.	48 to 120 or more.	
GcC2	Glenville silt loam, 6 to 12 percent slopes, moderately eroded.	36 to 120 or more.	
HaA	Hagerstown silt loam, 0 to 3 percent slopes	36 to 96 or more.	Deep, well-drained soils, formed from pure limestone and dolomite. Mainly CL or MH to bedrock. Acid. Water table more than 3 feet below surface.
HaA2	Hagerstown silt loam, 0 to 3 percent slopes, moderately eroded.	36 to 96 or more.	
HaB	Hagerstown silt loam, 3 to 6 percent slopes	36 to 96 or more.	
HaB2	Hagerstown silt loam, 3 to 6 percent slopes, moderately eroded.	36 to 96 or more.	
HaC2	Hagerstown silt loam, 6 to 12 percent slopes, moderately eroded.	30 to 96 or more.	
HaD2	Hagerstown silt loam, 12 to 18 percent slopes, moderately eroded.	30 to 96 or more.	
HaE2	Hagerstown silt loam, 18 to 25 percent slopes, moderately eroded.	30 to 96 or more.	
HbB2	Hollinger silt loam, 3 to 8 percent slopes, moderately eroded.	20 to 60	Moderately deep to shallow, well-drained soils, formed from micaceous limestone or calcareous schist. Mainly ML or MH to bedrock. Acid surface soil, calcareous substratum. Water table is deep.
HbC2	Hollinger silt loam, 8 to 15 percent slopes, moderately eroded.	16 to 54	
HbD2	Hollinger silt loam, 15 to 25 percent slopes, moderately eroded.	14 to 48	
HbE	Hollinger silt loam, 25 to 35 percent slopes	12 to 48	
HcA	Huntington fine sandy loam, 0 to 3 percent slopes	36 or more	Well-drained flood-plain soil, formed from alluvium derived from calcareous upland soils. Mainly SM or ML to depths of 36 inches or more. Neutral reaction. Water table more than 3 feet below surface. Occasionally flooded.
HdA	Huntington silt loam, 0 to 3 percent slopes	36 or more	Well-drained flood-plain soil, formed from alluvium from calcareous upland soils. Mainly ML to depths of 36 inches or more. Neutral reaction. Water table more than 3 feet below surface. Occasionally flooded.
HeA	Huntington silt loam, local alluvium, 0 to 3 percent slopes.	48 or more	Moderately well drained soil, formed from alluvium derived from calcareous upland soils. Mainly ML to depths of 48 inches or more. Neutral reaction. Water table more than 30 inches below surface. Frequently flooded in some locations.
LaA	Lansdale gravelly loam, 0 to 3 percent slopes	36 to 48	Deep, well-drained upland soils, formed from yellowish-gray sandstone and conglomerate. GM to CL to bedrock. Acid. Water table more than 3 feet below surface.
LaB2	Lansdale gravelly loam, 3 to 8 percent slopes, moderately eroded.	30 to 48	
LaC2	Lansdale gravelly loam, 8 to 15 percent slopes, moderately eroded.	30 to 42	
LaC3	Lansdale gravelly loam, 8 to 15 percent slopes, severely eroded.	27 to 40	
LaD2	Lansdale gravelly loam, 15 to 25 percent slopes, moderately eroded.	27 to 42	
LaD3	Lansdale gravelly loam, 15 to 25 percent slopes, severely eroded.	24 to 36	
LaE	Lansdale gravelly loam, 25 to 40 percent slopes	20 to 40	
LbA	Lansdale loam, 0 to 3 percent slopes	36 to 54	Deep, well-drained upland soils, formed from yellowish-gray sandstone. SM to CL to bedrock. Acid. Water table more than 3 feet below surface.
LbB	Lansdale loam, 3 to 8 percent slopes	36 to 54	
LbB2	Lansdale loam, 3 to 8 percent slopes, moderately eroded.	30 to 48	
LbC2	Lansdale loam, 8 to 15 percent slopes, moderately eroded.	24 to 48	
LbD	Lansdale loam, 15 to 25 percent slopes	24 to 42	

TABLE 6.—*Soil map units and selected characteristics significant to engineering*—Continued

Map symbol	Name	Depth to bedrock	Selected characteristics significant to engineering
		Inches	
LcA	Lansdale sandy loam, 0 to 3 percent slopes	36 to 60	Deep, well-drained upland soils, formed from yellowish-gray sandstone. Mainly SM or CL to bedrock. Acid. Water table more than 3 feet below surface.
LcB	Lansdale sandy loam, 3 to 8 percent slopes	36 to 60	
LcB2	Lansdale sandy loam, 3 to 8 percent slopes, moderately eroded.	30 to 54	
LcC	Lansdale sandy loam, 8 to 15 percent slopes	30 to 54	
LdA	Lansdale stony sandy loam, 0 to 8 percent slopes	36 to 60	Deep, well-drained stony soils, formed from yellowish-gray sandstone and conglomerate. GM to CL to bedrock. Acid. Water table more than 3 feet below surface.
LdC	Lansdale stony sandy loam, 8 to 15 percent slopes	30 to 60	
LdD	Lansdale stony sandy loam, 15 to 25 percent slopes	24 to 54	
LdE	Lansdale stony sandy loam, 25 to 35 percent slopes	20 to 48	
LeA	Lawrence silt loam, 0 to 3 percent slopes	48 to 96	Moderately well drained to poorly drained upland soils, formed from limestone. Mainly ML and CL to bedrock. Neutral reaction. Water table 0 to 30 inches from surface in some seasons.
LeB2	Lawrence silt loam, 3 to 6 percent slopes, moderately eroded.	36 to 96	
LfA	Lehigh silt loam, 0 to 3 percent slopes	36 to 48	Moderately well drained to somewhat poorly drained upland soils, formed from porcelainite or hard shale. Mainly ML and CL to bedrock. Acid. Water table 12 to 30 inches from surface in some seasons.
LfB2	Lehigh silt loam, 3 to 8 percent slopes, moderately eroded.	30 to 45	
LgB2	Lehigh slaty silt loam, 3 to 8 percent slopes, moderately eroded.	24 to 42	Moderately well drained to somewhat poorly drained upland soils, formed from porcelainite or hard shale. Mainly ML and CL to bedrock. Acid. Water table 12 to 30 inches from surface in some seasons.
LgC2	Lehigh slaty silt loam, 8 to 15 percent slopes, moderately eroded.	24 to 36	
LgD2	Lehigh slaty silt loam, 15 to 25 percent slopes, moderately eroded.	24 to 36	
LhA	Letort silt loam, 0 to 3 percent slopes	36 to 96 or more.	Deep, well-drained upland soils, formed from dark calcareous schist. ML to MH to bedrock. Acid. Water table more than 3 feet below surface.
LhB2	Letort silt loam, 3 to 6 percent slopes, moderately eroded.	36 to 84	
LhC2	Letort silt loam, 6 to 12 percent slopes, moderately eroded.	36 to 84	
LhC3	Letort silt loam, 6 to 12 percent slopes, severely eroded.	36 to 72	
LhD2	Letort silt loam, 12 to 18 percent slopes, moderately eroded.	36 to 84	
LhE2	Letort silt loam, 18 to 25 percent slopes, moderately eroded.	36 to 72	
LkA	Lewisberry gravelly sandy loam, 0 to 3 percent slopes	30 to 60	Deep, well-drained upland soils, formed from red sandstone and conglomerate. Mainly SM to GC to bedrock. Acid. Water table more than 3 feet below surface.
LkB2	Lewisberry gravelly sandy loam, 3 to 8 percent slopes, moderately eroded.	27 to 45	
LkC2	Lewisberry gravelly sandy loam, 8 to 15 percent slopes, moderately eroded.	27 to 45	
LkD2	Lewisberry gravelly sandy loam, 15 to 25 percent slopes, moderately eroded.	24 to 42	
LmA	Lewisberry stony sandy loam, 0 to 8 percent slopes	24 to 48	Deep, well-drained stony soils, formed from red sandstone and conglomerate. Mainly SM to CL to bedrock. Acid. Water table is deep.
LmC	Lewisberry stony sandy loam, 8 to 15 percent slopes	24 to 48	
LmD	Lewisberry stony sandy loam, 15 to 25 percent slopes	24 to 48	
LmE	Lewisberry stony sandy loam, 25 to 40 percent slopes	24 to 48	
LnA	Lindside silt loam, 0 to 3 percent slopes	36 or more	Moderately well drained to somewhat poorly drained flood-plain soil, formed from alluvium derived from limestone. Mainly ML and CL to depths of 36 or more inches. Neutral reaction. Frequently flooded. Water table 20 to 30 inches from surface in some seasons.
LoA	Lindside silt loam, local alluvium, 0 to 3 percent slopes.	36 or more	Moderately well drained to somewhat poorly drained soils, formed from alluvium originating in limestone uplands. Mainly ML and CL to depths of 36 inches or more. Neutral reaction. Frequently flooded in some places. Water table 20 to 30 inches from surface in some seasons.
LoB	Lindside silt loam, local alluvium, 3 to 6 percent slopes.	36 or more	

TABLE 6.—*Soil map units and selected characteristics significant to engineering*—Continued

Map symbol	Name	Depth to bedrock	Selected characteristics significant to engineering
		Inches	
MaB2	Manor channery loam, 3 to 8 percent slopes, moderately eroded.	16 to 48	Shallow, well-drained upland soils, formed from schist and gneiss. Contain rock fragments up to 6 inches in length. Mainly SM to ML to bedrock. Acid. Water table usually deep.
MaC	Manor channery loam, 8 to 15 percent slopes	16 to 48	
MaC2	Manor channery loam, 8 to 15 percent slopes, moderately eroded.	14 to 42	
MaD	Manor channery loam, 15 to 25 percent slopes	14 to 40	
MaD2	Manor channery loam, 15 to 25 percent slopes, moderately eroded.	12 to 36	
MbB	Manor channery silt loam, 3 to 8 percent slopes	18 to 120 or more.	Shallow, well-drained upland soils, formed from schist and gneiss. Contain numerous rock fragments up to 6 inches in length. Mainly ML to MH to bedrock. Acid. Water table usually deep.
MbB2	Manor channery silt loam, 3 to 8 percent slopes, moderately eroded.	16 to 120 or more.	
MbB3	Manor channery silt loam, 3 to 8 percent slopes, severely eroded.	10 to 120 or more.	
MbC	Manor channery silt loam, 8 to 15 percent slopes	16 to 120 or more.	
MbC2	Manor channery silt loam, 8 to 15 percent slopes, moderately eroded.	14 to 120 or more.	
MbC3	Manor channery silt loam, 8 to 15 percent slopes, severely eroded.	8 to 120 or more.	
MbD	Manor channery silt loam, 15 to 25 percent slopes	14 to 120 or more.	
MbD2	Manor channery silt loam, 15 to 25 percent slopes, moderately eroded.	12 to 120 or more.	
McB2	Manor silt loam, 3 to 8 percent slopes, moderately eroded.	16 to 120 or more.	Shallow, well-drained upland soils, formed from schist and gneiss. Mainly ML or MH to bedrock. Acid. Water table usually deep.
McC	Manor silt loam, 8 to 15 percent slopes	16 to 120 or more.	
McC2	Manor silt loam, 8 to 15 percent slopes, moderately eroded.	14 to 120 or more.	
McC3	Manor silt loam, 8 to 15 percent slopes, severely eroded.	8 to 120 or more.	
McD	Manor silt loam, 15 to 25 percent slopes	14 to 120 or more.	
McD2	Manor silt loam, 15 to 25 percent slopes, moderately eroded.	12 to 120 or more.	
MdD3	Manor soils, 15 to 25 percent slopes, severely eroded	8 to 120 or more.	Shallow, well-drained upland soils, formed from schist and gneiss. SM to MH to bedrock. Content of coarse fragments varies. Acid. Water table usually deep.
MdE	Manor soils, 25 to 40 percent slopes	12 to 120 or more.	
MdE2	Manor soils, 25 to 40 percent slopes, moderately eroded	10 to 120 or more.	
MdE3	Manor soils, 25 to 40 percent slopes, severely eroded	6 to 120 or more.	
MeA	Manor stony loam, 0 to 8 percent slopes	16 to 48	Shallow, well-drained, stony upland soils, formed from schist and gneiss. Mainly SM or MH to bedrock. Acid. Water table usually deep.
MeC	Manor stony loam, 8 to 15 percent slopes	16 to 48	
MeC2	Manor stony loam, 8 to 15 percent slopes, moderately eroded.	12 to 48	
MeD	Manor stony loam, 15 to 25 percent slopes	14 to 40	
MeD2	Manor stony loam, 15 to 25 percent slopes, moderately eroded.	12 to 36	
MeE	Manor stony loam, 25 to 40 percent slopes	12 to 36	
MfA	Melvin silt loam, 0 to 3 percent slopes	36 or more	Poorly drained to somewhat poorly drained upland soil, formed from limestone. Mainly ML to CL to 36 inches or more. Neutral reaction. Water table 0 to 18 inches from surface in some seasons.

