

U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF SOILS—MILTON WHITNEY, Chief.

IN COOPERATION WITH THE VIRGINIA AGRICULTURAL EXPERIMENT
STATION, A. W. DRINKARD, JR. DIRECTOR.

SOIL SURVEY OF PITTSYLVANIA COUNTY,
VIRGINIA.

BY

N. M. KIRK, IN CHARGE, AND E. H. STEVENS, OF THE U. S.
DEPARTMENT OF AGRICULTURE, AND C. H. DRINKARD,
AND G. W. PATTESON, JR., OF THE VIRGINIA
AGRICULTURAL EXPERIMENT STATION.

W. EDWARD HEARN, INSPECTOR, SOUTHERN DIVISION.

[Advance Sheets—Field Operations of the Bureau of Soils, 1918.]



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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF SOILS,

Washington, D. C., July 1, 1921.

SIR: I have the honor to transmit herewith the manuscript report and map covering the soil survey of Pittsylvania County, Va., and to recommend that they be published as advance sheets of Field Operations of the Bureau of Soils, 1918, as authorized by law. This work was done in cooperation with the Virginia Agricultural Experiment Station.

Respectfully,

MILTON WHITNEY,

Chief of Bureau.

Hon. H. C. WALLACE,

Secretary of Agriculture.

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MAP.

Soil map, Pittsylvania County sheet, Virginia.

SOIL SURVEY OF PITTSYLVANIA COUNTY, VIRGINIA.

By N. M. KIRK, In Charge, and E. H. STEVENS, of the U. S. Department of Agriculture, and C. H. DRINKARD and G. W. PATTESON, Jr., of the Virginia Agricultural Experiment Station—Area Inspected by W. EDWARD HEARN.

DESCRIPTION OF THE AREA.

Pittsylvania County, Virginia, is situated in the southern part of the State, on the North Carolina State line. It has a latitude similar to that of southern Kansas and northern Arizona, while its longitude is about that of western New York and eastern South Carolina. The county is bounded on the north by the Roanoke River.¹ Its greatest dimension from north to south is 40 miles, and from east to west 28 miles. The total area is 1,012 square miles, or 647,680 acres.

Pittsylvania County lies wholly within the Piedmont Plateau, a psysiographic province extending from New Jersey to Alabama. The general topography is that of a high plateau which has been so dissected by numerous streams as to be decidedly rolling. The surface generally becomes quite hilly and broken as the main drainage ways are approached. This plateau is broken by White Oak Mountain, which extends through the county in a northeasterly direction from the vicinity of Mountcross to the vicinity of Riceville, where there is a break of about 5 miles, after which Betterton Mountain extends in the same general direction for about 4 miles. From Mountcross, and extending in a southwesterly direction to a point near Oak Hill, there are several conspicuous ridges which seem to be remnants of what was probably an extension of White Oak Mountain. Smith Mountain, in the northwest corner of the county, and Turkey Cock Mountain, about 4 miles northwest of Callands, form very conspicuous physiographic features, as also do Jasper, Farmers, and Brushy Mountains in the northern part of the county. All these are well-defined mountain ridges standing several hundred feet above the upland of the rest of the county.

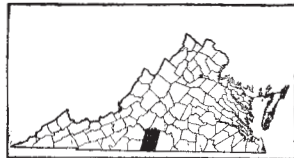


FIG. 1.—Sketch map showing location of the Pittsylvania County area, Virginia.

¹ The bureau follows a decision of the U. S. Board of Geographic Names in designating this stream as the Roanoke River. This is the name it has always borne at its head and mouth, but a section of its middle course is sometimes called Staunton River.

The rivers and large creeks have carved comparatively deep drainage courses, ranging from 50 to 150 feet below the intervening ridges. Generally the valley slopes are fairly smooth, but in some cases they are steep and broken. The most prominent of these steeper areas lie along Dan River west of Danville; in the southwest corner of the county along the upper reaches of Sandy River, along Turkey Cock, Tomahawk, Old Womans, and Reed Creeks; along Sandy Creek north of Keeling; and at various places along Pig and Roanoke Rivers. Some of the smoother areas are found in the vicinity of Lima, Whitmell, Climax, Kentuck, Laurel Grove, and Chalk Level.

The level stream terraces and bottom lands vary considerably in width and extent. The terraces, or second bottoms, are for the most part narrow, ranging in width from a few yards to several hundred yards, and they occur only discontinuously along some of the principal creeks and rivers. The recent-alluvial deposits, or first bottoms, developed along practically all the streams, vary in width from a few yards along the smaller streams to half a mile along the rivers. Both the terrace and first-bottom lands are adapted to the use of modern farm machinery.

The general range of elevation of the county is from 400 to 800 feet above sea level. Smith Mountain, however, has an elevation of about 2,000 feet, and Brushy and Jasper Mountains and Wheeler Knob reach 1,000 to 1,200 feet above sea level. The elevation at Level Run is 719 feet; three-fourths mile east of Pittsville, 965 feet; at Chatham, about 500 feet; and at Danville, 425 feet.

The area is thoroughly dissected so that surface drainage over the county as a whole is good, practically every square mile of land being traversed by a perennial drainage way or reached by numerous small intermittent branches. About 2 miles east of Sheva, however, and south of Cascade Station in what is locally called "The Meadows," drainage has not been fully established. Here the surface is level, or nearly so, and during periods of excessive rainfall the run-off is not sufficient to meet the needs of crops. The drainage of the greater part of the county is toward the south and east. The southern portion and a considerable area in the western part of the county are drained directly by the Dan River and its tributaries, the more important of which are Sandy River, Sandy Creek, Fall Creek, and Cane Creek. Bannister River, which has its source within the county and which flows into the Dan River in Halifax County, drains the central and eastern parts of the county. Beginning in the western part of the county at Grady, and following a general line through Triangle School, Green Pond, Piney Fork, Brutus, and Renan, the drainage is toward the north and northeast into Roanoke River.

All the streams have rapid currents and are actively cutting their channels. Water power has been developed to a large extent on the Dan River at Danville for operating cotton mills and other manufacturing, and on numerous smaller streams in all parts of the county for operating grist mills. Further development of water power on many of the creeks, to furnish electrical power for farm use, would apparently be practicable.

Pittsylvania County was formed from Halifax County in 1767, and its present boundaries were fixed in 1776. The earliest settlement began about 1740, the settlers being English people whose ancestors had settled along the coast. Most of the present population consists of direct descendants of the early settlers, together with a few farmers who have come from northern and western States. In 1920 the total rural population was 56,493, or 55.7 persons per square mile, and the urban population 21,539. The latter is confined to the city of Danville. Settlement is fairly well scattered over all parts of the county except the north-central part, which is sparsely inhabited.

Danville, in the southern part of the county, within 3 miles of the State line, is the largest city in the county. In 1920 it had a population of 21,539.² It is a modern city in every respect and is the center of extensive tobacco and cotton industries. Chatham, the county seat, is the next largest town, with a population of 1,171. Gretna in 1920 had a population of about 470. Hurt, Motley, Toshes, Fall Creek, Cascade, Dry Fork, Ringgold, and Sutherlin are places of local importance.

The school system throughout the county is apparently good. At Climax is located an agricultural high school which receives aid from the State. The Virginia Polytechnic Institute has an experiment substation about 3 miles north of Chatham, where experiments are carried on with tobacco, wheat, corn, and herd's grass.

Iron ore has been mined in the vicinity of Pittsville in large quantities, but at present there is little activity in this industry. A considerable deposit of emery is being worked about 1 mile west of Whittle.

The county as a whole has adequate railroad facilities, but in the vicinity of Riceville and Pickaway in the eastern part of the county, and near Swansonville, Hinesville, and Callands in the western part, the farms are 12 to 18 miles from a shipping point. The main line of the Southern Railway between Washington and Atlanta passes through the central part of the county from north to south. Along this line there are shipping points every 4 to 6 miles. At Danville branches of this system extend to Norfolk and Richmond, while the Danville & Western furnishes communication with points to the west.

² Danville is located within the county but independent thereof.

The Franklin & Pittsylvania Railroad operates from Gretna westward to Rocky Mount (Franklin County). The Virginian Railroad touches the county at the northern extremity. Altavista, Mansion, and Long Island, all in Campbell County, are available shipping points on this line.

The public roads are adequate for the needs of the county and are generally in fair condition for travel except in the winter, when they become badly rutted. In the last 4 or 5 years road building has been making considerable progress, and main highways are being scientifically built, either of macadam or sand and clay. Telephone service has been extended to most parts of the rural sections, but there is still much room for improvement.

Danville is the principal market for the farmers of the county. It is the leading loose-leaf, bright-tobacco market of the world, handling annually 30,000,000 to 50,000,000 pounds. It is also an excellent market for all kinds of produce, including beef, pork, poultry and dairy products, and truck crops. Gretna is a flourishing tobacco market, handling about 2,000,000 pounds annually. In the sections more remote from railroads, poultry, butter, and eggs are collected at the numerous country stores and forwarded to Washington and Baltimore.