TABLE 6.—*Soil map units and selected characteristics significant to engineering*—Continued

Map symbol	Name	Depth to bedrock	Selected characteristics significant to engineering
		Inches	
MgA	Montalto channery silt loam, 0 to 3 percent slopes	36 to 60	Deep, well-drained upland soils, formed from diabase. Contain rock fragments up to 6 inches in length. Mainly MH and ML to bedrock. Acid. Water table more than 3 feet below surface.
MgB	Montalto channery silt loam, 3 to 8 percent slopes	36 to 60	
MgB2	Montalto channery silt loam, 3 to 8 percent slopes, moderately eroded.	30 to 60	
MgC	Montalto channery silt loam, 8 to 15 percent slopes	36 to 60	
MgC2	Montalto channery silt loam, 8 to 15 percent slopes, moderately eroded.	30 to 60	
MgD	Montalto channery silt loam, 15 to 25 percent slopes	36 to 54	
MgD2	Montalto channery silt loam, 15 to 25 percent slopes, moderately eroded.	30 to 54	
MgE	Montalto channery silt loam, 25 to 35 percent slopes	30 to 54	
MkA	Montalto extremely stony silt loam, 0 to 8 percent slopes.	36 to 60	Deep, well-drained upland soils, formed from diabase. Contain very large boulders. Mainly MH to ML to bedrock. Acid. Water table more than 3 feet below surface.
MkC	Montalto extremely stony silt loam, 8 to 15 percent slopes.	36 to 60	
MkD	Montalto extremely stony silt loam, 15 to 25 percent slopes.	36 to 54	
MkE	Montalto extremely stony silt loam, 25 to 35 percent slopes.	30 to 48	
MhA	Montalto very stony silt loam, 0 to 8 percent slopes	36 to 60	Deep, well-drained upland soils, formed from diabase. Contain many stones and boulders. Mainly MH to ML to bedrock. Acid. Water table more than 3 feet below surface.
MhC	Montalto very stony silt loam, 8 to 15 percent slopes	36 to 60	
MhD	Montalto very stony silt loam, 15 to 25 percent slopes	36 to 54	
MhE	Montalto very stony silt loam, 25 to 35 percent slopes	30 to 54	
MmA	Murrill gravelly loam, 0 to 3 percent slopes	48 to 120 or more.	Deep, well-drained soils, formed from mixed alluvium derived from quartzite and limestone. Contain varying amounts of fragments up to 6 inches in diameter. Mainly SM to CL to bedrock. Water table more than 3 feet below surface.
MmB	Murrill gravelly loam, 3 to 8 percent slopes	48 to 120 or more.	
MmB2	Murrill gravelly loam, 3 to 8 percent slopes, moderately eroded.	42 to 120 or more.	
MmB3	Murrill gravelly loam, 3 to 8 percent slopes, severely eroded.	36 to 120 or more.	
MmC	Murrill gravelly loam, 8 to 15 percent slopes	48 to 120 or more.	
MmC2	Murrill gravelly loam, 8 to 15 percent slopes, moderately eroded.	42 to 120 or more.	
MmD2	Murrill gravelly loam, 15 to 25 percent slopes, moderately eroded.	42 to 120 or more.	
MnA	Murrill loam, 0 to 3 percent slopes	48 to 120 or more.	Deep, well-drained soils, formed from mixed alluvium derived from quartzite and limestone. Contain varying amount of rock fragments. SM to CL to bedrock. Acidity varies. Water table more than 3 feet below surface.
MnB	Murrill loam, 3 to 8 percent slopes	48 to 120 or more.	
MnB2	Murrill loam, 3 to 8 percent slopes, moderately eroded	42 to 120 or more.	
MnC2	Murrill loam, 8 to 15 percent slopes, moderately eroded	48 to 120 or more.	
NaA	Neshaminy silt loam, 0 to 3 percent slopes	36 to 72	Deep, well-drained upland soils, formed from gneiss and gabbro. Mainly ML and CL to bedrock. Acid. Water table more than 3 feet below surface.
NaB	Neshaminy silt loam, 3 to 6 percent slopes	36 to 72	
NaB2	Neshaminy silt loam, 3 to 6 percent slopes, moderately eroded.	36 to 65	
NaC	Neshaminy silt loam, 6 to 12 percent slopes	36 to 60	
NaC2	Neshaminy silt loam, 6 to 12 percent slopes, moderately eroded.	36 to 60	
NaC3	Neshaminy silt loam, 6 to 12 percent slopes, severely eroded.	30 to 48	
PaA	Penn gravelly loam, 0 to 3 percent slopes	20 to 36	Moderately deep to shallow, well-drained soils, formed from red sandstone and conglomerate. Content of gravel varies. Mainly SM and ML to bedrock. Acid. Water table more than 3 feet below surface.
PaB	Penn gravelly loam, 3 to 8 percent slopes	20 to 36	
PaB2	Penn gravelly loam, 3 to 8 percent slopes, moderately eroded.	20 to 30	
PaB3	Penn gravelly loam, 3 to 8 percent slopes, severely eroded.	10 to 24	
PaC	Penn gravelly loam, 8 to 15 percent slopes	20 to 30	
PaC2	Penn gravelly loam, 8 to 15 percent slopes, moderately eroded.	15 to 30	
PaC3	Penn gravelly loam, 8 to 15 percent slopes, severely eroded.	10 to 24	
PaD2	Penn gravelly loam, 15 to 25 percent slopes, moderately eroded.	10 to 24	
PaD3	Penn gravelly loam, 15 to 25 percent slopes, severely eroded.	10 to 20	

TABLE 6.—*Soil map units and selected characteristics significant to engineering*—Continued

Map symbol	Name	Depth to bedrock	Selected characteristics significant to engineering
		Inches	
PbA	Penn gravelly silt loam, 0 to 3 percent slopes	20 to 48	Moderately deep to deep soils, formed from siltstone and shale. Contain rock fragments up to 6 inches in length. Mainly ML and CL to bedrock. Acid. Water table more than 3 feet below surface.
PbB	Penn gravelly silt loam, 3 to 8 percent slopes	20 to 36	
PbB2	Penn gravelly silt loam, 3 to 8 percent slopes, moderately eroded.	20 to 36	
PbB3	Penn gravelly silt loam, 3 to 8 percent slopes, severely eroded.	20 to 30	
PbC	Penn gravelly silt loam, 8 to 15 percent slopes	20 to 36	
PbC2	Penn gravelly silt loam, 8 to 15 percent slopes, moderately eroded.	20 to 30	
PbC3	Penn gravelly silt loam, 8 to 15 percent slopes, severely eroded.	10 to 24	
PbD	Penn gravelly silt loam, 15 to 25 percent slopes	20 to 30	
PbD2	Penn gravelly silt loam, 15 to 25 percent slopes, moderately eroded.	20 to 30	
PbD3	Penn gravelly silt loam, 15 to 25 percent slopes, severely eroded.	10 to 24	
PcA	Penn loam, 0 to 3 percent slopes	20 to 36	Moderately deep to shallow, well-drained soils, formed from red sandstone and conglomerate. Mainly SM to ML to bedrock. Acid. Water table more than 3 feet below surface.
PcB2	Penn loam, 3 to 8 percent slopes, moderately eroded	20 to 30	
PcB3	Penn loam, 3 to 8 percent slopes, severely eroded	10 to 24	
PcC2	Penn loam, 8 to 15 percent slopes, moderately eroded	20 to 30	
PcC3	Penn loam, 8 to 15 percent slopes, severely eroded	10 to 20	
PdA	Penn silt loam, 0 to 3 percent slopes	20 to 48	Moderately deep to deep, well-drained soils, formed from siltstone and shale. Mainly ML and CL to bedrock. Acid. Water table more than 3 feet below surface.
PdA2	Penn silt loam, 0 to 3 percent slopes, moderately eroded.	20 to 36	
PdB	Penn silt loam, 3 to 8 percent slopes	20 to 36	
PdB2	Penn silt loam, 3 to 8 percent slopes, moderately eroded.	20 to 30	
PdC	Penn silt loam, 8 to 15 percent slopes	20 to 30	
PdC2	Penn silt loam, 8 to 15 percent slopes, moderately eroded.	12 to 24	
PdC3	Penn silt loam, 8 to 15 percent slopes, severely eroded	10 to 24	
PfE2	Penn soils, 25 to 35 percent slopes, moderately eroded	10 to 24	Moderately deep to shallow, well-drained soils, formed from red shale, sandstone, and conglomerate. SM to CL to bedrock. Acid. Water table more than 3 feet below surface.
PfE3	Penn soils, 25 to 35 percent slopes, severely eroded	9 to 24	
PeA	Penn stony silt loam, 0 to 8 percent slopes	12 to 40	Shallow, moderately deep, or deep, well-drained stony soils, formed from red shale and sandstone. Mainly ML to CL to bedrock. Acid. Water table more than 3 feet below surface.
PeC	Penn stony silt loam, 8 to 15 percent slopes	12 to 36	
PeC2	Penn stony silt loam, 8 to 15 percent slopes, moderately eroded.	12 to 30	
PeD	Penn stony silt loam, 15 to 25 percent slopes	10 to 30	
PeD2	Penn stony silt loam, 15 to 25 percent slopes, moderately eroded.	10 to 24	
PeE	Penn stony silt loam, 25 to 35 percent slopes	9 to 24	
PgA	Penn-Lansdale gravelly loams, 0 to 3 percent slopes	20 to 48	Moderately deep to deep upland soils, formed from red and yellow sandstone and conglomerate. Contain rock fragments up to 6 inches in length. Mainly GC to CL to bedrock. Acid. Water table more than 3 feet below surface.
PgB2	Penn-Lansdale gravelly loams, 3 to 8 percent slopes, moderately eroded.	20 to 48	
PgC2	Penn-Lansdale gravelly loams, 8 to 15 percent slopes, moderately eroded.	20 to 40	
PgD2	Penn-Lansdale gravelly loams, 15 to 25 percent slopes, moderately eroded.	20 to 30	
PhA	Penn-Lansdale loams, 0 to 3 percent slopes	20 to 48	Moderately deep to deep upland soils, formed from red and yellow sandstone, shale, and conglomerate. Mainly SM to CL to bedrock. Acid. Water table more than 3 feet below surface.
PhB2	Penn-Lansdale loams, 3 to 8 percent slopes, moderately eroded.	20 to 40	
PhC	Penn-Lansdale loams, 8 to 15 percent slopes	20 to 36	
PhC2	Penn-Lansdale loams, 8 to 15 percent slopes, moderately eroded.	20 to 30	

TABLE 6.—*Soil map units and selected characteristics significant to engineering*—Continued

Map symbol	Name	Depth to bedrock	Selected characteristics significant to engineering
		Inches	
PkB2	Pequea silt loam, 3 to 8 percent slopes, moderately eroded.	20 to 54	Shallow, well-drained upland soils, formed from dark calcareous schist. Mainly ML and MH to bedrock. Acid surface soil and calcareous substratum. Water table more than 3 feet below surface.
PkC2	Pequea silt loam, 8 to 15 percent slopes, moderately eroded.	16 to 48	
PkD2	Pequea silt loam, 15 to 25 percent slopes, moderately eroded.	14 to 40	
PkD3	Pequea silt loam, 15 to 25 percent slopes, severely eroded.	12 to 36	
PkE2	Pequea silt loam, 25 to 35 percent slopes, moderately eroded.	14 to 40	
PkE3	Pequea silt loam, 25 to 35 percent slopes, severely eroded.	12 to 30	
RaA	Readington loam, 0 to 3 percent slopes	24 to 60	Moderately well drained upland soils, formed from red and yellow sandstone, shale, and conglomerate. Mainly SM to CL to bedrock. Acid. Water table 20 to 36 inches from surface in some seasons.
RaB	Readington loam, 3 to 8 percent slopes	24 to 48	
RaB2	Readington loam, 3 to 8 percent slopes, moderately eroded.	24 to 36	
RaC2	Readington loam, 8 to 15 percent slopes, moderately eroded.	24 to 30	
Rb	Riverwash	36 or more	Mixed alluvial material, varying in depth and composition. Mainly GP to SM to varying depths. Acidity varies. Water table at or near surface. Very frequently flooded.
RcA	Rowland and Bermudian silt loams, 0 to 3 percent slopes.	36 or more	Moderately well drained to well-drained flood-plain soils, formed from alluvium derived from upland sandstone and shale. Mainly SM to ML to depths of 36 inches or more. Acid. Water table 20 to 36 inches from surface in some seasons. Frequently flooded.
SaA	Sciotoville silt loam, 0 to 3 percent slopes	48 to 120 or more.	Moderately well drained terrace soils, formed from mixed acid and calcareous materials. Mainly SM to CL to bedrock. Water table 20 inches from surface in some seasons.
SaB	Sciotoville silt loam, 3 to 6 percent slopes	48 to 120 or more.	
ScC3	Steinsburg gravelly loam, 8 to 15 percent slopes, severely eroded.	12 to 24	Shallow, well-drained, gravelly upland soils, formed from yellow sandstone and conglomerate. Mainly SM to bedrock. Acid. Water table more than 3 feet below surface.
ScD3	Steinsburg gravelly loam, 15 to 25 percent slopes, severely eroded.	6 to 20	
ScE	Steinsburg gravelly loam, 25 to 35 percent slopes	6 to 30	
WaA	Watchung silt loam, 0 to 3 percent slopes	36 to 72	Poorly drained upland soils, formed from diabase. Mainly ML to MH to bedrock. Acid. Water table 0 to 24 inches from surface in some seasons.
WaB	Watchung silt loam, 3 to 8 percent slopes	36 to 72	
WaB2	Watchung silt loam, 3 to 8 percent slopes, moderately eroded.	30 to 72	
WbA	Watchung very stony silt loam, 0 to 8 percent slopes	36 to 72	Poorly drained, very stony upland soil, formed from diabase. Mainly ML to MH to bedrock. Acid. Water table 0 to 24 inches from surface in some seasons.
WcA	Wehadkee silt loam, 0 to 3 percent slopes	36 or more	Poorly drained soil, formed from alluvium derived from schist and gneiss. Mainly ML to MH to depths of 36 inches or more. Acid. Water table 0 to 20 inches from surface in some seasons. Frequently flooded.
Wda	Wheeling silt loam, 0 to 3 percent slopes	48 to 120 or more.	Deep, well-drained terrace soils, formed from mixed acid and calcareous materials. Mainly SM to CL to depths of 36 to 120 inches. Acid. Water table more than 3 feet below surface.
WdB2	Wheeling silt loam, 3 to 6 percent slopes, moderately eroded.	48 to 120 or more.	
WdC2	Wheeling silt loam, 6 to 12 percent slopes, moderately eroded.	36 to 120 or more.	
WdD	Wheeling silt loam, 12 to 18 percent slopes	36 to 120 or more.	
WdD2	Wheeling silt loam, 12 to 18 percent slopes, moderately eroded.	36 to 120 or more.	
WeB2	Whiteford slaty silt loam, 3 to 8 percent slopes, moderately eroded.	30 to 48	Deep, well-drained soils, formed from slate. Mainly ML to bedrock. Acid. Water table more than 3 feet below surface.
WeC2	Whiteford slaty silt loam, 8 to 15 percent slopes, moderately eroded.	30 to 48	
WeD2	Whiteford slaty silt loam, 15 to 25 percent slopes, moderately eroded.	27 to 42	

TABLE 7.—*Estimated physical properties and engineering classification of soils, as determined from soil survey data*