CLIMATE.

The summers in Pittsylvania County are usually long and hot, and the winters short, and not very severe. The mean annual temperature for the winter months is 39.5° F., and for the summer 77.5°. The minimum temperature recorded is 4° below zero, and the maximum is 107°, recorded in 1918. During the winter there are frequent changes in temperature, and long-continued periods of severe cold weather seldom occur. For the most part the summer and fall days are pleasant, although at times in summer the heat becomes very oppressive. The nights are usually cool and pleasant.

The climate is favorable for the growing of all kinds of farm crops, including tobacco, corn, wheat, oats, grasses, and fruits. The average growing season is about 6½ months. The average date of the last killing frost in the spring at Danville is April 8, and that of the first in the fall, October 24.

The precipitation is well distributed throughout the year. The mean annual precipitation as recorded at Danville is 40.28 inches, which is ample for the growth of all the common crops. The total amount of rainfall for the driest year on record (1914) was 32.02 inches, and for the wettest year (1891) 54.86 inches. The driest season is the fall, and this condition is especially favorable for the harvesting of corn and peavine hay. Occasionally there are periods of drought which extend over several weeks in the summer and

which, under present agricultural methods, are sometimes disastrous. It is estimated that the hot, dry weather during May, 1918, reduced the wheat crop one-third, and it likewise caused much loss in transplanting tobacco.

Snow in normal winters seldom remains on the ground for any great length of time. During the severe winter of 1917-18, however, snow remained for about 2 months.

The following table, compiled from records of the Weather Bureau station at Danville, gives the normal monthly, seasonal, and annual temperature and precipitation for the county:

Normal monthly, seasonal, and annual temperature and precipitation at Danville.

(Elevation, 413 feet.)

Month.	Temperature.			Precipitation.			
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1914).	Total amount for the wettest year (1891).	Snow, average depth.
	° F.	° F.	° F.	Inches.	Inches.	Inches.	Inches.
December.....	38.7	71	-1	3.46	6.27	1.85	0.5
January.....	37.8	70	-4	2.87	2.16	7.00	3.0
February.....	42.1	77	2	3.55	3.74	4.60	3.8
Winter.....	39.5	77	-4	9.88	12.17	13.45	7.3
March.....	51.1	81	22	2.87	2.67	7.00	1.6
April.....	58.6	93	27	2.81	2.30	3.82	.3
May.....	68.9	99	36	4.04	2.93	5.49
Spring.....	59.5	99	22	9.72	7.90	16.31	1.9
June.....	75.3	103	47	4.05	1.88	1.81
July.....	77.8	103	52	3.92	3.78	8.53
August.....	79.3	107	52	4.97	.87	8.83
Summer.....	77.5	107	47	12.94	6.53	19.17
September.....	70.3	100	37	3.17	.56	1.03
October.....	62.1	96	25	2.97	2.45	1.76
November.....	49.1	82	17	1.60	2.41	3.14	.2
Fall.....	60.5	100	17	7.74	5.42	5.93	.2
Year.....	58.9	107	-4	40.28	32.02	54.86	9.4

AGRICULTURE.

Pittsylvania County is primarily an agricultural district, and, while the many cotton mills at Danville are of considerable industrial importance, the business of the county is built mainly upon its agricultural products.

Farming development in this county from its early settlement has followed the general lines of progress common to the Piedmont section. The early settlers grew the same staple crops that are produced to-day, namely, corn, wheat, oats, and vegetables, with tobacco as a secondary crop. More cattle, sheep, and hogs were raised than at the present time, live stock being ranged at large over the surrounding country. Many of the earlier farms, usually very large plantations, produced nearly everything necessary to their existence. All the products were consumed on the farm either for subsistence or clothing. Tobacco was generally used as a medium of exchange. As the country became more thickly settled cattle, hogs, and the surplus supplies of wheat and tobacco were taken to Lynchburg and sold. After the completion of the railroad from Danville to Richmond much of the farm produce was taken to Danville and shipped to Richmond.

Tobacco has always been a profitable crop, and it has steadily increased in acreage. Before the Civil War a dark, heavy-leaf tobacco was grown, but this gradually gave way to bright-yellow, flue-cured varieties. The following table, compiled from the last five census reports, shows that there has been an uninterrupted increase in the tobacco acreage, that the increase in the acreages of corn and wheat has been marked, and that there has been a decrease in the acreage of oats until the crop has become of little importance, although in 1879 it was second only to corn in area occupied.

Acreage of principal crops, 1879 to 1919.

Crop.	1879	1889	1899	1909	1919
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Tobacco.....	22,680	23,958	29,806	34,201	38,549
Corn.....	40,477	42,584	47,658	45,037	50,175
Wheat.....	16,790	22,888	28,451	26,583	31,440
Oats.....	30,014	21,895	15,489	8,193	1,854

The agriculture of Pittsylvania County at the present time consists of the production of tobacco as the cash crop, and the growing of corn, wheat, oats, cowpeas, and crimson clover as subsistence crops, all of which are generally consumed on the farm. The area devoted to tobacco in 1919 was 38,549 acres, producing 15,726,645 pounds.

The corn production in 1919 amounted to 858,306 bushels on 50,175 acres. All the corn produced in the county is used on the farms for feeding work stock, fattening hogs, and making meal for home use. Some is sold on the local markets.

Practically all the farmers grow some wheat for home use. In 1919 wheat occupied 31,440 acres and produced 289,841 bushels. Oats

are of minor importance, only 1,854 acres being devoted to this crop in 1919. Most of the product is fed in the sheaf to work stock. Cowpeas are gradually becoming important in the agriculture of the county. The 1920 census reports 616 acres in cow peas, with a production of 4,040 bushels. The vines are made into hay and fed to work stock and milk cows on the farm.

Increased interest is manifested in the raising of livestock, especially hogs. In 1909 there were 15,183 hogs sold or slaughtered, mostly grade animals of an inferior type. An effort is being made to secure good registered breeding stock of the Duroc-Jersey, Berkshire, and Poland-China breeds. The pork products are mainly consumed on the farm, but occasionally hogs are sold on the local markets. The 1920 census reports 16,345 hogs in the county. The number of cattle and calves sold or slaughtered in 1909 was 3,659. The 1920 census reports 14,442 cattle in the county, of which 12,611 are dairy cattle. In general, the cows supply only sufficient dairy products for home use, but a few herds near Danville and Chatham are used for commercial production. There is also at Motley a dairy that ships milk to Danville.

Herd's grass, timothy, crimson clover, red clover, soy beans, and some millet are grown for hay. Practically every farm has a home orchard of apples, plums, pears, cherries, and peaches. Irish potatoes and sweet potatoes are produced to supply home needs, and small quantities are sold locally. Strawberries, watermelons, and muskmelons, as well as the common vegetables, are produced on nearly every farm and small quantities are sold. Near Danville there is an extensive truck farm which can not supply the local demands. A few flocks of sheep are found in the county. Poultry is raised on practically every farm.

The prevailing system of agriculture on the terrace and bottom lands consists of the production of corn, wheat, and some tobacco, mostly of the heavier export variety. On the uplands the production of tobacco ranks first, followed by corn, wheat, and hay.

The adaptation of particular soils to certain crops is recognized to a considerable extent in farm practice. The well-drained, friable, easily tilled, smooth first-bottom soils of the Congaree series are used for the production of corn and some wheat, and in the sandier areas for tobacco. The gray second-bottom soils of the Altavista series are satisfactory for the production of grain and bright tobacco, while the dark-colored heavier Wickham soil in the same position is used principally in growing corn and wheat. The light-colored sandy soils of the upland, including types of the Granville, Appling, Durham, Wilkes, and Louisa series, and the deep areas of types in the Cecil series are recognized as more desirable for the production of bright-yellow tobacco than the Davidson, Iredell, and Penn soils,

which are recognized as natural grain lands, although tobacco is also produced on them.

The equipment used to carry on farming operations is not of the most modern and effective type. The ground is generally broken with a one-horse turning plow, but some farmers use two-horse plows, and these are coming into more general use every year. A few tractors are used for plowing, but most of the cultivation is done with one-horse cultivators. About 50 per cent of the wheat is cut with cradles, and practically no corn-harvesting machinery is used. The work stock consists chiefly of mules. The buildings are generally adequate for the prevailing methods of farming and are usually kept in good repair. The dwelling houses are good and in many cases have modern improvements.

The seed bed for tobacco is usually prepared and planted during February, on newly-cleared land. As early in the spring as the land intended for tobacco is dry enough, it is plowed and allowed to lie in the rough until about the middle of May, when it is replowed, harrowed, and marked off with furrows about 40 inches apart. Fertilizer is distributed in the furrows and ridges formed over them. As soon as the season permits, usually about June 1, the plants are lifted from the seed bed and set out by hand, about 36 inches apart in the row. When growth starts cultivation begins. This is usually very thorough, both horse-drawn cultivators and hand hoes being employed until the crop is ready to be laid by. Harvesting begins about August 10 on the Granville, Durham, and Appling soils, and a little later on the Cecil, Iredell, and Wadesboro soils. Cutting continues until the first part of October. It is becoming the practice to pull off (prime) the bottom leaves before cutting the stalk. Most of the tobacco is cured in barns heated by flues, but in the northern part of the county, along the Roanoke River, a heavier dark variety is cured in barns with open fires. After the tobacco is cured it is packed away, and later stripped off the stalk, graded, tied into bundles or hands, and sold at Danville, Gretna, and Altavista. Selling usually continues until the last of March. The chief varieties of bright tobacco grown are the Warne, Lizard Tail, and Gold Leaf, and of the heavy, dark, export type the Oronoca and Breckel Stem.