Soil series and typical depth of major horizons	Percentage passing sieve—		Engineering classification of soils		Structure	Permeability	Shrink-swell potential	Reaction
	No. 200	No. 4	A.A.S.H.O.	Unified				
						Inches per hour		*pH*
Aldino:								
0 to 8 inches	65	75	A-7-6	OL	Weak fine granular	2.0 to 6.2	Low	5.2
8 to 20 inches	65	75	A-7-6	CL	Moderate medium blocky	Less than 0.2.	Moderate	6.0
Alluvial land:								
0 to 8 inches	75	90	A-7-6	OL	Weak subgranular	2.0 to 6.2	Low	5.2
8 to 36 inches	75	90	A-7-6	Variable	Structureless	0.6 to 2.0	Low	5.2
Bedington:								
0 to 8 inches	80	90	A-7-6	OL	Weak fine granular	2.0 to 6.2	Low	5.2
8 to 36 inches	80	90	A-7-6	CL	Moderate medium subangular blocky.	0.2 to 0.6	Moderate	5.2
Berks:								
0 to 8 inches	65	75	A-6	OL	Weak fine granular	2.0 to 6.2	Low	6.0
8 to 24 inches	30-65	75	A-6	GC or CL	Weak subangular blocky	0.6 to 2.0	Low	6.4
24 to 40 inches, brown subsoil.	30	60	A-6	GC	Weak medium subangular blocky.	0.6 to 2.0	Low	5.5
Birdsboro:								
0 to 8 inches	60	95	A-7-6	ML	Weak fine granular	2.0 to 6.2	Low	6.5
8 to 36 inches	60	95	A-7-6	ML or SC	Weak medium subangular blocky.	0.6 to 2.0	Moderate	5.4
36 to 60 inches or more.	60	90	A-7-6	SM	Weak medium subangular blocky.	0.6 to 2.0	Low	5.4
Blairton:								
0 to 8 inches	60	90	A-7-6	OL	Weak fine granular	2.0 to 6.2	Low	6.0
8 to 24 inches	70	95	A-7-6	CL	Prismatic blocky to blocky	0.2 to 0.6	Moderate	5.5
24 to 40 inches	40	85	A-7-6	CL or GC	Weak medium blocky	0.2 to 0.6	Moderate	5.0
Bowmansville:								
0 to 8 inches	80	98	A-7-6	OL	Weak fine granular	2.0 to 6.2	Low	6.2
8 to 36 inches	80	98	A-7-6	CH or SM	Structureless	0.6 to 2.0	Low	6.0
Brecknock:								
0 to 8 inches	50	70	A-6	OL	Weak fine granular	2.0 to 6.2	Low	4.8
8 to 40 inches	50	65	A-6	GC or ML	Weak subangular blocky	0.6 to 2.0	Low	5.5
Cardiff:								
0 to 8 inches	65	75	A-6	OL	Weak fine granular	2.0 to 6.2	Low	6.0
8 to 30 inches	45	70	A-6	GC or ML	Weak subangular blocky	0.6 to 2.0	Low	6.5
Chester:								
0 to 8 inches	79	94	A-7-6	OL	Weak fine granular	2.0 to 6.2	Low	5.3
8 to 30 inches	74	93	A-7-6(11)	ML or CL	Weak medium subangular blocky.	0.6 to 2.0	Moderate	5.5
30 to 120 inches	54	82	A-7-5(7)	SM or ML	Weak thin to medium platy.	0.6 to 2.0	Low	6.0
Chewacla:								
0 to 8 inches	80	98	A-7-5	OL	Weak fine granular	2.0 to 6.2	Low	5.4
8 to 36 inches or more.	80	98	A-7-5 and A-5	ML or MH	Weak subangular blocky	0.6 to 2.0	Low	6.0
Conestoga:								
0 to 8 inches	88	100	A-7-6	OL	Weak fine granular	2.0 to 6.2	Low	5.4
8 to 30 inches	90	100	A-7-6(13)	ML or CL	Moderate medium subangular blocky.	0.6 to 2.0	Moderate	5.4
30 to 96 inches or more.	86	99	A-7-6(15)	ML or CL	Weak thin to medium platy.	0.6 to 2.0	Low	6.5 to 8.0
Congaree:								
0 to 8 inches	80	98	A-7-6	OL	Weak fine granular	2.0 to 6.2	Low	5.3
8 to 36 inches	80	98	A-5	ML or SM	Structureless	2.0 to 6.2	Low	6.0
Croton:								
0 to 8 inches	50	95	A-7-6	OL	Weak fine granular	2.0 to 6.2	Low	5.5
8 to 36 inches	50	95	A-7-6	CL or SC	Moderate medium blocky to platy.	Less than 0.2.	Moderate	5.1
Duffield:								
0 to 8 inches	90	97	A-4(8)	OL	Weak fine granular	2.0 to 6.2	Low	5.6
8 to 36 inches	86	98	A-7-6(14)	CL	Moderate very fine blocky	0.6 to 2.0	Moderate	5.3
36 to 84 inches	90	98	A-7-6(14)	ML or CL	Moderate medium blocky	0.6 to 2.0	Moderate	6.5 to 7.5
Edgemont:								
0 to 8 inches	31	89	A-4(1)	SM	Single grain	2.0 to 6.2	Low	5.2
8 to 24 inches	28	91	A-2-4(0)	SM	Weak fine subangular blocky.	0.6 to 2.0	Low	5.0
24 to 40 inches	25	87	A-2-4(0)	SM	Weak fine subangular blocky.	0.6 to 2.0	Low	4.8

TABLE 7.—*Estimated physical properties and engineering classification of soils, as determined from soil survey data*—Continued

Soil series and typical depth of major horizons	Percentage passing sieve—		Engineering classification of soils		Structure	Permeability	Shrink-swell potential	Reaction
	No. 200	No. 4	A.A.S.H.O.	Unified				
						Inches per hour		*pH*
Elioak:								
0 to 8 inches	85	98	A-7-6	OL	Moderate thin platy	2.0 to 6.2	Low	6.6
8 to 36 inches	85	98	A-7-6	CL or ML	Moderate fine blocky	0.6 to 2.0	Moderate	6.7
36 to 96 inches	75	98	A-7-5 to A-5	ML or MH	Moderate fine blocky and platy.	0.6 to 2.0	Low	6.8
Elk:								
0 to 8 inches	60	95	A-7-6	OL	Weak fine granular	2.0 to 6.2	Low	6.0
8 to 36 inches	60	95	A-7-6	CL or ML	Strong medium blocky	0.6 to 2.0	Moderate	6.6
36 to 60 inches	40	95	A-7-6	SM	Moderate medium blocky	0.6 to 2.0	Low	6.4
Glenelg:								
0 to 8 inches	45	80	A-7-5	OL	Weak fine granular	2.0 to 6.2	Low	6.6
8 to 24 inches	45	80	A-6	ML or CL	Weak medium subangular blocky.	0.6 to 2.0	Moderate	6.3
24 to 120 inches	40	65	A-4 to A-5	ML	Weak medium subangular blocky.	0.6 to 2.0	Low	6.2
Glenville:								
0 to 8 inches	70	90	A-7-6	OL	Moderate very fine subangular blocky.	2.0 to 6.2	Low	6.7
8 to 30 inches	75	95	A-7-6	CL	Moderate medium blocky	0.2 to 0.6	Moderate	6.5
30 to 120 inches	55	80	A-7-6	CL or MH	Very weak medium platy	0.2 to 0.6	Moderate	6.3
Hagerstown:								
0 to 8 inches	95	100	A-7-6	OL	Moderate fine blocky	2.0 to 6.2	Low	6.4
8 to 30 inches	85	100	A-7-6	CL or MH	Moderate fine granular	0.6 to 2.0	Moderate	6.8
30 to 96 inches	90	100	A-7-6	CL or ML	Moderate fine subangular blocky.	0.6 to 2.0	Moderate	6.5 to 7.5
Hollinger:								
0 to 8 inches	80	95	A-7-6	OL	Moderate thin platy	2.0 to 6.2	Low	6.0
8 to 16 inches	85	95	A-7-6	CL or ML	Weak medium blocky	0.6 to 2.0	Moderate	6.4
16 to 48 inches	70	90	A-7-5 to A-5	ML or MH	Weak medium blocky to platy.	0.6 to 2.0	Low	6.5 to 8.0
Huntington:								
0 to 8 inches	50	90	A-7-6	OL	Moderate medium crumb	2.0 to 6.2	Low	6.4
8 to 48 inches or more	40	80	A-4	ML or SM	Moderate medium blocky	0.6 to 2.0	Low	6.6
Lansdale:								
0 to 8 inches	55	93	A-4(2)	SM or SC	Very weak fine granular	2.0 to 6.2	Low	5.0
8 to 30 inches	55	90	A-4(1) to A-6(5).	SC	Weak medium blocky	0.6 to 2.0	Low	5.3
34 to 54 inches	55	85	A-4(6)	SC or CL	Moderate medium blocky	0.6 to 2.0	Low	5.0
Lawrence:								
0 to 8 inches	90	95	A-7-6	OL	Weak fine crumb	2.0 to 6.2	Low	6.8
8 to 30 inches	87	90	A-7-6	CL	Moderate coarse subangular blocky.	0.2 to 0.6	Moderate	6.6
30 to 96 inches	90	90	A-7-6	CL or ML	Moderate medium blocky	0.2 to 0.6	Moderate	6.8
Lehigh:								
0 to 8 inches	60	70	A-7-6	OL	Weak fine granular	2.0 to 6.2	Low	6.4
8 to 36 inches	50	50	A-7-6	CL or GC	Moderate fine blocky	0.2 to 0.6	Moderate	6.2
Letort:								
0 to 8 inches	85	97	A-7-6	OL	Very weak fine granular	2.0 to 6.2	Low	6.3
8 to 36 inches	90	98	A-7-5	CL or ML	Moderate very fine blocky	0.6 to 2.0	Moderate	6.6
36 to 96 inches	80	95	A-7-5 to A-5	ML or MH	Moderate medium blocky	0.6 to 2.0	Low	6.8
Lewisberry:								
0 to 8 inches	20	80	A-4	SM	Very weak subangular blocky	2.0 to 6.2	Low	5.0
8 to 30 inches	30	75	A-2 to A-4	GC or SM	Weak medium blocky	0.6 to 2.0	Low	5.0
30 to 60 inches	15	70	A-2	SM	Very weak subangular blocky to single grain.	0.6 to 2.0	Low	5.0
Lindside:								
0 to 8 inches	90	100	A-7-6	OL	Moderate very fine subangular blocky.	2.0 to 6.2	Low	6.8
8 to 36 inches or more	95	100	A-7-6	CL or ML	Moderate fine subangular blocky.	0.2 to 0.6	Moderate	6.5
Manor:								
0 to 8 inches	75	90	A-4 to A-7-5	OL	Weak fine granular	2.0 to 6.2	Low	5.4
8 to 24 inches	65	80	A-4 to A-5	ML	Weak thin platy to subangular blocky.	0.6 to 2.0	Low	5.3
24 to 120 inches or more.	55	70	A-4 to A-5	ML or MH	Weak thin platy to structureless.	0.6 to 2.0	Low	5.0

TABLE 7.—*Estimated physical properties and engineering classification of soils, as determined from soil survey data*—Continued

Soil series and typical depth of major horizons	Percentage passing sieve—		Engineering classification of soils		Structure	Permeability	Shrink-swell potential	Reaction
	No. 200	No. 4	A.A.S.H.O.	Unified				
						Inches per hour		*pH*
Melvin:								
0 to 8 inches	90	98	A-7-6	OL	Weak fine blocky	2.0 to 6.2	Low	6.6
8 to 36 inches or more.	95	100	A-7-6	CL or ML	Moderate medium blocky	Less than 0.2.	Moderate	5.5
Montalto:								
0 to 8 inches	50	90	A-4(8)	OL	Weak thin platy	2.0 to 6.2	Low	5.6
8 to 30 inches	90	98	A-7-6(14)	CL or MH	Weak fine subangular blocky.	0.6 to 2.0	Moderate	5.3
30 to 60 inches	85	95	A-7-6(14)	ML or MH	Strong medium blocky	0.6 to 2.0	Moderate	
Murrill:								
0 to 8 inches	50	60	A-2-4	OL	Moderate fine granular	2.0 to 6.2	Low	6.8
8 to 36 inches	35	55	A-4 or A-7-5	ML or SM	Moderate fine subangular blocky.	0.6 to 2.0	Moderate	6.5
36 to 120 inches	60	75	A-7-6	CL or ML	Moderate medium blocky	0.6 to 2.0	Moderate	5.5
Neshaminy:								
0 to 8 inches	65	95	A-7-6	OL	Moderate fine granular	2.0 to 6.2	Low	6.7
8 to 36 inches	85	95	A-7-6	CL or ML	Moderate fine subangular blocky.	0.6 to 2.0	Moderate	6.6
36 to 72 inches	70	90	A-7-6	ML	Moderate medium blocky	0.6 to 2.0	Moderate	6.5
Penn:								
0 to 8 inches	30-60	70-90	A-4 or A-7	OL or SM	Weak fine granular	2.0 to 6.2	Low	5.0
8 to 20 inches	30-75	40-80	A-4 or A-7-5	CL or SM	Weak to medium fine subangular blocky.	0.6 to 2.0	Moderate	5.4
20 to 36 inches	20-50	35-70	A-4 or A-7-5	ML or SM	Weak to moderate medium blocky.	0.6 to 2.0	Low to moderate.	5.3
Penn-Lansdale:								
0 to 8 inches	30-60	70-90	A-4(1) to A-6	OL to SM	Weak moderate fine granular.	2.0 to 6.2	Low	5.0
8 to 20 inches	30-75	40-80	A-4 to A-6	CL to SM	Weak to moderate medium subangular blocky.	0.6 to 2.0	Low to moderate.	5.4
20 to 48 inches	20-50	35-70	A-4 to A-6	SM to GC	Weak to moderate medium blocky.	0.6 to 2.0	Low to moderate.	5.2
Pequea:								
0 to 8 inches	80	95	A-7-6	OL	Weak medium granular	2.0 to 6.2	Low	6.6
8 to 20 inches	85	90	A-7-5 or A-5	CL or ML	Weak fine subangular blocky.	0.6 to 2.0	Moderate	6.8
20 to 54 inches	70	80	A-5	ML or MH	Weak thin platy to subangular blocky.	0.6 to 2.0	Low	7.0 to 8.0
Readington:								
0 to 8 inches	60	97	A-7-6	OL	Moderate fine granular	2.0 to 6.2	Low	5.0
8 to 36 inches	40-70	95	A-7-6 to A-4	CL or SM	Moderate medium subangular blocky.	0.2 to 0.6	Moderate	5.0
Riverwash:								
0 to 36 inches[1]	0-30	0-50	A-1-a to A-4	GP or SM	Variable	2.0 to 6.2	Low	
Rowland and Bermudian:								
0 to 8 inches	55	85	A-7-6	OL	Moderate fine granular	2.0 to 6.2	Low	5.8
8 to 36 inches or more.	40-60	80	A-4 to A-7-5	ML or SM	Moderate medium blocky	0.2 to 2.0	Low to moderate.	5.8
Sciotoville:								
0 to 8 inches	60	90	A-7-6	ML	Weak fine granular	2.0 to 6.2	Low	5.6
8 to 36 inches	70	90	A-7-6	CL	Moderate medium blocky	0.6 to 2.0	Moderate	5.4
36 to 120 inches	40	70	A-7-6 or A-4	SM	Moderate medium blocky	0.6 to 2.0	Moderate	5.0
Steinsburg:								
0 to 8 inches	20	70	A-4	SM	Weak medium crumb	2.0 to 6.2	Low	6.0
8 to 30 inches	15	65	A-2-4	SW or SC	Weak very fine subangular blocky.	0.6 to 2.0	Low	5.8
Watchung:								
0 to 8 inches	60	90	A-7-6	OL	Moderate fine subangular blocky.	2.0 to 6.2	Low	5.6
8 to 36 inches	95	95	A-7-6	CL	Moderate fine blocky	Less than 0.2.	Moderate	6.2
36 to 72 inches	90	95	A-7-6	CL or MH	Moderate medium blocky	Less than 0.2.	Moderate	6.4
Wehadkee:								
0 to 8 inches	80	95	A-7-6	OL	Weak fine crumb	2.0 to 6.2	Low	5.2
8 to 36 inches or more.	85	95	A-7-6 to A-4	ML or MH	Weak medium subangular blocky to blocky.	0.6 to 2.0	Low to moderate.	5.4