If the weather conditions are favorable plowing for corn is generally done during the winter, otherwise in the spring. The ground is gotten into fair tilth with harrows and the crop is planted in rows 40 inches apart, with the stalks 36 inches apart in the row. One-horse planters are used. Cultivation is done with one-horse walking cultivators, or in some cases with one-horse turning plows. Cow-peas are often sowed in the corn at the last cultivation. At maturity some of the peas are picked for home use, and the stalks are plowed

under in preparing the land for wheat. This practice, now followed by the better farmers, is gaining in favor.

In harvesting the corn crop several methods are employed. On the upland the prevailing method is to cut and shock the crop. Some farmers pull the blades off the entire stalk in August, leaving the ear on the stalk and gathering it in November. Others cut the top above the ear and pull the fodder below in August and September, leaving the ear to be harvested later. On the bottom lands the most common method is to cut the tops in September and gather the corn in November. The leading varieties grown are the Boone County White, Caseys Pure Bred, Hickory King, and Cockes Prolific.

In growing wheat the prevailing method is to disk corn-stubble land several times and sow the seed with a drill. When wheat follows cowpeas, the land is generally plowed before sowing. Wheat is sown in October and harvested in the early part of June. The grain is shocked in the field and later stacked in some convenient place for thrashing. The straw is saved and used as roughage for mules and cows during the winter. Fulcaster and Little Red are the chief varieties grown.

Cowpeas for hay generally follow wheat. The land is prepared as soon as the wheat crop is taken off, and the seed sown broadcast or with a drill. The crop is cut with a mower in September and October and stored in stacks. Oats and crimson clover are sown in the fall and cut for hay in the spring.

While there is no definite system of crop rotation, a large number of the farmers are beginning to realize the need of one and are growing corn, wheat, herd's grass, or cowpeas on land not intended for tobacco. Where tobacco is grown it is usually followed by wheat, which is sometimes followed by herd's grass and often by tobacco. Sometimes the land is allowed to remain idle for a year and is then planted to tobacco again. On the bottom lands corn is grown continuously year after year.

Practically all crops are fertilized, and the amount of money expended for commercial fertilizer is increasing annually. In 1889 the sum of \$128,691 was spent for fertilizers; in 1899, \$189,890; in 1909, \$330,966; and in 1919, \$900,957. Tobacco receives 250 to 800 pounds per acre of an 8-3-3 or 8-2-2 mixture. Corn and wheat receive 200 pounds of 16 per cent acid phosphate. At the time of this survey (1918), owing to shortage and high price of potash, very little was used on tobacco.

The labor on the farm is done mostly by negroes. In recent years labor has been scarce and only fair in quality, many laborers preferring to rent land on the share basis rather than work for wages. About \$30 a month or \$1.50 to \$2 a day is paid. Wheat is generally harvested on the cooperative plan.

Farms vary greatly in size, ranging from 10 to several hundred acres. The 1920 census reports 7,025 farms in the county, with an average size of 82.9 acres. This does not represent the average size of holdings, as the census tabulates each tenancy as a farm. In 1920 the per cent of improved land in farms was 46.3.

Almost half the farms are operated by the owners, the remainder by tenants. Tenantry seems to be increasing. Under the tenant system the owner generally furnishes the teams, implements, and one-half the fertilizer, and collects one-half the crop. When the tenant furnishes everything, the landowner receives one-fourth the crop. Practically no land rents for cash.

Land values range from \$12 an acre for the poorer and more remote areas to \$75 and \$100 an acre for productive, well-improved land. Prices vary with the location and the influence of towns and transportation facilities. A fair average is about \$40 an acre. According to the 1920 census the average assessed value of land is \$39.25 per acre.

SOILS.

Pittsylvania County lies wholly within the Piedmont Plateau province. All the upland soils are residual, being derived from the underlying formations, principally granite, gneiss, mica schist, diorite, diabase, sandstone, and shale.

Triassic sandstones and shales extend across the county in a belt varying from 2 to 4 miles wide, reaching from the northeast to the southwest corner. The sandstones range in color from gray to red, while the shales are prevailing Indian red. Some of these rocks are extremely hard, of a dark-gray to bluish-gray color, and appear to have undergone considerable metamorphism.

By far the greater part of the county is underlain by granite, gneiss, and schist, and exposures of these rocks are common. Scattered throughout the extreme southern end of the county, particularly east of Danville, are areas of diorite. This is a heavy, dark-green to almost black rock which has weathered to only shallow depths, the soft, greenish, partly disintegrated rock being encountered at 24 to 30 inches below the surface. Some diorite occurs also in the northwestern corner of the county, and here a few areas of diabase and hornblende schist exist. These rocks give rise to dark-red clay soils.

Smith Mountain, in the extreme northwest corner, is composed of fine-grained schist and gneiss.

The weathering of the various rocks has given rise to a number of soils. These have been grouped into several series according to their origin, structure, and color. The upland soils thus arranged

fall into the Cecil, Louisa, Durham, Appling, Davidson, Iredell, Wilkes, Granville, Penn, Lehigh, Wadesboro, and White Store series.

Types of the Cecil series are characterized by gray to yellowish-gray surface soils in the sandy types and brownish-red to red soils in the heavy-textured types. The subsoil is a brownish-red, brittle, heavy clay, which is somewhat plastic when wet and which normally contains an appreciable amount of small, white, sharp quartz fragments and some small mica flakes. This series is the predominant one of the area, as well as of the entire Piedmont Plateau. In Pittsylvania County the gravelly fine sandy loam, sandy loam, with a steep phase, fine sandy loam, and clay loam are mapped.

The Louisa series includes types having gray or yellowish-gray to red surface soils containing a noticeable quantity of small mica flakes, and a friable, compact, crumbly red micaceous clay subsoil. Micaceous gneiss and schist usually occur within the 3-foot section. The gravelly fine sandy loam, with a steep phase, and fine sandy loam types of this series are mapped in Pittsylvania County.

The Durham series comprises types with light-gray to yellowish-gray surface soils and a yellow, compact but friable clay or heavy sandy clay subsoil. The latter contains a noticeable amount of angular quartz sand and a very small mixture of mica scales. This series is derived from the weathering of light-colored gneiss and some granite. The sandy loam and fine sandy loam are mapped in Pittsylvania County.

The types in the Appling series have gray to brownish-gray surface soils underlain by a friable and compact sandy clay to clay subsoil of a reddish-yellow or yellow mottled with red color. The series is derived from light-colored gneisses and granite and is intermediate in respect to subsoil color between the Cecil and Durham series. In this county the sandy loam and fine sandy loam members of the Appling series are mapped.

The surface soil of the types in the Davidson series is reddish brown to dark red in color, and the subsoil is a dark-red or maroon-red clay. The subsoil has a characteristic friable structure and a smooth, slightly greasy feel. It is free from quartz sand. This series is derived from dark-colored igneous and metamorphic rocks, such as diabase, diorite, gabbro, and hornblende schist and is closely related to the Iredell and Wilkes series. Only the clay loam type is recognized in this county.

The types included in the Iredell series have a brownish-gray to brown surface soil and a brownish-yellow impervious waxy sticky clay subsoil, which in the lower portion is commonly mottled with gray. They have been derived from the weathering of diorite and related rocks, which usually occur within the 3-foot section. The sandy loam and loam types are mapped.

The Wilkes series includes types with a brownish-gray to yellowish-gray soil and a yellowish to brownish-yellow or mottled red and yellow sandy clay subsoil, passing in the lower profile into a plastic sticky brownish-yellow or olive-green clay. In many places this sticky heavy stratum is absent, its place being taken by partly decayed rock. The Wilkes soils are derived from a mixture of rocks, consisting of light-colored gneisses and hornblende schist, cut by dikes of diabase and diorite. The soils are associated with the Durham, Appling, and Iredell soils. The sandy loam and fine sandy loam members are recognized in this county.

The types in the Granville series are characterized by light-gray surface soils and yellow friable sandy clay subsoils, which in the lower part of the 3-foot section often grade into mottled reddish-yellow, gray, and sometimes Indian red clay. These soils are derived from Triassic sandstone, the color of which varies from gray to brown. In this county two members of the series are mapped, the sandy loam and fine sandy loam.