TABLE 7.—*Estimated physical properties and engineering classification of soils, as determined from soil survey data*—Continued

Soil series and typical depth of major horizons	Percentage passing sieve—		Engineering classification of soils		Structure	Permeability	Shrink-swell potential	Reaction
	No. 200	No. 4	A.A.S.H.O.	Unified				
						Inches per hour		*pH*
Wheeling:								
0 to 8 inches	60	90	A-4	ML	Weak medium blocky	2.0 to 6.2	Low	6.8
8 to 36 inches	50-70	80	A-7-5	CL or SM	Moderate medium subangular blocky.	0.6 to 2.0	Moderate	5.2
36 to 120 inches	20-50	40-60	A-7-6 or A-1-a	GM	Moderate medium blocky	0.6 to 2.0	Low	5.2
Whiteford:								
0 to 8 inches	80	90	A-7-6	OL	Weak medium granular	2.0 to 6.2	Low	6.0
8 to 30 inches	85	95	A-6	ML	Moderate medium subangular blocky.	0.6 to 2.0	Moderate	6.5
30 to 48 inches	40	80	A-6	GC	Moderate medium blocky	0.6 to 2.0	Low	5.5

[1] Variable at depths of more than 36 inches.

TABLE 8.—*Soil characteristics*

Soil series	Range of slopes	Depth to seasonally high water table[1]	Recommended location of gradeline	Suitability as source of—	
				Topsoil	Sand, gravel, shale, or crushed stone
	Percent	*Feet*			
Aldino (nonstony)	3 to 25	0 to 2	Above water table	Fair	Crushed stone, fair
Aldino (stony)	3 to 25	0 to 2	Above water table	Poor	Crushed stone, fair
Alluvial land	0 to 3	0 to 2	Above water table	Fair	Fair
Bedington	0 to 8	Deep	Anywhere	Fair	Poor
Berks	3 to 35	Deep	Anywhere	Fair	Shale, good
Birdsboro	0 to 6	Deep	Anywhere	Fair	Poor
Blairton	0 to 15	1½ to 3	Above water table	Fair	Poor
Bowmansville	0 to 6	0 to 2	Above water table	Fair	Poor
Brecknock (nonstony)	0 to 35	Deep	Depends on bedrock	Fair	Crushed stone, fair
Brecknock (stony)	0 to 15	Deep	Depends on bedrock	Poor	Crushed stone, fair
Cardiff	0 to 35	Deep	Anywhere	Fair	Shale, good
Chester (nonstony)	0 to 18	Deep	Anywhere	Good	Poor
Chester (stony)	0 to 25	Deep	Anywhere	Poor	Poor
Chewacla	0 to 3	1½ to 3	Above water table	Good	Poor
Conestoga	0 to 25	Deep	Anywhere	Good	Crushed stone, good
Congaree	0 to 3	3 or more	Above water table	Good	Poor
Croton	0 to 12	0 to 1½	Above water table	Fair	Poor
Duffield	0 to 30	Deep	Anywhere	Good	Crushed stone, good
Edgemont (nonstony)	0 to 35	Deep	Depends on bedrock	Fair	Crushed stone, good; sand, fair
Edgemont (very stony)	0 to 40	Deep	Depends on bedrock	Poor	Crushed stone, good; sand, fair
Elioak	0 to 18	Deep	Anywhere	Good	Poor
Elk	0 to 12	Deep	Anywhere	Good	Sand and gravel, fair
Glenelg	3 to 25	Deep	Anywhere	Good	Poor
Glenville	0 to 12	1½ to 3	Above water table	Good	Poor
Hagerstown	0 to 25	Deep	Depends on bedrock	Good	Crushed stone, good
Hollinger	3 to 35	Deep	Anywhere	Good	Crushed stone, good
Huntington	0 to 3	More than 3	Above water table	Good	Sand and gravel, fair to poor
Lansdale (nonstony)	0 to 40	Deep	Anywhere	Fair	Good
Lansdale (stony)	0 to 35	Deep	Anywhere	Poor	Good
Lawrence	0 to 6	1 to 2	Above water table	Fair	Poor
Lehigh	0 to 25	1 to 3	Above water table	Fair	Crushed stone, fair
Letort	0 to 25	Deep	Anywhere	Fair	Poor
Lewisberry (nonstony)	0 to 25	Deep	Anywhere	Fair	Good
Lewisberry (stony)	0 to 40	Deep	Anywhere	Poor	Good
Lindside	0 to 3	1½ to 3	Above water table	Good	Gravel and crushed stone, fair
Manor (nonstony)	3 to 40	Deep	Anywhere	Fair	Poor
Manor (stony)	0 to 40	Deep	Anywhere	Poor	Poor
Melvin	0 to 3	0 to 1½	Above water table	Fair	Poor
Montalto (nonstony)	0 to 35	Deep	Anywhere	Fair	Crushed stone, good
Montalto (very stony)	0 to 35	Deep	Anywhere	Poor	Crushed stone, good
Montalto (extremely stony)	0 to 35	Deep	Anywhere	Poor	Crushed stone, good
Murrill	0 to 25	Deep	Anywhere	Fair	Crushed stone, fair to good
Neshaminy	0 to 12	Deep	Anywhere	Fair	Crushed stone, good
Penn (nonstony)	0 to 35	Deep	Anywhere	Fair	Shale, fair
Penn (stony)	0 to 35	Deep	Anywhere	Poor	Poor
Penn-Lansdale	0 to 25	Deep	Anywhere	Fair	Fair
Pequea	0 to 35	Deep	Anywhere	Fair	Poor
Readington	0 to 15	1½ to 3	Above water table	Fair	Poor
Riverwash	0 to 8	0 to 3	Above water table	Poor	Very good
Rowland and Bermudian	0 to 3	1½ to 5	Above water table	Fair	Fair
Sciotoville	0 to 6	1½ to 3	Above water table	Good	Sand and gravel, very good
Steinsburg	8 to 35	Deep	Anywhere	Fair	Good

affecting engineering work

Characteristics unfavorable for—				
Drainage		Irrigation	Pond construction	Terrace and diversion construction
Open	Tile			
Conditions favorable	Shallowness	Shallowness; poor drainage	Shallowness	Shallowness.
Shallowness	Shallowness; stoniness	Shallowness; poor drainage	Shallowness	Shallowness; stoniness.
Lack of grade	Lack of grade	Poor drainage	Permeable substratum	Overflow.
Not needed	Not needed	Conditions favorable	Permeability	Conditions favorable.
Not needed	Not needed	Conditions favorable	Permeability	Conditions favorable.
Not needed	Not needed	Conditions favorable	Permeability	Conditions favorable.
Conditions favorable	Conditions favorable	Moderately good drainage; slow permeability.	Conditions favorable	Conditions favorable.
Conditions favorable	Lack of grade	Poor drainage; slow permeability.	Conditions favorable	Flooding.
Not needed	Not needed	Conditions favorable	Permeable substratum	Conditions favorable.
Not needed	Not needed	Stoniness	Permeable substratum	Stoniness.
Not needed	Not needed	Conditions favorable	Permeable substratum	Conditions favorable.
Not needed	Not needed	Conditions favorable	Permeable substratum	Conditions favorable.
Not needed	Not needed	Stoniness	Permeable substratum	Stoniness.
Conditions favorable	Lack of grade	Moderately good drainage	Conditions favorable	Flooding.
Not needed	Not needed	Surface crusting; erosion	Very permeable substratum	Conditions favorable.
Not needed	Not needed	Conditions favorable	Permeability	Flooding.
Conditions favorable	16 inches to hardpan	Poor drainage; slow permeability.	Conditions favorable	Shallowness to hardpan.
Not needed	Not needed	Conditions favorable	Permeable substratum	Rock ledges.
Not needed	Not needed	Conditions favorable	Permeable substratum	Conditions favorable.
Not needed	Not needed	Stoniness	Permeable substratum	Stoniness.
Not needed	Not needed	Conditions favorable	Permeable substratum	Conditions favorable.
Not needed	Not needed	Conditions favorable	Conditions favorable	Conditions favorable.
Not needed	Not needed	Conditions favorable	Permeable substratum; shallowness.	Conditions favorable.
Conditions favorable	Conditions favorable	Moderately good drainage	Conditions favorable	Conditions favorable.
Not needed	Not needed	Conditions favorable	Very rapid permeability; rock ledges.	Ledges.
Not needed	Not needed	Shallowness	Permeability; rock ledges	Ledges.
Not needed	Not needed	Conditions favorable	Conditions favorable	Flooding.
Not needed	Not needed	Conditions favorable	Permeable substratum	Conditions favorable.
Not needed	Not needed	Stoniness	Permeable substratum	Stoniness.
Conditions favorable	Conditions favorable	Moderately good drainage; slow permeability.	Permeable substratum	Conditions favorable.
Slow permeability	Slow permeability	Moderately good drainage; slow permeability.	Shallow to bedrock in most places.	Stoniness.
Not needed	Not needed	Crusting; erodibility	Permeable substratum	Conditions favorable.
Not needed	Not needed	Conditions favorable	Permeable substratum	Conditions favorable.
Not needed	Not needed	Stoniness	Permeable substratum	Stoniness.
Conditions favorable	Lack of grade	Slow permeability; high water table.	Conditions favorable	Overflow.
Not needed	Not needed	Shallowness	Shallowness; permeability	Conditions favorable.
Not needed	Not needed	Shallowness; stoniness	Shallowness; permeability	Stoniness.
Conditions favorable	Lack of grade	Poor drainage; slow permeability.	Conditions favorable	Overflow.
Not needed	Not needed	Conditions favorable	Conditions favorable	Conditions favorable.
Not needed	Not needed	Stoniness	Stoniness	Stoniness.
Not needed	Not needed	Stoniness	Stoniness	Stoniness.
Not needed	Not needed	Conditions favorable	Permeable substratum	Conditions favorable.
Not needed	Not needed	Conditions favorable	Conditions favorable	Conditions favorable.
Not needed	Not needed	Shallowness	Shallowness	Conditions favorable.
Not needed	Not needed	Shallowness	Shallowness	Stoniness.
Not needed	Not needed	Shallowness	Shallowness; permeable substratum.	Conditions favorable.
Not needed	Not needed	Shallowness	Shallowness	Conditions favorable.
Conditions favorable	Hardpan at 18 to 30 inches.	Moderately good drainage; slow permeability.	Conditions favorable	Conditions favorable.
Lack of outlet grade	Lack of outlet grade	Fluctuating high water table	Permeable material; fluctuating high water table.	Overflow.
Conditions favorable	Lack of grade	High water table	Conditions favorable	Overflow.
Conditions favorable	Conditions favorable	Moderately good drainage; slow permeability.	Permeable substratum	Conditions favorable.
Not needed	Not needed	Shallowness	Shallowness; permeable substratum.	Shallowness.

TABLE 8.—*Soil characteristics*

Soil series	Range of slopes	Depth to seasonally high water table[1]	Recommended location of gradeline	Suitability as source of—	
				Topsoil	Sand, gravel, shale, or crushed stone
	Percent	*Feet*			
Watchung (nonstony)	0 to 8	0 to 1	Above water table	Poor	Poor
Watchung (very stony)	0 to 8	0 to 1	Above water table	Poor	Poor
Wehadkee	0 to 3	0 to 1½	Above water table	Fair	Poor
Wheeling	0 to 18	Deep	Anywhere	Good	Sand and gravel, very good
Whiteford	0 to 25	Deep	Anywhere	Fair	Shale, fair

[1] "Deep" is used to describe well-drained soils that do not have a seasonal high water table.

Suitability for Irrigation

The following lists show groups of soil types according to their suitability for irrigation. Not all of the groups in the statewide classification of soils for irrigation are represented in Lancaster County.

The qualities and characteristics most important in irrigation are rate of infiltration, permeability, depth, texture, drainage, and moisture-holding capacity. Slope, extent of previous erosion, and hazard of further erosion must be considered carefully in relation to individual sites. Steep or stony soils, poorly drained soils, and most soils with fine-textured, slowly permeable subsoils have been omitted from this grouping, since they are generally unsuitable for irrigation.

Irrigation group A.—Deep, well drained to moderately well drained, permeable, medium-textured soils. These are residual soils on uplands and alluvial and colluvial soils on terraces and flood plains. They are more than 36 inches deep. The soils in this group are—

Bedington silt loam.
Bermudian silt loam.
Birdsboro silt loam.
Chester loam.
Chester silt loam.
Chewacla silt loam.
Conestoga silt loam.
Duffield silt loam.
Elk gravelly silt loam.
Huntington silt loam.
Huntington silt loam, local alluvium.
Lansdale gravelly loam.
Lansdale loam.
Letort silt loam.
Neshaminy silt loam.
Rowland silt loam.
Whiteford slaty silt loam.

The estimated available moisture-holding capacity of these soils ranges from 1.6 to 2.2 inches of water per foot of depth of soil. The maximum rate of application of irrigation water should be 0.5 inch per hour on cultivated crops and 1.0 inch per hour on sod.

Irrigation group B.—Deep, well drained to moderately well drained, permeable, medium-textured to coarse-textured soils. These soils occur on uplands, terraces, flood plains, and colluvial areas. They are more than 36 inches deep. The soils in this group are—

Edgemont channery loam.
Edgemont channery silt loam.
Edgemont loam.
Edgemont silt loam, moderately well drained variant.
Huntington fine sandy loam.
Lansdale sandy loam.
Lewisberry gravelly sandy loam.

These soils have an estimated available moisture-holding capacity of 1.3 to 1.7 inches of water per foot of depth of soil. The maximum rate of application should be 0.5 inch of water per hour on cultivated crops and 1.0 inch per hour on sod.

Irrigation group D.—Deep, well-drained, permeable silt loam soils that have heavy subsoils but good structure. These are residual soils on uplands. They developed from limestone or diabase parent materials. They are more than 36 inches deep. The soils in this group are—

Hagerstown silt loam.
Montalto channery silt loam.

The estimated available moisture-holding capacity of these soils is from 2.0 to 2.3 inches of water per foot of depth of soil. Not more than 0.5 inch of water per hour should be applied on cultivated soils and not more than 0.9 inch of water per hour on sod.

Irrigation group F.—Moderately well drained to somewhat poorly drained, medium-textured soils, moderately deep over hardpan or claypan. The initial permeability of these soils is usually moderate, but after they are saturated above the hardpan or claypan, further permeability is moderately slow to slow. The hardpan or claypan is 20 to 36 inches below the surface. These soils are residual on uplands and alluvial and colluvial on terraces. The soils in this group are—

Blairton silt loam.
Glenville silt loam.
Lehigh silt loam.
Lehigh slaty silt loam.
Lindside silt loam, local alluvium.
Readington loam.
Sciotoville silt loam.

These soils have an estimated available moisture-holding capacity of 1.8 to 2.2 inches of water per foot of depth of soil. The maximum application rate for irrigation water should be 0.5 inch per hour on cultivated soils and 1.0 inch per hour on sod.

Irrigation group H.—Moderately deep, well-drained, permeable, medium-textured soils. These are residual soils that are 20 to 36 inches deep over bedrock. The soils in this group are—

Berks silt loam.
Brecknock silt loam.
Brecknock slaty silt loam.
Glenelg channery sandy loam.
Glenelg silt loam.

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Characteristics unfavorable for—				
Drainage		Irrigation	Pond construction	Terrace and diversion construction
Open	Tile			
Very slow permeability	Very slow permeability	Poor drainage; slow permeability.	Conditions favorable	Conditions favorable.
Very slow permeability	Very slow permeability	Poor drainage; slow permeability.	Stoniness	Stoniness.
Lack of grade	Lack of grade	Poor drainage; high water table.	Conditions favorable	Overflow.
Not needed	Not needed	Conditions favorable	Permeable substratum	Conditions favorable.
Not needed	Not needed	Conditions favorable	Permeable substratum	Conditions favorable.

Manor channery loam.
Manor channery silt loam.
Manor silt loam.
Penn gravelly loam.
Penn gravelly silt loam.
Penn loam.
Penn silt loam.

The estimated available moisture-holding capacity of these soils ranges from 1.8 to 2.2 inches of water per foot of depth of soil. The maximum rate at which irrigation water should be applied is 0.5 inch per hour on cultivated crops and 1.0 inch per hour on sod.

Irrigation group K.—Shallow, well-drained, permeable, medium-textured soils. These are residual soils that are 10 to 20 inches deep over bedrock. The soils in this group are—

Berks shaly silt loam.
Cardiff slaty silt loam.
Hollinger silt loam.
Pequea silt loam.
Steinsburg gravelly loam.

The estimated available moisture-holding capacity of these soils ranges from 1.6 to 2.4 inches of water per foot of soil depth. The maximum rate of application should be 0.5 inch of water per hour on cultivated crops and 1.0 inch per hour on sod.

Suitability for Pond Construction

Seepage of impounded water from earth-filled ponds has been a problem in some areas of Lancaster County. Some soils, especially the limestone soils such as the Hagerstown and Duffield, do not maintain their ability to hold water after mechanical compaction. They have a very strong tendency to form aggregates. The water seeps out between the aggregates and through the compacted zone. The porous substratum and the solution channels in the bedrock encourage the movement of water away from the impoundment area.

Before construction of a pond is started, the site should be carefully inspected for active sinkholes or for evidence of earth settlement. Any sign of sinkhole activity means that the area is unsuitable for a pond. Areas with rock ledges or areas where bedrock will be less than 2 feet below the bottom of the pond should also be avoided.

Formation and Classification of Soils

Soils are mixtures of fragmented and partly or completely weathered rocks, minerals, organic matter, water, and air in greatly varying proportions. They have more or less distinct horizons that have developed under the influence of the soil-forming factors of their environment. The important factors in development of soils are the parent materials, the climate, the relief or lay of the land, the biological forces, and time. The kind of soil that develops in any given environment depends on the interaction of these five factors.

Soil Formation in Lancaster County

The humid, temperate climate and the native forest under which the soils formed were nearly uniform throughout Lancaster County. This lack of variation tended to produce uniformity in the major characteristics of many soils now found in the county. In contrast, the parent materials and relief vary within short distances. The influence of these two factors of soil formation was great enough to produce important differences locally. The kind of parent material, for example, greatly influenced natural fertility; and relief, to a large extent, determined drainage.

Most of the soils of Lancaster County have an accumulation of organic matter in the upper few inches of the profile. The surface soils (A horizons) contain smaller amounts of clay, bases, iron, and certain other materials than the subsoil (B horizons). In contrast, quartz and other minerals that weather slowly are more abundant in the surface soils than in the subsoils. A large amount of soluble material has been lost in the drainage water.

The poorly drained areas have a fluctuating high water table that keeps the subsoil saturated most of the time. Soils in these wet areas have a gray, bluish-gray, or greenish-gray subsoil that is mottled with yellow, brown, or rusty colors. The grayish colors and the mottling are caused by lack of air or by uneven penetration of air into the soil.

Table 9 shows the parent material of the soil series in Lancaster County and the natural drainage under which the soils of each series developed.

TABLE 9.—*Parent material and drainage of the soil series of Lancaster County*

Parent material	Drainage						
	Good			Moderately good	Somewhat poor	Poor	Very poor
	Deep soils	Moderately deep soils	Shallow soils				
SOILS MOSTLY ON RESIDUUM FROM UNDERLYING ROCK							
Schist and gneiss	Chester, Elioak	Glenelg	Manor	Glenville	Glenville		
Dark igneous and metamorphic rocks.	Neshaminy			Aldino	Aldino		
Serpentine	Neshaminy			Aldino	Aldino		
Diabase	Montalto				Watchung[1]	Watchung	Watchung.
Phyllite and slate other than Triassic.	Whiteford	Cardiff	Cardiff				
Pure limestones	Hagerstown			Lawrence[1]	Lawrence	Lawrence[2]	
Impure and shaly limestones	Duffield			Lawrence[1]	Lawrence	Lawrence[2]	
Bright micaceous limestone or calcareous schist.	Conestoga	Hollinger	Hollinger				
Dark, graphitic, calcareous schist.	Letort	Pequea	Pequea				
Cocalico or Martinsburg shale	Bedington	Berks	Berks	Blairton	Blairton[2]		
Red Triassic shales, sandstones, and conglomerates.	Penn	Penn	Penn	Readington	Readington[2]	Croton	
Red Triassic conglomerates and sandstone.	Lewisberry	Penn	Penn	Readington	Readington[2], Croton[1]	Croton	
Gray Triassic sandstones and conglomerates.	Lansdale	Lansdale, Steinsburg	Steinsburg	Readington	Readington[2], Croton[1]	Croton	
Metamorphosed Triassic rocks	Brecknock	Brecknock	Brecknock	Lehigh	Lehigh[2], Croton[1]	Croton	
Quartzite	Edgemont	Edgemont					
SOILS ON COLLUVIAL MATERIAL							
Sandstone or quartzite colluvium over limestone and some shales.	Murrill						
Alluvial and colluvial material from limestone.	Huntington, local alluvium.			Lindside, local alluvium.	Lindside, local alluvium.[2]		
SOILS ON TERRACE MATERIAL							
Old alluvium from limestone uplands, along small streams.	Elk						
Mixed old alluvium from limestone and acid soils of uplands, along the Susquehanna River.	Wheeling			Sciotoville			
Old alluvium from Triassic uplands.	Birdsboro						
SOILS ON FLOOD PLAINS							
Alluvium from schist, gneiss, and metamorphic rocks on uplands.	Congaree			Chewacla	Chewacla[2], Wehadkee[1]	Wehadkee	Wehadkee.
Alluvium from limestone on uplands.	Huntington			Lindside	Lindside[2], Melvin[1]	Melvin	Melvin.
Alluvium from Cocalico shale red and gray Triassic rocks on uplands.	Bermudian			Rowland	Rowland[2], Bowmansville[1]	Bowmansville	Bowmansville.
Mixed gravel, cobblestones, and boulders along the Susquehanna River.				Riverwash[1]	Riverwash	Riverwash	Riverwash.
Undifferentiated alluvium				Alluvial land.[1]	Alluvial land	Alluvial land	Alluvial land.

[1] This series is in the wettest part of this drainage range.

[2] This series is in the driest part of this drainage range.

Classification of Soils of Lancaster County

Most of the soils in this county are Red-Yellow Podzolic soils, Gray-Brown Podzolic soils, or intergrades between these two great soil groups. Other great soil groups represented in the county are Low-Humic Gley soils, Alluvial soils, intergrades between Gray-Brown Podzolic soils and Lithosols, and intergrades between Gray-Brown Podzolic soils and Planosols.

The classification scheme used here is similar to that given in the 1938 Yearbook of Agriculture (*17*), as modified by Thorp and Smith (*15*).

Gray-Brown Podzolic soils

The Gray-Brown Podzolic soils of Lancaster County consist of the Conestoga, Duffield, and Letort series. A typical soil of this great soil group has a thin leaf litter on its surface. Next is a dark grayish-brown, granular, mull humus layer, 1 or 2 inches thick. This is underlain by a grayish leached layer that extends to a depth of 8 to 12 inches. The B horizon or subsoil is distinctly finer in texture than the A horizon or surface soil. The subsoil becomes lighter in color and coarser in texture with depth.

The productivity of the Gray-Brown Podzolic soils varies considerably, depending on the texture and other characteristics of the parent material. These soils generally respond to additions of lime, organic matter, and fertilizers.

A Gray-Brown Podzolic soil in Lancaster County is Duffield silt loam, which developed on impure limestone. A profile description follows.

A_{00} −1½ to −½ inches, oak and maple leaves.

A_0 −½ to 0 inch, dark reddish-brown (5YR 3/2) mull; medium acid; abrupt wavy boundary.

A_1 0 to 4 inches, dark-brown (7.5YR 3/2) silt loam; weak fine granular structure; very friable; medium acid; clear wavy boundary.

A_2 4 to 13 inches, dark-brown (7.5YR 4/4) silt loam; weak indistinct medium platy, breaking to fine granular, structure; very friable; strongly acid; clear wavy boundary.

B_1 13 to 19 inches, strong-brown (7.5YR 5/6) fine silt loam; weak medium subangular blocky structure; friable; strongly acid; clear wavy boundary.

B_{21} 19 to 26 inches, yellowish-red to strong-brown (5YR 5/6 to 7.5YR 5/6) silty clay loam; mixed blocky and moderate medium subangular blocky structure; friable; firm when moist, slightly plastic when wet; strongly acid; gradual wavy boundary.

B_{22} 26 to 37 inches, yellowish-red (5YR 4/6) silty clay loam to silt loam; moderate medium blocky structure; some manganese coatings and distinct clay coatings on peds; firm when moist, slightly plastic when wet; strongly acid; gradual wavy boundary.

B_3 37 to 49 inches, strong-brown (7.5YR 5/6) silt loam; moderate fine blocky structure; some manganese and clay coatings on peds; firm when moist, nonplastic when wet; strongly acid; clear irregular boundary.

C 49 to 66 inches +, yellowish-brown and yellowish-red (10YR 5/6 and 5YR 5/6) silt loam; weak medium platy structure; firm when moist, nonplastic when wet; strongly acid in upper part, grading to slightly acid in lower part; some manganese concretions.

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Intergrade between Gray-Brown Podzolic and Red-Yellow Podzolic soils

Soils of the following series show some characteristics of the Gray-Brown Podzolic and some characteristics of the Red-Yellow Podzolic great soil groups: Bedington, Birdsboro, Blairton, Brecknock, Cardiff, Chester, Edgemont, Elk, Glenelg, Glenville, Hagerstown, Lansdale, Lawrence, Lewisberry, Montalto, Murrill, Neshaminy, Penn, Readington, Sciotoville, Wheeling, and Whiteford.

These soils are like the Gray-Brown Podzolic soils in depth of solum, sequence of horizons, color, and degree of textural and structural development. In other properties, such as low degree of base saturation and low remaining amounts of the easily weathered minerals, they resemble the Red-Yellow Podzolic soils.

The Blairton, Glenville, Lawrence, and Readington soils are intergrades between the Gray-Brown Podzolic and Red-Yellow Podzolic soils, but they have a firm or very firm layer of silt or silty clay that impedes the flow of water and the penetration of roots. The following profile of Glenville silt loam, which developed on schist and gneiss, is typical of these soils.

A_{00} −1 to −½ inch, mixed hardwood leaves.

A_0 −½ to 0 inch, black mull; weak fine granular structure; pH 6.2.

A_1 0 to 5 inches, dark-brown (7.5YR 3/2) silt loam; mixed weak thin platy and weak fine granular structure; friable; pH 5.2; contains many roots; 3 to 7 inches thick; clear wavy boundary.

A_2 5 to 12 inches, yellowish-brown (10YR 5/4) fine silt loam; weak medium subangular blocky structure; most ped surfaces have clay coats; friable; pH 5.2; contains many roots; contains some wormholes; 4 to 8 inches thick; clear wavy boundary.

B_{21} 12 to 18 inches, yellowish-brown (10YR 5/6) silty clay loam; weak medium subangular blocky structure; firm; pH 5.2; 3 to 8 inches thick; clear wavy boundary.

B_{22} 18 to 22 inches, yellowish-brown (10YR 5/6) silty clay loam; many medium, distinct, dark yellowish-brown (10YR 4/4) and light-gray (10YR 7/1) mottles near bottom of horizon; weak coarse prismatic, breaking to moderate thin to medium platy, structure; clay coatings on all peds; firm; pH 5.2; 2 to 6 inches thick; gradual wavy boundary.

B_{23gm} 22 to 28 inches, light brownish-gray (10YR 6/2) silty clay loam; many coarse, prominent, yellowish-brown (10YR 5/6) mottles; moderate coarse prismatic, breaking to weak thin platy, structure; heavy clay coatings on prism faces and some on plates; a fragipan layer, very firm when moist, hard when dry; pH 5.2; contains a few roots along prism faces; 5 to 7 inches thick; gradual wavy boundary.