The surface soil of the types classed in the Penn series varies in color from purplish gray to Indian red and the subsoil from purplish brown to Indian red. This series is derived from the weathering of fine-grained red to brownish-red sandstones and shales of Triassic age. Fragments of the parent rock are present on the surface and throughout the subsoil in many places, and the bedrock frequently outcrops. These soils are found in scattered shallow basins in the Piedmont Plateau from New York to South Carolina and are well developed in Virginia. The fine sandy loam and loam are mapped in Pittsylvania County.

The types included in the Lehigh series have a gray, slaty-gray, or drab surface soil and a bluish-gray, drab, or olive-drab to olive-yellow or brownish plastic waxy clay subsoil. In this county the subsoil commonly shows mottlings of gray and yellow. The Lehigh series is derived from fine-grained Triassic sandstones and shales which have apparently been metamorphosed. The types mapped in this county are the stony silt loam and silt loam.

The Wadesboro series is very much like the Cecil. The surface soil is gray to yellowish gray in the sandy types and reddish in the heavier types. The subsoil consists of red moderately friable clay. In this county the series is derived from sandstones which in a majority of cases have been metamorphosed. The stony fine sandy loam and fine sandy loam members are recognized in this survey.

The types included in the White Store series have dull-red to dark-red soils mottled with gray and yellow and a plastic, heavy subsoil. The surface soil is grayish in the lighter textured types and redder in the heavy members. The White Store soils are derived through

weathering from Triassic sandstone, mudstone, and shale. The series is represented by the fine sandy loam type in Pittsylvania County.

Bordering the rivers and small streams there have been developed comparatively narrow belts of alluvial material. This has been washed from the upland soils of the Piedmont Plateau, and to some extent of the Appalachian Mountains, and brought down by the streams and deposited during periods of overflow. Most of the material lies in the first bottoms, but scattered second-bottom or terrace areas lie along the larger streams. The alluvial soils are classified according to their color and position. The Wickham and Altavista series include the terrace soils and the Congaree series and Meadow the first-bottom soils.

The types in the Wickham series consist of yellowish-gray or brownish to reddish-brown soils overlying a dull-red to reddish-brown or yellowish-red, compact, friable clay to sandy clay subsoil. Water-rounded gravel and rocks are present in the soil and throughout the subsoil. This series occupies high terraces and second bottoms well above overflow. The loam is the only member recognized in this county.

The Altavista series includes types with gray to yellowish-gray surface soils and a yellow, compact but friable clay subsoil. The series is developed on terraces and lies well above overflow. The fine sandy loam is the only type mapped in this survey.

The Congaree types are characteristically brown to reddish brown in the surface soil and subsoil, though in places grayish, bluish, or mottled gray, brown, or yellow colors are encountered in the lower subsoil. Mica scales are abundant in the material throughout the 3-foot section. The Congaree soils occupy first bottoms and are more or less subject to inundation. The fine sandy loam and silt loam types are mapped in the present survey.

Alluvial material found along the smaller streams, and to some extent along the larger creeks, and consisting of a mixture of textures too variable within narrow limits to allow the mapping of separate types, is classed as Meadow. It is subject to overflow.

Rough stony land embraces those areas of rough, mountainous land which are extremely stony and characterized by huge rock outcrops.

In the following pages of this report the various soils of Pittsylvania County are described in detail and their relation to agriculture discussed. The distribution of the soils is shown on the map accompanying this report, and the table below gives the actual and relative extent of each type:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Cecil sandy loam.....	131,456	23.1	Wadesboro stony fine sandy loam.....	8,320	1.3
Steep phase.....	17,984		Louisa fine sandy loam.....	7,936	1.2
Cecil gravelly fine sandy loam.....	104,576	16.1	Davidson clay loam.....	7,104	1.1
Cecil fine sandy loam.....	89,728	13.9	Congaree silt loam.....	6,976	1.1
Appling fine sandy loam.....	44,800	6.9	Penn fine sandy loam.....	6,336	1.0
Louisa gravelly fine sandy loam.....	25,984	4.7	Lehigh stony silt loam.....	5,888	.9
Steep phase.....	4,864		Penn loam.....	5,568	.9
Cecil clay loam.....	29,184	4.5	White Store fine sandy loam.....	4,928	.8
Granville fine sandy loam.....	20,032	3.1	Wilkes fine sandy loam.....	4,864	.7
Granville sandy loam.....	19,264	3.0	Rough stony land.....	3,968	.6
Durham fine sandy loam.....	15,936	2.5	Lehigh silt loam.....	3,008	.5
Meadow (Congaree material).....	15,808	2.4	Durham sandy loam.....	2,944	.5
Wadesboro fine sandy loam.....	13,504	2.1	Altavista fine sandy loam.....	1,920	.3
Appling sandy loam.....	11,136	1.7	Iredell loam.....	1,408	.2
Iredell sandy loam.....	10,688	1.6	Wickham loam.....	1,280	.2
Wilkes sandy loam.....	10,432	1.6			
Congaree fine sandy loam.....	9,856	1.5	Total.....	647,680	-----

CECIL GRAVELLY FINE SANDY LOAM.

The surface soil of the Cecil gravelly fine sandy loam consists of a gray or yellowish-gray gravelly fine sandy loam. At 8 to 10 inches it passes into a red, stiff but brittle clay, which extends to a depth of 3 feet or more. The surface soil contains an abundance of quartz gravel. When wet it has a brownish color, but upon drying out the immediate surface soil has a decidedly gray to almost white appearance, which an inch or so below gives way to yellowish gray. In wooded areas the surface soil is often reddish.

Scattered through the type are irregular areas of fine sandy loam, too small and indefinite to map. In the vicinity of Forbes and Pickerel Crossing west of Gretna, small areas of Louisa material are included. In the vicinity of Wards Bridge considerable water-rounded gravel and stones are scattered over the surface, and in a few cases the surface material is of water-laid origin. The subsoil, however, is distinctly Cecil material. On account of the small extent of this variation it is mapped with the true Cecil.

The Cecil gravelly fine sandy loam occupies a large area in the northern half of the county. Some of the more typically developed bodies lie around Gretna, Pittsville, Hillgrove, and Brights. Small areas occur in the central part of the county.

The topography varies from gently rolling to rolling and even hilly. Some of the more nearly level areas are around Gretna, Level Run, Grit, and Brights. The rolling topography favors thorough surface drainage, but the gravel content in some measure prevents erosion. The internal drainage is good.

This is one of the most extensive soils in the county, but only a small proportion of it is under cultivation. The greater part supports a forest of oak, chestnut, hickory, dogwood, and sourwood. Very little of the timber is merchantable. Tobacco, corn, wheat, and cow-peas are the chief crops. Apples, peaches, and pears are grown for home use with excellent results. All kinds of garden and truck crops do well.

The tobacco produced on this type compares favorably with that grown on the Cecil sandy loam, and in many cases there is a tendency for the leaf to be much brighter. Practically the same farming methods are followed and the same fertilizers used as on the Cecil sandy loam. Tobacco yields 500 to 800 pounds per acre, corn 15 to 30 bushels, and wheat about 10 bushels.

All crops receive applications of commercial fertilizer. Ordinarily tobacco is given 300 to 600 pounds of an 8-2-2 or 8-3-3 mixture, and corn and wheat 200 pounds of 8 or 16 per cent acid phosphate. A definite rotation is followed by few farmers. Some use the succession—tobacco, wheat, herd's grass.

Land of this type sells for \$12 to \$60 an acre.

To increase yields of the staple farm crops on this soil liberal quantities of organic matter in some form should be plowed under, and an occasional application of lime should be made.

CECIL SANDY LOAM.

The Cecil sandy loam consists of a gray, yellowish-gray, or light-brown sandy loam, 6 to 8 inches deep, passing into yellowish, heavy sandy loam or sandy clay which at 10 to 15 inches grades quickly into a heavy, stiff yet brittle, bright-red clay, many feet in depth. The surface soil when wet has a distinctly brownish color, but on drying out the immediate surface becomes light gray. Freshly plowed fields often have a reddish color.

In many places over the county the yellowish subsurface material is absent, the red clay lying within 6 inches of the surface. Such areas resemble very closely the clay loam type. This characteristic is most marked in the southwestern part of the county in the vicinity of Brosville, Vance, and Soapstone, and north of Cascade. In this same region the rocks giving this type have been cut by narrow dikes of schist, forming small areas of Louisa soil that could not be shown on the map. Similar areas lie near Chatham. In a few small areas the red clay lies at depths greater than 24 inches. At Mountain Hill about 400 acres of distinctly water-laid material, with a red, friable clay subsoil (Molena), is included with the Cecil sandy loam.

In places the surface soil resembles that of the Cecil fine sandy loam, and it is difficult to draw a distinct boundary between the two types. Disintegrated granitic and gneiss rocks appear within the

3-foot section on some of the slopes and knolls. Quartz fragments are scattered on the surface throughout the greater part of the type, and areas in which they are abundant, if of sufficient extent, are shown on the map by gravel symbols. Areas of this description are encountered mostly in the southwestern and western parts of the county. "Gall" spots, varying in size from a few square yards to an acre or more, occur in places on the slopes and knolls.