B_{24gm} 28 to 35 inches, light brownish-gray (10YR 6/2) silty clay loam; many coarse, prominent, yellowish-brown (10YR 5/6) mottles; moderate coarse prismatic, breaking to weak thin platy, structure; heavy clay coatings on prism faces; very firm when moist, hard when dry; pH 5.6; 6 to 8 inches thick; clear wavy boundary.

B_{31} 35 to 47 inches, dark yellowish-brown (10YR 4/4) loam; some gray and dark-brown mottling near top of horizon; weak coarse prismatic structure; clay coatings on prisms; firm; pH 6.0; contains many black concretions near top of horizon; contains a few quartz fragments; contains a few tree roots; 10 to 14 inches thick; clear wavy boundary.

B_{32} 47 to 51 inches, brown (10YR 5/3) silt loam; a few medium, distinct mottles; moderate coarse prismatic, breaking to weak medium subangular blocky, structure; partial clay coatings on ped surfaces; firm; pH 5.9; 2 to 5 inches thick; clear wavy boundary.

C 51 to 75 inches, yellowish-brown and grayish-brown micaceous loam; many medium, faint mottles; weak thin platy structure; friable; pH 5.8.

Intergrade between Gray-Brown Podzolic soils and Lithosols

In this county the soils that intergrade between Gray-Brown Podzolic soils and Lithosols belong to the Berks, Hollinger, Manor, Pequea, and Steinsburg series. Their characteristics are like those of the Gray-Brown Podzolic soils, but they are shallow to bedrock. Their B horizons have weakly developed structure and little accumulation of clay. Most of these soils contain a high proportion of fresh or imperfectly weathered fragments of rock. Generally, the steepest soils are the shallowest.

Intergrade between Gray-Brown Podzolic soils and Planosols

The Aldino and Lehigh series in this county are intergrades between the Gray-Brown Podzolic soils and the Planosols. Their general properties are similar to those of the intergrades between Gray-Brown Podzolic and Red-Yellow Podzolic soils. However, these soils occurring on nearly level to gentle slopes have a high water table and are not well drained. They have a fine-textured plastic subsoil. There is a marked difference in texture between the silt loam A horizon and the clay or silty clay B horizon. This is characteristic of the Planosols, except that in the true Planosols the change in texture is more abrupt.

A typical soil of this group is Lehigh silt loam, which developed on metamorphosed Triassic sandstone and shale. A profile description follows.

A_p 0 to 6 inches, dark-brown (10YR 4/3) silt loam; weak very fine subangular blocky structure; friable; pH 6.4; clear wavy boundary.

B_1 6 to 10 inches, dark yellowish-brown (10YR 4/4) silt loam; moderate medium blocky structure; friable; pH 6.4; clear wavy boundary.

B_2 10 to 27 inches, dark yellowish-brown (10YR 4/4) silty clay loam; many medium streaks and blotches of light brownish gray (10YR 6/2); moderate fine blocky structure; friable; pH 6.4.

C 27 to 36 inches, dark yellowish-brown (10YR 4/4) slaty silt loam; many medium streaks and blotches of light olive brown (2.5Y 5/4); moderate fine blocky structure; friable; pH 6.2.

Red-Yellow Podzolic soils

Although 23 soil series of this county show some characteristics typical of the Red-Yellow Podzolic great soil group, only 1 series, the Elioak, is classed as a Red-Yellow Podzolic soil.

A typical Red-Yellow Podzolic soil is strongly leached, acid in reaction, and low in organic matter and mineral plant nutrients. The surface soil is prevailingly light colored. The subsoil is finer textured and more plastic than the surface soil. The subsoil is red or yellow in places and somewhat mottled in the lower part. These soils are low in natural fertility, but they are easy to till and respond well to fertilization. They are suitable for a wide range of crops.

A typical profile of a Red-Yellow Podzolic soil is the following one of Elioak silt loam, which developed on Wissahickon schist:

A_{p1} 0 to 4 inches, dark-brown (7.5YR 4/4) silt loam; strong fine crumb structure; very friable; clear wavy boundary.

A_{p2} 4 to 8 inches, dark-brown (7.5YR 4/4) and strong-brown (7.5YR 5/6) silt loam; moderate thin platy structure; friable; clear wavy boundary.

A_3 8 to 13 inches, strong-brown (7.5YR 5/6) silt loam; moderate fine subangular blocky and some platy structure; friable; clear wavy boundary.

B_1 13 to 22 inches, yellowish-red (5YR 4/8) fine silt loam; moderate fine to medium blocky structure; friable to firm; clear wavy boundary.

B_2 22 to 32 inches, red (2.5YR 4/8) to yellowish-red (5YR 4/8) silt loam; moderate fine blocky, tending toward platy, structure; friable; clear wavy boundary.

B_3 32 to 42 inches, red (2.5YR 4/6) silt loam; moderate medium platy structure; very friable; abrupt wavy boundary.

C 42 inches +, strong-brown (7.5YR 5/8) disintegrated and decomposed schist; very friable; has a greasy feeling.

Low-Humic Gley soils

The Low-Humic Gley great soil group includes Croton and Watchung soils on uplands and Bowmansville, Melvin, and Wehadkee soils on bottom lands. All of these soils reflect the influence of poor or inadequate drainage, caused by lack of slope or by a high water table. These are somewhat poorly drained to poorly drained soils that have a very thin surface horizon that is moderately high in organic matter. They are distinctly or prominently mottled in the subsoil. In most places the subsoil is fine textured and plastic.

A typical Low-Humic Gley soil in this county is Croton loam, which developed on Triassic shales. A profile description follows.

A_p 0 to 5 inches, dark-gray (10YR 4/1) loam; a few, fine, faint, yellowish-red (5YR 5/6) mottles; moderate medium granular structure; friable; pH 6.5; clear wavy boundary.

B_{21g} 5 to 15 inches, gray (10YR 5/1) silty clay to clay loam; common, fine, distinct, brownish-yellow (10YR 6/6) mottles; strong coarse blocky structure; friable; pH 5.8; clear wavy boundary.

B_{22g} 15 to 36 inches, gray (5YR 6/1) silty clay loam; many, medium, prominent, light-gray (5YR 7/1) and strong-brown (7.5YR 5/6) mottles; strong prismatic, breaking to coarse blocky, structure; very firm; pH 5.2.

Alluvial soils

The Alluvial soils of this county consist of the Bermudian, Chewacla, Congaree, Huntington, Lindside, and Rowland series.

These Alluvial soils occur on bottom lands near streams. The streams deposit new soil materials when they overflow. These soil materials have not been in place long enough to have been much affected by the soil-forming processes. The profiles show little or no development. They are differentiated according to the drainage and to the type of geologic and soil material of which they are composed.

A typical Alluvial soil that developed on recent alluvium washed from schist and gneiss uplands is Chewacla silt loam. A profile description follows. The horizons have not been given genetic designations because they are not clearly enough differentiated.

0 to 8 inches, dark-brown (10YR 4/3 to 10YR 3/3) silt loam; weak medium platy to fine subangular blocky structure; very friable; pH 5.4; abrupt smooth boundary.

8 to 20 inches, dark-brown to dark grayish-brown (10YR 4/2 to 10YR 4/3) silt loam; weak medium platy to fine subangular blocky structure; very friable; pH 5.6; abrupt smooth boundary.

20 to 36 inches, yellowish-brown (10YR 5/4) silt loam; a few fine, distinct, light olive-brown (2.5Y 5/6) mottles; weak medium to coarse subangular blocky structure; very friable; pH 5.6; gradual wavy boundary.

36 to 42 inches, light olive-brown (2.5Y 5/4) silt loam; many medium, prominent, strong-brown (7.5YR 5/6) mottles; weak medium to coarse subangular blocky structure; friable; pH 6.4.

Analyses of Selected Soils

Mechanical and chemical analyses of 6 soils of Lancaster County were made at the Soil Survey Laboratory at Beltsville, Maryland. Two profiles of each soil type were analyzed, and the results are shown in table 10. The mineral composition of the clay fraction was determined by X-ray. Free iron oxides were determined as a percentage of the soil fractions less than 2 millimeters in diameter.

TABLE 10.—*Mechanical and chemical*

[Dashed lines indicate that the information

Soil type and sample number	Depth	Horizon	Particle size distribution							Textural class	Reaction	Organic carbon
			Very coarse sand (2.0 to 1.0 mm.)	Coarse sand (1.0 to 0.5 mm.)	Medium sand (0.5 to 0.25 mm.)	Fine sand (0.25 to 0.10 mm.)	Very fine sand (0.10 to 0.05 mm.)	Silt (0.05 to 0.002 mm.)	Clay (Less than 0.002 mm.)			
	Inches		*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*		*pH*	*Percent*
Chester silt loam:												
551630	−½ to 0	A_0									4.7	
551631	0 to 4	A_1	1.6	2.8	2.9	6.8	5.1	56.8	24.0	Silt loam	4.8	3.59
551632	4 to 11	A_2	2.1	2.8	2.7	6.4	5.3	55.2	25.5	Silt loam	4.8	.84
551633	11 to 18	B_{21}	2.5	3.0	2.8	6.6	5.7	49.3	30.1	Silty clay loam to clay loam.	4.8	.33
551634	18 to 27	B_{22}	2.9	3.5	3.1	7.6	7.1	41.1	34.7	Clay loam	5.0	.24
551635	27 to 32	B_{23}	4.3	5.3	4.3	11.0	11.1	31.0	33.0	Clay loam	5.2	.12
551636	32 to 38	B_{31}	4.8	6.4	5.2	12.8	12.8	27.0	31.0	Clay loam	5.4	.10
551637	38 to 50	B_{32}	4.0	5.6	4.7	11.4	10.7	29.5	34.1	Clay loam	5.3	.11
551638	50 to 70+	C	7.2	7.4	4.9	11.5	11.3	25.1	32.6	Clay loam	5.3	.10
Chester silt loam:												
551639	−1 to 0	A_0									4.2	
551640	0 to 3	A_1	3.7	4.6	2.8	7.9	[1]6.4	54.6	20.0	Silt loam	4.3	7.3
551641	3 to 10	A_2	3.6	3.3	2.4	6.6	5.6	54.9	23.6	Silt loam	4.5	2.67
551642	10 to 12	B_1	5.7	4.0	2.6	6.5	5.5	50.9	24.8	Silt loam to loam	4.5	.54
551643	12 to 19	B_{21}	5.1	3.9	2.5	6.3	5.6	49.0	27.6	Clay loam to loam	4.7	.38
551644	19 to 27	B_{22}	5.9	4.4	2.8	6.7	5.8	50.6	23.8	Silt loam to loam	5.0	.14
551645	27 to 38	B_3	10.9	8.8	4.2	9.4	8.0	39.7	19.0	Loam	5.1	.12
551646	38 to 50+	C	15.9	13.2	6.0	12.6	11.1	28.0	13.2	Coarse sandy loam	5.0	.08
Conestoga silt loam:												
551600	0 to 3	A_1	1.4	1.9	1.3	4.6	8.1	63.9	18.8	Silt loam	5.9	5.2
551601	3 to 11	A_2	.9	1.6	1.3	4.2	7.3	64.6	20.1	Silt loam	4.9	.79
551602	11 to 15	B_1	1.4	1.4	1.1	3.4	6.4	61.1	25.2	Silt loam	4.7	.30
551603	15 to 20	B_{21}	.9	1.2	1.0	3.2	5.3	56.9	31.5	Silty clay loam	4.9	.23
551604	20 to 30	B_{22}	1.7	1.9	1.2	3.6	5.6	56.1	29.9	Silty clay loam	5.0	.19
551605	30 to 37	B_{23}	1.5	1.6	1.2	3.5	5.4	59.7	27.1	Silty clay loam to silt loam.	5.0	.12
551606	37 to 43	B_3	.9	1.5	1.3	4.5	7.3	48.0	36.5	Silty clay loam	5.0	.11
551607	43 to 56+	C	1.9	2.1	1.6	5.5	9.4	37.1	42.4	Clay	5.1	.12
Conestoga silt loam:												
551608	−2 to 0	A_0									5.5	21.1
551609	0 to 4	A_1	1.6	2.1	1.2	3.8	[1]6.6	62.4	22.3	Silt loam	4.7	6.5
551610	4 to 10	A_2	2.2	1.8	1.1	3.0	6.0	62.6	23.3	Silt loam	4.7	1.96
551611	10 to 15	B_1	1.7	1.4	.8	2.4	5.1	56.5	32.1	Silty clay loam	4.7	.35
551612	15 to 23	B_{21}	1.5	1.3	.8	2.7	5.3	53.8	34.6	Silty clay loam	4.9	.22
551613	23 to 29	B_{22}	1.8	1.6	1.0	2.8	5.4	55.7	31.7	Silty clay loam	5.0	.15
551614	29 to 34	B_3	2.6	3.2	1.8	5.2	8.9	52.5	25.8	Silt loam	5.1	.14
551615	34 to 45+	C	3.6	5.0	3.0	9.0	12.7	48.9	17.8	Loam to silt loam	5.1	.08
Duffield silt loam:												
551557	−½ to 0	A_0									5.3	12.7
551558	0 to 4	A_1	1.9	1.9	1.4	2.5	4.4	68.5	19.4	Silt loam	4.9	3.33
551559	4 to 13	A_2	1.5	1.6	1.2	1.9	3.9	67.7	22.2	Silt loam	4.4	.36
551560	13 to 19	B_{21}	1.5	1.6	1.2	1.9	4.2	60.9	28.7	Silty clay loam	4.5	.22
551561	19 to 26	B_{22}	2.4	1.7	1.2	2.0	4.1	53.3	35.3	Silty clay loam	4.9	.12
551562	26 to 37	B_{23}	1.8	1.8	1.3	2.2	5.0	42.1	45.8	Silty clay	4.8	.13
551563	37 to 49	B_3	1.3	1.1	.9	1.4	3.2	62.6	29.5	Silty clay loam	4.9	.12
551564	49 to 66	C	1.9	1.4	1.0	1.7	4.0	56.2	33.8	Silty clay loam	5.0	.11
Duffield silt loam:												
551565	0 to 5	A_1	.3	.4	.2	.8	2.8	75.8	19.7	Silt loam	5.0	3.39
551566	5 to 14	A_2	.7	.9	.6	1.5	4.8	73.0	18.5	Silt loam	4.5	1.15
551567	14 to 19	B_1	1.1	.8	.6	1.4	4.3	72.1	19.7	Silt loam	4.4	.29
551568	19 to 28	B_{21}	1.0	1.1	.8	1.8	5.5	62.3	27.5	Silty clay loam to silt loam.	4.8	.18
551569	28 to 34	B_{22}	1.5	1.5	.9	2.3	7.5	50.3	36.0	Silty clay loam	5.2	.12
551570	34 to 43	B_{23}	2.3	1.9	1.1	2.6	8.8	47.4	35.9	Silty clay loam	5.2	.07
551571	43 to 56+	C	1.7	1.7	.9	2.6	9.6	46.8	36.7	Silty clay loam	5.1	.10

analyses of selected soils

was not determined for that horizon]

Cation exchange capacity	Extractable cations					Base saturation	Mineral composition of the clay fraction					Free iron oxides (Fe_2O_3)
	Ca	Mg	H	Na	K		Mica	Vermiculite	Chlorite	Montmorillonite	Kaolinite	
m.eq./100 g.	*m.eq./100 g.*	*m.eq./100 g.*	*m.eq./100 g.*	*m.eq./100 g.*	*m.eq./100 g.*	*Percent*						*Percent*
29.1	6.9	1.8	19.9	<0.1	0.5	32						
18.8	.6	.6	17.2	<.1	.4	9						3.5
10.1	.1	.1	9.5	.1	.3	6	Moderate	Moderate	Detected	Not detected	Moderate	4.2
9.8	.2	.3	8.8	.3	.2	10						5.5
9.7	.3	.1	8.9	.2	.2	8	Detected	Moderate	Detected	Not detected	Moderate	7.6
7.0	.1	.5	6.0	.2	.2	14						9.0
6.8	.1	<.1	6.4	.1	.2	6						9.6
7.1	.1	.1	6.6	.1	.2	7						9.2
7.0	.1	.1	6.4	.2	.2	9	Detected	Moderate	Detected	Not detected	Moderate	9.7
62.3	6.5	4.9	49.7	<.1	1.2	20						
26.6	.6	1.1	24.4	<.1	.5	8						3.5
13.6	.1	.1	13.1	<.1	.3	4	Detected	Moderate	Moderate	Not detected	Moderate	3.9
9.2	<.1	.1	8.6	.3	.2	7						4.4
10.1	.4	.1	9.3	.1	.2	8						5.2
9.3	.1	1.6	7.3	.2	.2	22	Detected	Moderate	Moderate	Not detected	Moderate	5.4
5.9	<.1	.2	5.3	.2	.2	10						5.8
6.9	<.1	<.1	6.5	.3	.1	6	Detected	Moderate	Moderate	Not detected	Moderate	5.0
24.6	9.7	2.6	11.7	<.1	.6	52						
8.9	1.0	.6	7.1	<.1	.2	20	Detected	Moderate	Moderate	Not detected	Moderate	
10.2	.8	.6	8.6	<.1	.2	16						
12.5	1.4	1.9	8.9	<.1	.3	29						
10.9	1.0	3.5	6.1	<.1	.3	44	Moderate	Moderate	Detected	Not detected	Moderate	
10.2	.7	2.8	6.5	<.1	.2	36						
10.6	.6	1.9	8.9	<.1	.2	25						
13.9	.8	3.6	9.2	.1	.2	34	Detected	Abundant	Not detected	Not detected	Abundant	
49.4	10.5	2.7	35.3	.3	.6	29						
24.9	1.0	.8	22.6	.3	.2	9						
14.7	.2	.5	13.6	.1	.3	7	Not detected	Moderate	Moderate	Not detected	Abundant	
10.0	.2	.7	8.8	<.1	.3	12						
11.8	.3	2.3	8.3	.1	.4	30						
11.3	.2	2.8	7.9	.1	.3	30	Not detected	Moderate	Moderate	Not detected	Abundant	
6.1	<.1	1.5	4.3	<.1	.3	30						
5.1	.1	.8	4.1	<.1	.1	20	Detected	Abundant	Not detected	Not detected	Abundant	
44.8	13.0	2.9	27.7	.1	1.1	38						
21.2	2.0	1.8	17.0	<.1	.4	20						2.2
9.3	.5	.2	8.4	<.1	.2	10	Detected	Moderate	Moderate	Not detected	Moderate	2..
11.5	.7	.3	10.3	<.1	.2	10						3.9
14.3	1.7	1.2	11.1	<.1	.3	22	Detected	Moderate	Moderate	Not detected	Moderate	497
14.7	1.0	2.2	11.2	<.1	.3	24						5.9
11.3	.5	1.0	9.5	.1	.2	16						4.4
12.1	.8	1.7	9.3	.1	.2	23	Detected	Detected	Detected	Not detected	Detected	5.0
24.3	5.5	1.2	17.0	<.1	.6	30						2.4
14.9	.5	1.5	12.6	<.1	.3	15	Detected	Moderate	Moderate	Not detected	Moderate	2.3
9.1	.4	.5	8.0	<.1	.2	12						2.5
12.1	1.5	2.0	8.4	<.1	.2	30						3.9
13.8	2.2	3.8	7.4	.1	.3	46	Detected	Detected	Detected	Not detected	Detected	5.2
13.4	2.1	3.4	7.6	<.1	.3	43						5.3
12.5	1.8	3.1	7.4	<.1	.2	41	Detected	Detected	Detected	Not detected	Moderate	5.6

TABLE 10.—*Mechanical and chemical*

Soil type and sample number	Depth	Horizon	Particle size distribution							Textural class	Reaction	Organic carbon
			Very coarse sand (2.0 to 1.0 mm.)	Coarse sand (1.0 to 0.5 mm.)	Medium sand (0.5 to 0.25 mm.)	Fine sand (0.25 to 0.10 mm.)	Very fine sand (0.10 to 0.05 mm.)	Silt (0.05 to 0.002 mm.)	Clay (Less than 0.002 mm.)			
	Inches		*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*		*pH*	*Percent*
Edgemont stony fine sandy loam:[2]												
551616	−½ to 0	A_0									3.6	
551617	0 to 1	A_2	3.6	[3]7.7	8.9	36.6	15.6	20.5	7.1	Fine sandy loam	3.6	5.6
551618	1 to 2	B_1	6.2	5.6	7.4	33.7	16.1	21.6	9.4	Fine sandy loam	3.9	2.39
551619	2 to 12	A_2'	6.4	6.0	6.9	30.3	17.0	23.3	10.1	Fine sandy loam	4.6	.92
551620	12 to 18	A_3'	7.4	6.6	6.5	29.5	17.3	22.7	10.0	Fine sandy loam	4.6	.29
551621	18 to 25	B_2'	5.9	6.0	5.5	28.2	19.6	21.3	13.5	Fine sandy loam	4.4	.12
551622	25 to 32	B_3'	13.3	9.2	6.6	29.1	19.9	14.8	7.1	Fine sandy loam	4.5	.11
Edgemont fine sandy loam:[4]												
551623	−1 to 0	A_0									3.6	
551624	0 to 1	A_2	6.7	8.6	7.7	31.0	[1] [3]17.8	20.0	8.2	Fine sandy loam	3.6	5.0
551625	1 to 2	B_2	6.3	9.1	7.9	31.9	20.5	13.9	10.4	Fine sandy loam	4.0	2.93
551626	2 to 12	A_2'	11.1	8.3	5.7	23.6	18.7	24.6	8.0	Fine sandy loam	4.4	.30
551627	12 to 16	A_3'	16.2	9.1	5.2	21.6	19.0	21.2	7.7	Coarse sandy loam	4.4	.21
551628	16 to 24	B_2'	18.7	9.9	4.6	19.5	20.1	20.0	7.2	Coarse sandy loam	4.4	.15
551629	24 to 32+	C′	7.5	15.0	6.6	26.7	22.4	17.0	4.8	Loamy sand	4.7	.17
Lansdale loam:												
551588	0 to 5	A_1	7.1	10.8	7.2	10.0	7.5	44.4	13.0	Loam	5.5	4.20
551589	5 to 13	A_2	5.8	10.2	7.2	9.6	7.7	46.4	13.1	Loam	4.8	.89
551590	13 to 17	B_1	6.3	9.4	6.1	8.5	6.8	45.4	17.5	Loam	4.6	.23
551591	17 to 26	B_2	8.1	11.8	7.0	9.4	7.2	37.7	18.8	Loam	4.8	.17
551592	26 to 32	B_3	10.2	14.1	9.6	13.1	9.1	29.5	14.4	Sandy loam	4.8	.11
551593	32 to 37	C	8.4	17.2	12.9	18.4	10.7	22.5	9.9	Coarse sandy loam	4.9	.08
Lansdale loam:												
551594	0 to 7	A_1	7.4	14.5	10.2	13.0	6.8	34.4	13.7	Loam to sandy loam	4.4	1.97
551595	7 to 11	A_2	9.2	16.4	9.7	12.1	6.2	33.7	12.7	Coarse sandy loam	4.5	.42
551596	11 to 15	B_1	10.9	15.0	9.1	11.6	5.8	33.7	13.9	Coarse sandy loam to loam.	4.6	.17
551597	15 to 19	B_{21}	11.6	14.8	8.6	11.1	5.6	33.0	15.3	Loam to coarse sandy loam.	4.5	.19
551598	19 to 24	B_{22}	12.6	15.2	10.5	13.4	6.4	24.9	17.0	Coarse sandy loam	4.6	.14
551599	24 to 32	B_3	14.3	18.8	11.8	14.8	7.4	17.5	15.4	Coarse sandy loam	4.7	.10
Montalto channery silt loam:												
551572	0 to 2	A_1	2.9	2.8	1.5	3.2	4.9	64.8	19.9	Silt loam	4.7	5.0
551573	2 to 11	A_2	1.8	2.2	1.4	2.5	4.4	65.6	22.1	Silt loam	4.7	.64
551574	11 to 15	B_1	1.7	1.8	1.2	2.3	4.1	59.3	29.6	Silty clay loam	5.1	.28
551575	15 to 19	B_{21}	1.8	2.1	1.3	2.5	3.8	50.9	37.6	Silty clay loam	5.3	.20
551576	19 to 26	B_{22}	1.4	1.5	1.2	2.9	4.8	37.2	51.0	Clay	5.3	.19
551577	26 to 35	B_{23}	.9	1.5	1.2	3.1	5.0	35.8	52.5	Clay	5.2	.13
551578	35 to 51	B_3	.3	1.2	1.1	3.6	6.0	34.0	53.8	Clay	5.1	.13
551579	51 to 60+	C	.8	1.9	1.4	4.1	6.4	31.6	53.8	Clay	5.2	.14
Montalto very stony silt loam:												
551580	0 to 4	A_1	2.6	3.4	2.1	4.9	6.7	64.0	16.3	Silt loam	6.6	4.13
551581	4 to 8	A_2	1.4	2.5	1.7	3.7	5.6	59.0	26.1	Silt loam to silty clay loam.	4.8	.91
551582	8 to 12	B_1	1.3	2.0	1.3	3.1	5.0	56.5	30.8	Silty clay loam	4.8	.59
551583	12 to 18	B_{21}	.7	1.3	.9	2.4	3.9	50.0	40.8	Silty clay to silty clay loam.	4.9	.35
551584	18 to 32	B_{22}	.5	1.3	1.0	2.6	4.4	44.7	45.5	Silty clay	5.0	.18
551585	32 to 40	B_{23}	2.7	6.0	3.8	6.0	6.6	36.1	38.8	Clay loam	5.1	.16
551586	40 to 48	B_3	.4	1.8	2.0	5.3	7.2	44.7	38.6	Silty clay loam	5.0	.15
551587	48 to 60+	C	.1	1.6	2.2	7.0	9.5	45.0	34.6	Clay loam to silty clay loam.	5.0	.14

[1] Some undecomposed organic matter in sand fractions.
[2] On the soil map, this sample site is included in an area of Edgemont very stony loam.
[3] Aggregates in coarse sands.
[4] On the soil map, this sample site is included in an area of Edgemont loam.

analyses of selected soils—Continued

Cation exchange capacity	Extractable cations					Base saturation	Mineral composition of the clay fraction					Free iron oxides (Fe_2O_3)
	Ca	Mg	H	Na	K		Mica	Vermiculite	Chlorite	Montmorillonite	Kaolinite	
m.eq./100 g.	*m.eq./100 g.*	*m.eq./100 g.*	*m.eq./100 g.*	*m.eq./100 g.*	*m.eq./100 g.*	*Percent*						*Percent*
72.0	1.7	.5	69.1	.2	.5	4						
15.8	.2	.4	14.9	.1	.2	6						.3
14.1	.1	.3	13.5	.1	.1	4						.6
7.0	.1	<.1	6.6	.2	.1	6						.8
4.5	.1	.1	4.0	.2	.1	11						.7
5.9	<.1	<.1	5.7	<.1	.2	3						1.2
2.8	<.1	.2	2.5	<.1	.1	11						.6
68.8	.3	.7	67.1	.2	.3	2						
25.8	.1	.4	25.0	.2	.1	3						.3
22.0	.1	1.2	20.6	<.1	.1	6						.6
4.5	<.1	<.1	4.2	.1	.1	7						.4
3.5	<.1	.1	3.2	.1	.1	9						.5
5.0	<.1	.1	3.8	<.1	.1	24						.5
2.5	<.1	.1	2.3	<.1	.1	8						.4
21.4	5.3	1.4	14.1	.1	.5	34						
8.5	.7	.2	7.3	.1	.2	14	Detected	Moderate	Moderate	Not detected	Moderate	
9.0	.6	<.1	8.1	.1	.2	10						
10.0	1.1	.9	7.7	.1	.2	23	Detected	Abundant	Not detected	Not detected	Moderate	
10.5	1.6	1.4	7.3	<.1	.2	30						
8.3	1.1	1.4	5.6	<.1	.2	32	Detected	Abundant	Not detected	Not detected	Moderate	
14.0	.6	.4	12.8	<.1	.2	8						
6.5	.3	.4	5.6	<.1	.2	14	Detected	Moderate	Moderate	Not detected	Moderate	
6.1	.2	.1	5.6	<.1	.2	8						
7.0	.3	<.1	6.5	<.1	.2	7	Detected	Moderate	Moderate	Not detected	Moderate	
9.6	.9	1.5	6.9	<.1	.3	28						
8.7	.6	.8	7.1	<.1	.2	18	Detected	Moderate	Moderate	Not detected	Moderate	
23.3	2.4	1.6	18.8	<.1	.5	19						4.8
10.9	.3	.5	9.8	.1	.2	10	Not detected	Not detected	Moderate	Not detected	Abundant	5.1
10.6	1.0	1.2	8.2	<.1	.2	23						6.5
15.1	2.0	3.9	8.9	.1	.2	41						8.4
19.8	3.2	6.1	10.2	.1	.2	48	Not detected	Not detected	Detected	Not detected	Abundant	11.1
17.4	2.9	3.5	10.7	.1	.2	39						11.4
19.9	1.9	4.8	12.9	.1	.2	35						12.5
19.5	2.4	4.0	12.7	.2	.2	35	Not detected	Not detected	Moderate	Not detected	Abundant	13.5
16.3	2.4	3.5	9.5	.1	.8	42						5.1
14.0	1.0	.9	11.8	<.1	.3	16	Detected	Not detected	Detected	Not detected	Dominant	6.5
15.4	1.0	1.5	12.7	<.1	.2	18						6.9
18.1	2.1	4.1	11.7	<.1	.2	35						8.5
18.1	2.1	4.4	11.4	<.1	.2	37	Not detected	Not detected	Detected	Not detected	Abundant	10.4
19.7	1.8	4.8	12.7	.2	.2	36						12.3
19.6	2.1	4.6	12.5	.3	.1	36						11.1
18.7	1.9	4.0	12.4	.3	.1	34	Detected	Not detected	Detected	Not detected	Abundant	11.4

Glossary

Accelerated erosion.—Erosion more rapid than natural, normal, or geological erosion. It usually results from the activities of man or animals.