The Cecil sandy loam is the most extensive soil type in Pittsylvania County. It is widely distributed in broad areas throughout the southern, southwestern, western, and central parts of the county. It occupies undulating, gently rolling, and rolling areas, becoming somewhat broken and steep as the larger streams are approached. Where of sufficient extent the steeper areas are mapped as a steep phase of the type. The more broken areas occur north of Cascade, along the upper reaches of Sandy River, and along Tomahawk and Turkey Cock Creeks. Generally the topography is favorable for farming operations, including the use of all kinds of improved machinery. Both surface and internal drainage are good, but not excessive.

This is a very important soil in the agriculture of the county. About 60 per cent of it is under cultivation, the remainder supporting a good growth of white oak, red oak, chestnut oak, dogwood, and sourwood, with some hickory and second-growth pine. The crops are varied. Tobacco, corn, wheat, cowpeas, crimson clover, rye, and oats are among the more important products. Many farms have small orchards of apples, pears, plums, and peaches to supply the home needs, but there are no commercial orchards in the county. Sweet potatoes, Irish potatoes, garden vegetables, and sorghum are grown for home use. All the farms have several milk cows and a few hogs, and occasionally hogs, calves, or beef cattle are sold on the local markets. The work stock consists chiefly of mules, only a small percentage of which are raised in the county; most of them are shipped in from Kentucky and the grazing regions of southwest Virginia.

The lighter, sandy areas within the type are generally selected for tobacco. They yield a fair quality of the bright-leaf type, but the soil as a whole produces a rather heavy, dark-colored leaf which brings a lower price. However, it is generally assumed that the higher yield per acre approximately offsets the difference in price. Yields of 600 to 1,000 pounds per acre are generally obtained, and some farmers produce as much as 1,200 pounds. Corn ordinarily yields 20 to 40 bushels, and with better methods 50 bushels per acre. Wheat yields 10 to 12 bushels per acre. Cowpeas do well and are grown both for green manure and for hay. Oats do fairly well, but are rarely grown for sale, the crop being fed to the work animals, mainly in the sheaf.

Commercial fertilizer is used on practically all crops. Tobacco usually receives 250 to 600 pounds of an 8-2-2 or 8-3-3 mixture and corn and wheat 200 pounds of 16 per cent acid phosphate. Some lime is used with good results, but barnyard manure is seldom applied. Cowpeas are commonly sowed in the corn at the last cultivation and disked under to supply organic matter for wheat.

There are many well-improved and flourishing farms on this type. The farmhouses are generally large and well built, and the other buildings are adequate for the needs of the prevailing system of farming.

The selling value of the Cecil sandy loam ranges from \$15 to \$75 an acre, depending on the location and improvements.

This soil is easily worked and is capable of producing large yields where proper methods are used. For good results in general farming the addition of organic matter in some form is necessary. Close to railroad facilities this could be done profitably by raising more dairy cattle and hogs, the products of which find a ready sale in Danville and northern markets, and applying the manure to the fields. In the more remote sections of the county organic matter can be economically supplied by plowing under cowpeas, soy beans, or rye. At the experiment station north of Chatham, lime has been found to be beneficial. It can be laid down at Chatham at \$3.50 to \$4 a ton. Deeper plowing, combined with frequent, shallow level cultivation would no doubt increase the yields of corn by conserving moisture and liberating plant food. More care should also be taken in selecting seed. By terracing the steeper areas much plant food that now washes out of the soil would be saved.

Cecil sandy loam, steep phase.—The steep phase differs from the typical Cecil sandy loam in topography only. Included with this phase are areas of clay loam and gravelly fine sandy loam. In the vicinity of Three Island Ford some steep areas of Davidson soil have also been included, and along Roanoke River northeast of Level Run the phase includes some steep bluffs that are shown on the map by rock outcrop symbols.

The steep phase of the Cecil sandy loam is found along most of the main streams in the county. The most extensive developments are along Roanoke and Pig Rivers. Important areas lie in places along the creeks, mainly in the western part of the county. Most of the phase is too steep for cultivation, and the parts cultivated are farmed at a disadvantage, as the soil has a marked tendency to wash and gully. Some of it is used for pasture, but the greater part supports a growth of oak, pine, and sourwood. The phase is a good source of fuel wood for domestic use and for curing tobacco, and should be permitted either to remain in grass or to reforest itself.

CECIL FINE SANDY LOAM.

The Cecil fine sandy loam, to an average depth of about 7 inches, consists of a gray, yellowish-gray, or reddish-gray, mellow, loamy fine sand or fine sandy loam. This grades into a subsoil of bright-red, heavy, stiff clay, brittle when dry and plastic when wet, containing a noticeable number of small angular quartz particles and a variable quantity of small, finely divided mica flakes. In places there is a yellowish to reddish-yellow fine sandy clay layer between the surface soil and the heavy red subsoil, and in others the clay subsoil lies as deep as 20 inches. On steep slopes the clay is often near the surface, and on ridges and knolls it is frequently exposed.

Quartz fragments are scattered over the surface, but where such areas are of sufficient extent and the quantity large they are mapped separately as gravelly fine sandy loam. In the northwestern part of the county, between Pig River and the Franklin County line, quartz rocks are scattered over the surface in many places. These areas, which are small and irregular, are shown on the map by stone symbols.

The Cecil fine sandy loam occurs in large areas principally in the south-central and eastern parts of the county. It is developed on comparatively smooth ridges and in gently rolling to rolling areas. Most of the areas are suited to the use of modern farm machinery. In all areas both the surface and internal drainage is good.

The Cecil fine sandy loam, though not as extensive as the sandy loam type, is one of the most important agricultural soils in the county. About 60 per cent of it is under cultivation, the remainder supporting a forest of oak, hickory, pine, sourwood, and dogwood. Tobacco, corn, wheat, and cowpeas are the principal crops. For the most part the agricultural methods are the same as on the sandy loam, but the high content of silt and very fine sand causes a tendency to form clods, and the type requires greater care in seed-bed preparation than the sandy loam.

The land is held at \$20 to \$75 an acre, depending on the location and improvements. It is a desirable soil, and higher average yields could easily be obtained by the addition of organic matter and better tillage, combined with seed selection.

CECIL CLAY LOAM.

The Cecil clay loam consists of a reddish-brown to brownish-red, friable clay loam passing abruptly at 5 to 8 inches into a heavy, stiff but brittle, bright-red clay which extends to depths of several feet. When wet the subsoil is plastic and sticky. In places the surface soil consists of 2 or 3 inches of sandy loam, which rests on the characteristic red clay subsoil. Included with this type are occasional small

areas of Davidson material. Gravel and stone are scattered over the surface in places, such areas being shown on the map by gravel symbols.

This type forms comparatively small areas throughout the county. It occupies rolling to somewhat hilly country and is all well drained. The larger areas are mapped in the vicinity of and west of Vance, south of Level Run, south of Sandy Creek Church in the southeastern corner of the county, and southwest of Weal.

This is not an important soil in the agriculture of the county. The smoother areas are farmed, but most of the type supports a growth of hardwood forest. Some of the cleared areas are used for pasture. In these is a heavy sod. The soil gives large yields of heavy, dark tobacco and good yields of corn and wheat. On account of the difficulty of plowing it is not considered as desirable as the light-textured members of the series, but it is well adapted to small grains, grasses, and clovers, and with liberal applications of lime and manure good results can be obtained. This land is valued at \$20 to \$35 an acre.

LOUISA GRAVELLY FINE SANDY LOAM.

The surface soil of the Louisa gravelly fine sandy loam consists of a yellowish-gray to brownish-gray fine sandy loam, containing a large percentage of small angular quartz gravel and schist particles. At 10 to 14 inches the surface soil passes into a bright-red clay, containing a large amount of finely divided mica scales which render the clay very friable and give it a characteristic greasy feel. In many places the partly decomposed mica schist and mica gneiss, from which the type is derived, lie within 2 or 3 feet of the surface. The friable, smooth, greasy subsoil presents a marked contrast to the heavy, brittle subsoil of the Cecil series, the difference being due, in part at least, to the deeper weathering of the latter. There is less difference in the surface soils, and where the Louisa gravelly fine sandy loam adjoins the corresponding Cecil type it is difficult to draw a sharp and distinct boundary line between them.

The Louisa gravelly fine sandy loam is developed mainly in the northern part of the county. The largest bodies are mapped north of Midway School, south of Motley, east of Hillgrove, east of Hurt, and at Museville in the western part of the county. The surface in general is rolling to hilly, but where erosion has been active the land is rough and broken.

The Louisa gravelly fine sandy loam is not important in the agriculture of the county. It is of small extent, and only about 10 per cent of it is under cultivation, the remainder being in forest. Bright tobacco does well, giving a fairly good quality of leaf. Corn yields 15 to 30 bushels per acre in areas where cowpeas are turned

under and liberal applications of fertilizer are made. Wheat yields 8 to 12 bushels per acre.

This type of land is valued at \$10 to \$35 an acre.