Aeration, soil.—The process by which air and other gases in the soil are renewed. The rate of soil aeration depends largely on the size and number of pores in the soil and on the amount of water clogging the pores.

Aggregate, soil.—A single mass or cluster consisting of many primary soil particles held together, such as a prism, crumb, or granule.

Alluvial soil.—Soil formed from material, such as gravel, sand, silt, or clay, deposited by a stream of water and showing little or no modification of the original materials by soil-forming processes.

Base saturation.—The relative degree to which a soil has absorbed metallic cations (calcium, potassium, magnesium, etc.). The proportion of the cation-exchange capacity that is saturated with metallic cations (*16*).

Bedding, land.—Plowing, grading, or otherwise elevating the surface of fields into a series of parallel beds, or "lands," separated by shallow surface drains.

Bedrock.—The solid rock that underlies the soils and other unconsolidated material or that is exposed at the surface.

Calcareous.—Containing calcium carbonate or lime.

Channery soils.—Soils that contain thin, flat fragments of sandstone, limestone, or schist up to 6 inches along the longer axis. A single piece is called a fragment.

Claypan.—A compact horizon or layer rich in clay and separated more or less abruptly from the overlying horizon.

Clean tillage.—Cultivation to prevent the growth of all vegetation except the crop desired.

Coarse-textured soils.—Sands, loamy sands, sandy loams, and fine sandy loam.

Cobblestones.—Rounded rock fragments 3 to 10 inches in diameter.

Colluvial soils.—Soils formed from material that has been moved downhill by gravity, soil creep, frost action, or local erosion. It accumulates on lower slopes and at the foot of slopes.

Conglomerate.—Rock composed of gravel and rounded stones cemented together by hardened clay, lime, iron oxide, or silica.

Consistence.—The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are as follows:

Loose.—Noncoherent; will not hold together in a mass.

Friable.—When moist, crushes easily under moderate pressure between thumb and forefinger, and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure, but can be pressed into a lump; will form a wire when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material.

Hard.—When dry, moderately resistant to pressure; can barely be broken between thumb and forefinger.

Cemented.—Hard and brittle; little affected by moistening.

Contour farming.—Conducting field operations such as plowing, planting, cultivating, and harvesting in rows that are at right angles to the natural direction of the slope and as nearly level as practical.

Cover crops.—Close-growing crops, grown primarily to improve the soil and protect it between periods of regular crop production; or grown between trees in orchards.

Deciduous trees.—Trees that drop their leaves annually.

Diabase.—A basic igneous rock, locally called ironstone. It is composed essentially of plagioclase feldspar and augite with small quantities of magnetite and apatite.

Dike.—Igneous rock that was forced into a vertical crack or fissure while molten, then hardened in that shape.

Diversion terrace.—A channel with a supporting ridge on the lower side, constructed across the slope to intercept runoff and carry it to a planned outlet. These terraces are maintained in permanent sod.

Drainage terrace.—A relatively deep channel and low ridge constructed across the slope primarily for drainage. It may be either a diversion terrace or a field terrace.

Dolomite.—A rock consisting chiefly of calcium carbonate and magnesium carbonate in approximately equal proportions.

Erodible.—Susceptible to erosion; easily lost through the action of water or wind.

Erosion.—The wearing away of the surface of the soil by running water, wind, or other geological agencies.

Field terrace.—A ridge 10 to 20 inches high and 15 to 30 feet wide with gently sloping sides, a rounded crown, and a dish-shaped channel along the upper side, constructed across the direction of the slope to control erosion by diverting runoff along the contour at a safe speed. It may grade toward one or both ends. Cultivated crops may be grown over this terrace.

Fine-textured soils.—Clay loams, sandy clay loams, silty clay loams, sandy clays, silty clays, and clays.

Flood plain.—The nearly level areas, subject to overflow, that occur along streams.

Gabbro.—A more or less dark-colored, granular, igneous rock comprised mainly of basic plagioclase, generally labradorite, with a ferromagnesian mineral (augite, hypersthene, or hornblende) and accessory iron ore.

Geological erosion.—Normal erosion that takes place when soil is under native vegetation and undisturbed by human activity.

Gneiss.—A crystalline rock in which the component minerals are arranged in parallel bands or layers. This rock tends to cleave into slabs.

Graded stripcropping.—Growing crops in strips that are graded toward a protected waterway.

Granodiorite.—A granular, intrusive, igneous rock, intermediate between quartz-monzonite and quartz-diorite.

Graphitic.—Containing graphite, or native carbon.

Grassed waterway.—A waterway planted to grass to protect it against erosion; sometimes graded or shaped to control runoff.

Green-manure crop.—A crop of grasses or legumes worked into the soil while green or soon after maturity for the purpose of soil improvement.

Gully.—A steep-sided channel resulting from accelerated erosion; large enough to be an obstacle to farm machinery.

Hardpan.—A horizon or soil layer that is strongly compacted or cemented.

Horizon, soil.—A layer of soil, approximately parallel to the soil surface, with distinct characteristics produced by soil-forming processes. Horizons are identified by letters of the alphabet.

A horizon.—The horizon at the surface. It contains organic matter, or it has been leached of soluble minerals and clay, or it shows the effects of both. The major A horizon may be subdivided into A_1, the part that is darkest in color because it contains organic matter, and A_2, the part that is the most leached and light colored layer in the profile. In woodlands, a layer of organic matter accumulates on top of the mineral soil; this layer is called the A_0 horizon. The depth of the soil, however, is measured from the top of the mineral soil, because the A_0 horizon is rapidly destroyed if fire occurs or if the soil is cultivated. Where the upper layers of the soil are thoroughly mixed by cultivation, this plow layer is called the A_p horizon.

B horizon.—The horizon in which clay, minerals, or other material has accumulated, or which has developed a characteristic blocky or prismatic structure, or which shows the characteristics of both processes. It may be subdivided into B_1, B_2, or B_3 horizons. The B_2 horizon may be subdivided further by adding a number to the symbol, such a B_{21}, B_{22}, or B_{23}.

C horizon.—The unconsolidated material immediately under the true soil. It is presumed to be similar in chemical, physical, and mineral composition to the material from which at least part of the overlying solum has developed.

D horizon.—The stratum beneath the parent material. It may be unlike the parent material of the soil. If it consists of solid rock like that from which the parent material has developed, it is designated as D_r.

Gleyed horizon.—A strongly mottled or gray horizon that occurs in wet soils. It is designated by the letters BG, CG,

or sometimes merely by G. A horizon only slightly gleyed may have the letter $_g$ added to the symbol.

Igneous rock.—A rock produced through the cooling of melted mineral materials.

Leached layer.—A layer in which the soluble constituents have been dissolved and washed away by percolating water.

Liquid limit.—The moisture content at which the soil passes from a plastic to a liquid state. In engineering, a high liquid limit indicates that the soil has a high content of clay and a low capacity for carrying loads.

Medium-textured soil.—Very fine sandy loams, loams, silt loams, and silts.

Metamorphic rock.—A rock that has undergone pronounced alteration. Such alteration has generally been brought about by the combined action of pressure, heat, and water; frequently the resulting rock is more compact and more highly crystalline than the original. Gneiss, schist, and marble are common examples.

Micaceous.—Containing mica.

Mottling, soil.—Contrasting color patches that vary in number and size. Descriptive terms are as follows: Contrast—*faint, distinct,* and *prominent;* abundance—*few, common,* and *many;* and size—*fine, medium,* and *coarse.* The size measurements are the following: *fine,* less than 5 mm. (about 0.2 in.) in diameter along the greatest dimension; *medium,* ranging from 5 to 15 mm. (about 0.2 to 0.6 in.) in diameter along the greatest dimension; and *coarse,* more than 15 mm. (about 0.6 in.) in diameter along the greatest dimension.

Parent material.—The unconsolidated rock material from which the soil developed.

Peds.—The soil aggregates; the natural structural pieces into which the soil tends to separate when disturbed.

Permeability.—That quality of the soil that enables it to transmit water or air. Terms used to describe permeability are: *Very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

Phylite.—A micaceous schist, intermediate between mica-schist and slate.

Physiographic province.—One of the major geographic divisions of the continent.

Plastic limit.—The moisture content at which a soil changes from a semisolid to a plastic state.

Plasticity index.—The numerical difference between the liquid limit and the plastic limit; the range in moisture content over which the soil remains plastic.

Profile, soil.—A vertical section of the soil through all its horizons and extending into the parent material.

Quartz-monzonite.—A granite rich in plagioclase.

Quartzite.—A compact granular metamorphosed sandstone.

Reaction, soil.—The degree of acidity or alkalinity of the soil, expressed in pH values or in words, as follows (*18*):

	pH		*pH*
Extremely acid	Below 4.5	Mildly alkaline	7.4 to 7.8
Very strongly acid	4.5 to 5.0	Moderately alkaline	7.9 to 8.4
Strongly acid	5.1 to 5.5	Strongly alkaline	8.5 to 9.0
Medium acid	5.6 to 6.0	Very strongly alkaline	9.1 and higher.
Slightly acid	6.1 to 6.5		
Neutral	6.6 to 7.3		

Residual soil.—Soil formed from material weathered from the underlying consolidated rock.

Rill.—A steep-sided channel resulting from accelerated erosion; usually only a few inches in depth and width; not large enough to be an obstacle to farm machinery.

Runoff.—Rainwater that flows away over the surface of the soil without sinking in.

Schist.—A rock that has a parallel or foliated structure secondarily developed in it by shearing, a process generally accompanied by more or less recrystallization of the constituent minerals in layers parallel to the cleavage; splits or cleaves readily.

Sedimentary rock.—A rock formed from an accumulation of sediment in water. Although there are many intermediate types, the principal groups of sedimentary rocks are (1) conglomerates (from gravels), (2) sandstones (from sands), (3) shales (from clays), and (4) limestones (from calcium carbonate deposits).

Series, soil.—A group of soils that have horizons similar, except for the texture of the surface soil, as to differentiating characteristics and arrangement in the soil profile, and developed from a particular type of parent material. A series may include two or more soil types that differ from one another in the texture of the surface soil.

Serpentine.—A rock consisting essentially of hydrous magnesium silicate.

Shale.—A sedimentary rock formed by hardening of clay deposits into rock.

Sheet erosion.—Gradual and uniform removal of soil material from the surface of the soil, without the formation of rills and gullies.

Soil association.—A group of soils that occur together in an individual and characteristic pattern over a geographic area.

Sill.—Igneous rock that was forced into a horizontal crack or fissure while molten, then hardened in that shape.

Solum.—The upper part of the soil profile, above the parent material; the part of the profile that has been noticeably affected by the soil-forming processes. The solum of mature soils consists of the A and B horizons.

Stripcropping.—Growing alternate strips of close-growing crops and clean-tilled crops or fallow on the contour or parallel to terraces.

Structure, soil.—The arrangement of the primary soil particles into lumps, granules, or other aggregates. Structure is described by grade—*weak, moderate,* or *strong,* that is, the distinctness and durability of the aggregates; by the size of the aggregates—*very fine, fine, medium, coarse,* or *very coarse;* and by their shape—*platy, prismatic, columnar, blocky, granular,* or *crumb.* A soil is described as structureless if there are no observable aggregates. Structureless soils may be massive (coherent) or single grain (noncoherent).

Blocky, angular.—Aggregates are shaped like blocks; they may have flat or rounded surfaces that join at sharp angles.

Blocky, subangular.—Aggregates have some rounded and some flat surfaces; upper sides are rounded.

Columnar.—Aggregates are prismatic and are rounded at the top.

Crumb.—Aggregates are generally soft, small, porous, and irregular, but tend toward a spherical shape, as in the A_1 horizons of many soils. Crumb structure is closely related to granular structure.

Granular.—Roughly spherical firm small aggregates that may be either hard or soft but are generally more firm and less porous than crumb and without the distinct faces of blocky structure.

Platy.—Aggregates are flaky or plate like.

Prismatic.—Aggregates have flat vertical surfaces, and their height is greater than their width.

Subsoil.—The soil layers below the plow layer; the B horizon.

Substratum.—The soil material below the surface soil and the subsoil; the C or D horizon.

Surface soil.—The plow layer; the A horizon.

Texture, soil.—The relative amounts of particles of different size classes, called sand, silt, and clay, determine texture. The common soil textures in Lancaster County are sandy loam, loam, and silt loam. The sandy loam is half to more than four-fifths sand and less than one-fifth clay—the remainder is silt. The loam is one-fourth or less clay, one-fourth to one-half sand, and one-fourth to one-half silt. The silt loam is one-half or more silt and up to one-half sand—it contains very little clay.

Clay.—Small mineral soil grains, less than 0.002 millimeter (0.000079 inch) in diameter.

Silt.—Small mineral soil grains ranging from 0.05 millimeter (0.002 inch) to 0.002 millimeter (0.000079 inch) in diameter.

Sand.—Small rock or mineral fragments ranging from 0.05 millimeter (0.002 inch) to 2.0 millimeter (0.079 inch) in diameter.

Tilth.—The physical properties of the soil that affect the ease of cultivating it or its suitability for crops; implies the presence or absence of favorable soil structure.

Topsoil (engineering term).—Soil material containing organic matter and suitable as a surfacing for shoulders and slopes.

Water-holding capacity.—The ability of a soil to hold water that will not drain away but can be taken up by plant roots.

Water table.—The upper surface of the ground water.

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