In most cases this is a difficult soil to farm, owing to the porous nature of the subsoil and the high gravel content of the surface soil. However, by using an abundance of stable manure and by plowing under such crops as cowpeas, rye, and crimson clover, good yields of wheat and corn have been obtained. Buckwheat and rye should be profitable crops.

Louisa gravelly fine sandy loam, steep phase.—The steep phase differs from the typical Louisa gravelly fine sandy loam chiefly in topography. It occupies relatively high hills and ridges (locally called mountains) which range in elevation from 50 to 150 feet above the surrounding country. In many places quartz and gneiss fragments are scattered over the surface to such an extent as to hinder cultivation, and many of the slopes are too steep and gravelly for farming.

This phase is found in the northern half of the county, on Brushy, Farmers, and Jasper Mountains, and Wheeler Knob; on Brier Mountain north of Callands; and on Pine Mountain east of Museville. In the last two places, however, the soil greatly resembles the Cecil.

Here and there a small area has been cleared and planted to tobacco, which gives about the same yield and quality of leaf as the main type.

LOUISA FINE SANDY LOAM.

The Louisa fine sandy loam consists of a yellowish-gray to brownish-gray micaceous fine sandy loam, underlain at 10 to 12 inches by bright-red, friable micaceous clay. Partly decomposed mica schist and mica gneiss rocks commonly occur within the 3-foot section.

This type is developed in the central and northeastern parts of the county. It occupies rolling to somewhat hilly areas and is very well drained. The most prominent areas lie east of Whittle, in the vicinity of Whitethorn School, south of Ray, along Straightstone Creek, and east of Chatham.

The Louisa fine sandy loam is an unimportant soil, owing to its very small extent. About 60 per cent of it is under cultivation, the remainder supporting a good growth of white oak, red oak, chestnut oak, chestnut, and old-field pine. The same crops are grown as on the closely related Cecil soils. Tobacco produces well, and the leaf is generally of somewhat better grade than that grown on the Cecil fine sandy loam. With the same treatment corn and wheat produce slightly lower yields on this type. Good stands of red clover are obtained.

Land of the Louisa fine sandy loam is valued at \$25 to \$40 an acre.

On account of the pronounced friability of the subsoil and the shallowness of soil over the schist and gneiss rocks, crops sometimes suffer for moisture. As a rule it is difficult to keep this soil in a high state of productiveness, but it can be made to produce profitable yields of wheat and grass by incorporating organic matter and by using better cultural methods in general.

DURHAM SANDY LOAM.

The surface soil of the Durham sandy loam consists of a light-gray to yellowish-gray loamy sand to sandy loam, passing at about 6 inches into a subsurface layer of yellow, heavy sandy loam which continues to a depth of 10 to 15 inches. The subsoil is a yellow, friable clay to heavy, friable sandy clay, mottled with gray in the lower part where drainage is poor and with light red where the drainage is better. In places small, angular quartz fragments are scattered over the surface, but they are not sufficiently abundant or the areas sufficiently large to warrant separation as a gravelly type.

The Durham sandy loam is found in small, scattered areas throughout the county. The most prominent are those at Ringgold and north of Renan. The type occupies gently rolling to fairly smooth country and for the most part is well drained.

The type does not play a very important part in the agriculture of the county. Locally, however, it is highly prized as a tobacco soil, as it produces a bright leaf of very desirable quality and color. Most of the type is under cultivation and the rest is in forest. It is valued at about the same figure as the Durham fine sandy loam.

DURHAM FINE SANDY LOAM.

The surface soil of the Durham fine sandy loam is typically a white to gray fine sandy loam or loamy fine sand 6 to 8 inches deep. This passes into a yellow, heavy fine sandy loam, which grades at 10 to 14 inches into a yellow friable clay or clay loam. The latter is uniform except that the lower part in places shows mottlings of red, and, where the areas bordering drainage ways are somewhat flat, of gray. Occasionally the surface soil extends to 24 inches without change. Northwest of Danville, along Sandy River, small ill-defined areas of Wilkes fine sandy loam are included with this type.

The Durham fine sandy loam is developed chiefly along Sandy River, northwest of Danville; southwest of Chestnut Level along the Danville-Lynchburg Highway; between Chestnut Level and Spring Garden; and northwest of Lima. Smaller areas occur in various parts of the county. The type occupies undulating to gently rolling and gently sloping areas and has excellent natural drainage.

While this soil is of comparatively small extent, it is important in the agriculture of the county. It is highly esteemed as a bright-tobacco soil, and most of it is under cultivation. Tobacco, corn, and wheat, in the order named, are the chief crops. Sweet potatoes, fruits, and truck crops do well. Tobacco yields from 400 to 900 pounds, corn from 10 to 30 bushels, and wheat about 10 bushels per acre. The last two crops are consumed on the farm. Cowpeas and herd's grass, for hay, do well,

Where tobacco is grown, a rotation of tobacco, wheat, and herd's grass is often used, but as a rule wheat and tobacco are alternated. Some farmers allow the land to lie fallow a year after wheat before planting tobacco. Stable manure or cowpea vines are seldom plowed under except where it is desired to follow wheat with corn.

On account of the present (1918) high prices commanded by tobacco, this land is held at a comparatively high figure, generally from \$70 to \$85 an acre, depending on the location and improvements.

This soil is capable of being brought to a fairly high state of productiveness for general farm crops. There is good reason to believe that trucking could be carried on at a profit. Heavy applications of barnyard manure should be made, or some crop such as cowpeas or rye plowed under. Applications of lime every four or five years, together with deep plowing and shallow cultivation of corn, are also to be recommended. Under the present system of agriculture, with tobacco the only cash crop, this soil seems to be handled in a very efficient manner.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Durham fine sandy loam:

Mechanical analyses of Durham fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
211733.....	Soil.....	0.2	3.4	4.4	45.3	30.2	13.4	2.9
211734.....	Subsoil.....	.4	2.8	3.0	28.3	24.0	17.1	24.3

APPLING SANDY LOAM.

The Appling sandy loam consists of a light-gray to yellowish-gray loamy sand or sandy loam, 5 to 8 inches deep, generally passing into a yellow, heavy sandy loam to sandy clay, which at 12 to 20 inches grades into a reddish-yellow, yellowish-red, or yellow mottled with red, moderately friable clay. In places small areas of Cecil and Durham sandy loam are included with this type. Quartz gravel

occurs in places on the surface, and areas where it is abundant are shown on the map by symbols.

This type occurs as broad, gently rolling to rolling areas, mainly in the southeastern part of the county. Smaller developments lie north of Swansonville and Chatham and in the vicinity of Hinesville. As is the case with the upland soils derived from granite and gneiss, it is well drained.

The Appling sandy loam is of moderate extent and does not greatly influence the agriculture of the county. Locally, however, it is highly prized as a bright-tobacco soil, and most of it is farmed. Corn and wheat do well where barnyard manure or cowpeas are turned under.

This type sells for \$30 to \$100 an acre.

The Appling sandy loam is capable of producing good crops of corn, wheat, oats, and timothy. Owing to its loose and sandy texture its chief need is the heavy application of organic matter in some form. Applications of lime every 4 or 5 years should also give good results. Two tons of timothy and clover hay per acre have been produced on fields given the above treatment.

APPLING FINE SANDY LOAM.

The surface soil of the Appling fine sandy loam consists of an upper layer of light-gray or yellowish-gray fine sandy loam 5 to 10 inches thick, and a lower layer of yellow, heavy, friable fine sandy loam, from 2 to 12 inches thick. This in turn gives way to a moderately friable, yellowish-red or reddish-yellow clay. The subsoil has a wide range in color, presenting all shades from red to yellow, and in many cases is yellow mottled with red. Broadly, the subsoil represents a condition of color intermediate between the Cecil and the Durham. In places, particularly on the steeper slopes and knolls, where a moderate degree of erosion has taken place, exposures of reddish loam or clay loam appear. Included with the type are small areas where the heavy, red clay subsoil of the Cecil series is encountered at about 30 inches. As is the case with practically all the residual soils of the county, gravel and rock fragments are scattered sparingly over the surface. The more gravelly of these areas are shown on the map by means of symbol. The type is locally called "gray land" and "mulatto land."

The Appling fine sandy loam is developed in all parts of the county. The most extensive areas lie in the southern half, in the vicinity of Ferguson School, Kentuck, Pittston, Keeling, and Mount Herman Church, and south of Danville. The type occurs as broad, gently rolling to rolling areas, and on account of the favorable topography and friable subsoil it is well drained. Modern farm machinery can be used on most of the type.

This is one of the important soils of the county. As a tobacco soil it ranks favorably with the Durham and Granville, and as a grain soil it is held in higher esteem than either. Approximately 75 per cent of it is under cultivation, the remainder supporting a growth of oak, hickory, dogwood, and sourwood. The chief crops grown are tobacco, corn, wheat, and cowpeas for hay. This soil in general is highly developed, many of the most prosperous farms in the county being located on it.

With liberal applications of fertilizer the type produces a very satisfactory grade of bright tobacco, yielding 400 to 800 pounds per acre. Corn ordinarily yields 15 to 35 bushels, and wheat about 10 bushels per acre. Cowpeas do well, but are seldom plowed under for green manure.

The price of this land depends largely upon the location and development and ranges from \$30 to \$100 an acre.

In growing tobacco the Appling fine sandy loam is handled in a very efficient manner, but there is room for much improvement in the methods used for the general farm crops. Like all the soils of the region, the type is low in organic matter and would readily respond to applications of barnyard manure. Lime should be applied from time to time. As much of the type is easily accessible to Danville, where the milk supply appears to be inadequate, it would seem that dairying might be made a means of building up some of the farms.

Below are given the results of mechanical analyses of samples of the soil and subsoil of this type:

Mechanical analyses of Appling fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
211747.....	Soil.....	0.0	1.8	2.5	37.1	30.1	21.5	6.8
211748.....	Subsoil.....	.0	1.4	1.6	18.7	17.8	17.1	43.5

DAVIDSON CLAY LOAM.

The Davidson clay loam consists of a reddish-brown to chocolate-red clay loam, 4 to 6 inches deep, passing abruptly into a dark-red or maroon-red clay, which has a characteristic friable structure and a smooth, slightly greasy feel. The subsoil is practically free from quartz sand. In many places the material in the lower part of the 3-foot section is mottled with yellow, especially where the bedrock lies near the surface.

This soil is derived, through weathering, from dark-colored igneous and metamorphic rocks, such as diabase, gabbro, diorite, and horn-

blende schist. Boulders of the parent rock are scattered on the surface and exposed in road cuts. The type is locally referred to as "push land" and "red spongy land."

The Davidson clay loam is developed mainly in the western part of the county, where it occurs in relatively small areas. The most extensive are west of Brosville, south of Trelow, west of Vance, north-west of Museville, and in the vicinity of Sandy Level and Brights. Several small areas occur in the southeastern corner of the county. The type occupies gently rolling to gently sloping areas and has excellent drainage.

The soil is comparatively inextensive in Pittsylvania County, but most of it is under cultivation. Corn and wheat are the chief crops. Tobacco is grown to a small extent, but it is heavy, coarse, and dark colored, like that produced on the Cecil clay loam. In the vicinity of Brights, however, a good grade of heavy, export type tobacco is produced. Corn yields 20 to 30 bushels per acre and wheat 10 to 20 bushels. Cowpeas do well.

The Davidson clay loam is generally valued in conjunction with other types.

This is a good, strong soil, but one requiring heavy draft and difficult to keep in good tilth. With liberal applications of lime and manure the physical condition of the surface soil can be greatly improved and the preparation of a satisfactory seed bed made much easier. In the vicinity of Rock Hill, S. C., alfalfa has been found to do better on this soil and to endure longer than on any other Piedmont soil.³ In order to secure a good stand it is necessary to put the soil in good tilth, inoculate the seed, and make liberal applications of lime and acid phosphate. This soil can be built up to a high state of productiveness. It is well suited to the production of clover, corn, wheat, and grasses.

IREDELL SANDY LOAM.

The Iredell sandy loam consists of a dark-gray or brownish-gray to brown sandy loam, 10 to 14 inches deep, underlain by a yellowish-brown or dull-brown, sticky, impervious clay, which usually extends to a depth of about 24 to 30 inches. At this point a soft, disintegrated diorite rock is encountered. The heavy texture and color of the subsoil are the distinguishing characteristics of this type.

In places the surface soil is a decided dark-brown loam, but these areas are very small, occupying only an acre or two. The subsoil in the lower part is often mottled with gray, and even red. When exposed to weathering it cracks upon drying and assumes a dull-brown or greenish-brown color. In places the upper subsoil is a yellowish

³ The fact that the materials forming this soil come from basic or subbasic rocks may explain this adaptation.

sandy clay, such areas approaching the Wilkes sandy loam. Small iron concretions are scattered over the surface of many areas, and in places concretions and angular quartz fragments are present in sufficient quantities to make the soil very gravelly. Such areas are shown on the map by means of gravel symbols.

The Iredell sandy loam is locally known as "black gravelly land," "blackjack land," or "pipe-clay land." It occurs in gently rolling to rolling areas, mainly in the southern part of the county. The most prominent are east of Danville, southwest of Sutherlin, and north of Cascade. Most of the type is well suited to the use of modern farm machinery.

The surface drainage in nearly all cases is adequate, but on account of the heavy, impervious subsoil the internal drainage is slow and imperfect. During wet seasons tobacco becomes spotted and produces a very undesirable leaf. Better yields of all crops are obtained in years of moderate rainfall.

This soil is of comparatively small extent, and it is not important in the agriculture of the county. About 50 per cent of it is under cultivation; the rest supports a growth of white oak, red oak, blackjack oak, and old-field pine. Tobacco, corn, and wheat are the principal crops. On the sandy areas and in places where the depth to the heavy, plastic clay is greater than the average the yields are fairly satisfactory, but on the whole the soil is too cold and the subsoil too impervious for the successful growing of tobacco, as there is a strong tendency to produce a coarse, woody leaf. Tobacco yields 600 to 800 pounds per acre, corn 15 to 20 bushels, and wheat an average of about 10 bushels. On a few of the more highly improved areas larger yields are obtained.

This type of soil in most places sells for \$15 to \$40 an acre. Some farms close to Danville are held at somewhat higher prices.

There is good reason to believe that yields on this soil could be greatly increased by artificial drainage, deeper plowing, and the use of lime. The installation of tile drainage would prove beneficial and would probably cause the subsoil to become more friable. Deeper plowing would cause the soil to warm up more quickly in the spring, and liming would not only correct the natural acidity of the soil, but would probably tend to make the subsoil more friable.

IREDELL LOAM.

The Iredell loam has a brown to a dark-green or nearly black surface soil, extending to an average depth of about 8 inches. The subsoil is a tough, plastic clay of a yellowish-brown to greenish-yellow color, in many cases mottled with gray at 18 to 20 inches. At a depth of 24 to 30 inches this material grades into a greenish-

colored, partly decomposed diorite rock. Hard bowlders of the parent rock and numerous small, dark-colored iron concretions occur on the surface. The subsoil, on exposure to the atmosphere, turns rusty brown to greenish brown in color, cracks, and becomes hard. The type is locally known as "black gravelly land," "pipe-clay land," and "blackjack land." Near Straightstone a large body of this soil is referred to as the "glades."

The Iredell loam is not very extensive. The principal areas are those in the vicinity of Straightstone and north of Sandy Level. It forms undulating to gently rolling areas, and in the smoother areas, as near Straightstone, both the run-off and internal drainage are poor. On account of its small extent the type has little influence in the agriculture of the county. Very little of it is under cultivation. Most of it supports a forest of blackjack oak, post oak, and pine.

On some of the more sandy areas tobacco is grown successfully, although a favorable season—one of moderate rainfall—is necessary for good returns. Wheat yields 8 to 10 bushels per acre. At present the chief value of this type is as a source of firewood, but it is probable that with underdrainage, liming, deeper plowing, and the use of kainit good yields of grains and grasses can be obtained.

WILKES SANDY LOAM.

The areas mapped as Wilkes sandy loam are quite variable and represent a soil condition rather than a definite type. In a majority of areas the surface soil is gray or yellowish gray to brownish gray, changing at 6 to 8 inches into yellow or yellowish red. The lower subsoil, at 18 to 30 inches, is a plastic, sticky clay of a brownish-yellow color. In a general way the upper subsoil is similar to that of the Durham and Appling soils, while the lower part is identical with that of the Iredell series. In some places bedrock is encountered at 20 to 30 inches. In many places there are included with the type small areas of Durham and Appling sandy loam and narrow strips of Iredell soil. Small, light-colored quartz gravel is scattered over the surface and in places is very abundant. The larger of these areas are indicated on the map by gravel symbols.

The Wilkes sandy loam is derived from a mixture of rocks consisting of laminated, light-yellow gneiss and hornblende schist, cut by dikes of diorite or diabase. Locally it is often referred to as "hominy-gravel land." It occupies rolling to hilly and broken areas in the southeastern part of the county. It is naturally well drained. In the steeper places it is inclined to gully.

The Wilkes sandy loam is not very extensive, and it is not an important agricultural soil. About 40 per cent of it is under cultiva-

tion, the remainder being forested. All the crops common to the area are grown. Tobacco does very well in seasons of moderate rainfall.

This land is held at \$20 to \$40 an acre, the higher prices prevailing for farms near Danville.

The following table gives the results of mechanical analyses of samples of the soil, subsoil, and lower subsoil of the Wilkes sandy loam:

Mechanical analyses of Wilkes sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
211707.....	Soil.....	8.2	10.3	6.2	33.2	20.3	14.8	7.2
211708.....	Subsoil.....	3.8	10.4	4.9	20.4	13.9	26.7	20.2
211709.....	Lower subsoil...	5.5	10.2	4.8	16.8	10.1	16.1	36.4

WILKES FINE SANDY LOAM.

The surface soil of the Wilkes fine sandy loam predominantly consists of a gray to yellowish-gray fine sandy loam extending to an average depth of 8 to 10 inches. This passes into a yellow fine sandy loam or fine sandy clay, which at 18 to 24 inches changes abruptly to a heavy, plastic, mottled yellow and gray or dull-yellow clay. In a general way the upper 18 inches of the soil section is typical Durham, and the lower part Iredell material. In road cuts greenish diorite rock is exposed, and in many places the rock is encountered within the 3-foot section. This soil is, however, more uniform in character than the sandy loam type.

The Wilkes fine sandy loam occurs in much the same manner as the Wilkes sandy loam. The principal areas lie in the vicinity of Fall Creek station. The type is well drained, and where the heavy clay is deep it produces a good quality of bright tobacco. It is not very extensive, but practically all of it is under cultivation, being used for growing tobacco, corn, and wheat.

Results of mechanical analyses of samples of the soil, subsoil, and lower subsoil of the type are given below:

Mechanical analyses of Wilkes fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
211716.....	Soil.....	2.0	2.1	1.7	17.3	40.6	29.9	6.3
211717.....	Subsoil.....	.6	.9	.9	11.2	38.4	28.7	19.1
211718.....	Lower subsoil...	.7	.6	.4	4.8	26.6	17.4	49.4

GRANVILLE SANDY LOAM.

The surface soil of the Granville sandy loam consists of a light-gray to gray loamy sand to sandy loam, 2 to 6 inches deep, resting on a yellowish-gray or pale-yellow sandy loam which extends to depths of 8 to 15 inches. The subsoil is a yellow, friable sandy clay, becoming in the lower part of the 3-foot section distinctly heavy and mottled with light gray. In some places faint mottlings due to admixture of Penn material are encountered in the extreme lower part of the section, but this is not characteristic of the type in Pittsylvania County. In places the lower subsoil is reddish yellow, resembling that of the Appling series, and where the type lies adjacent to the Appling soils definite boundaries are hard to establish. The surface soil of many areas contains numerous particles of coarse sand and fine gravel, and in places quartz gravel is distributed over the surface. These conditions are especially noticeable over that part of the type extending northeasterly from a point in the vicinity of Bachelors Hall. In such areas the friable sandy clay subsoil is not encountered commonly within 20 inches of the surface.

The Granville sandy loam is derived from the weathering of medium to moderately coarse grained Triassic sandstone. It is developed throughout the area underlain by this formation, with the largest areas in the vicinity of Dry Fork, Lanier Mill, Bachelors Hall, and northeast of Chalk Level. It occupies broad, gently rolling to rolling areas generally at about the same elevation as the soils derived from granite and gneiss, except in the vicinity of Dry Fork, where it is slightly lower. Both the run-off and internal drainage are excellent. In places drainage is somewhat excessive for the best results with corn and grass.

While the area covered by this soil is much smaller than that of the Cecil sandy loam, it is nevertheless an important soil. Most of it is under cultivation, the rest supporting a growth of white and red oak, pine, hickory, and dogwood. This is preeminently a tobacco soil, and the greater part of it is devoted to this crop. Some corn and wheat are grown for home use, but the production is insufficient to meet the requirements of the farms.

Farmers on this type plan to grow only tobacco and to buy subsistence products from the local markets or from their neighbors. There is nevertheless a tendency to produce more corn and wheat than formerly. The tobacco grown on this soil is of very fine quality and color, and as a consequence it commands the highest market price. Yields of 400 to 800 pounds per acre are obtained, with an average of about 600 pounds. Corn does well only with heavy fertilization. It gives an average yield of about 20 bushels per acre, but

considerably higher yields are obtained where the crop follows cow-peas or crimson clover. Wheat yields 8 to 10 bushels per acre.

Since the Granville sandy loam is used mainly for tobacco, all the agricultural operations are based on this crop. Generally no definite rotation is observed, but a few farmers use the succession: tobacco, wheat, herd's grass for one or two years, allowing the latter to occupy the land and turning the sod for tobacco again. Most of the farmers follow tobacco with wheat and then allow the land to rest for a year. Tobacco is fertilized more heavily than on the Cecil sandy loam, from 700 to 1,000 pounds of an 8-3-3 mixture being applied per acre.

This soil commands a comparatively high price, from \$30 to \$100 an acre, depending on the location and the improvements.

The Granville sandy loam is used for that type of agriculture to which it is best adapted, but it is possible to obtain better yields of the subsistence crops than at present. The deficiency in organic matter should be made good by liberal applications of stable manure and the growing of cowpeas. The conservation of moisture by cultivation should be given more attention. These methods would doubtless make the production of corn and wheat profitable. By priming the leaves of tobacco as they become ripe, instead of cutting the stalk, the North Carolina Experiment Station has found that the yield can be increased 25 to 35 per cent and that the tobacco land can be maintained in a higher state of productiveness without serious danger of damaging the quality of the cured leaf.⁴

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Granville sandy loam:

Mechanical analyses of Granville sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
211749.....	Soil.....	5.1	18.0	10.6	33.5	15.5	12.9	4.5
211750.....	Subsoil.....	3.4	10.9	5.8	22.1	16.6	22.0	19.2

GRANVILLE FINE SANDY LOAM.

The surface soil of the Granville fine sandy loam consists of a light-gray to yellowish-gray fine sandy loam or loamy fine sand, which at 8 to 10 inches becomes yellower and heavier, until at 15 to 20 inches it passes into a friable, yellow clay to fine sandy clay. The lower part of the subsoil is commonly heavier than the upper part, and mottled with gray and red, and occasionally, Indian red. In

⁴ See Bul. 238, N. C. Agr. Expt. Sta., p. 11.

places this soil is so intricately mixed with Penn and Wadesboro material that it is difficult to separate, as is the case north of Oak Hill and southeast of Mount Airy. East of Straightstone the surface soil is a very fine sandy loam, but these heavier textured areas are comparatively small and indefinite and are consequently combined with the fine sandy loam in mapping.

The most prominent areas of Granville fine sandy loam are north of Oak Hill, east of Chatham, and in the vicinity of Mount Airy. The type occupies gently rolling to rolling situations and is very well drained. Most of it is suitable for the use of labor-saving farm machinery.

The soil is not as extensive as the sandy loam type, but it is nevertheless important. About 75 per cent of it is under cultivation; the rest supports a growth of oak, dogwood, and old-field pine. Like the sandy loam, it is primarily a tobacco soil, and the greater part of it is devoted to that crop. Corn and wheat are grown to a small extent for home use, as are also sweet potatoes and garden crops. The yields of corn and wheat are low. Tobacco produces about 500 to 800 pounds per acre of a very desirable leaf. The type is handled in much the same manner as the sandy loam. Tobacco is fertilized with about 500 to 800 pounds of an 8-3-3 mixture per acre.

This type of soil is highly esteemed, and the land is valued at \$30 to \$75 an acre. The steps necessary for improving the farms are the same as for those on the sandy loam.

Below are given the results of mechanical analyses of samples of the soil and subsoil of the Granville fine sandy loam:

Mechanical analyses of Granville fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
211719.....	Soil.....	2.7	6.1	4.0	26.7	27.8	22.0	10.8
211720.....	Subsoil.....	1.2	2.3	1.5	19.5	24.6	29.3	21.6

PENN FINE SANDY LOAM.

The Penn fine sandy loam consists of a purplish-gray or brown to Indian-red, mellow, fine sandy loam, which at 10 to 14 inches passes into a subsoil of Indian-red or purplish-red, friable clay, extending to a depth of many feet. Brownish-red to red, fine-grained sandstone fragments are scattered in places over the type, and in places small areas contain enough such material to be classed as a gravelly type.

This soil is closely associated with the Penn loam and the Granville and Wadesboro soils. It is mapped in the northeastern part of the county, in the region of the Triassic formation. The most prominent areas lie east and northeast of Mount Airy. The type occupies gently rolling to rolling areas and is very well drained. Over practically all of it the surface is favorable for the use of farm machinery.

The Penn fine sandy loam is a soil of moderate extent, covering about 9 square miles. About 50 per cent of it is under cultivation, the rest supporting a growth of oak, pine, and hickory. Good yields of wheat and corn are obtained, and on some of the lighter textured areas a good quality of bright tobacco is produced. The type as a whole, however, tends to produce a somewhat heavy, dark-colored leaf. This is a desirable, easily worked soil. It is capable of much improvement, and by following more intensive farm practices better yields of all the staple crops can be obtained.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Penn fine sandy loam:

Mechanical analyses of Penn fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
211723.....	Soil.....	2.4	8.6	5.4	28.0	28.1	20.6	6.8
211724.....	Subsoil.....	.8	3.9	2.4	12.2	18.4	35.4	26.6

PENN LOAM.

The surface soil of the Penn loam consists of a purplish-brown to Indian-red, mellow, friable loam, grading at a depth of 6 to 10 inches into an Indian-red, friable clay loam, which contains a considerable proportion of small shale particles. The reddish shale giving the material forming this soil is generally encountered at 20 to 24 inches, and in many places it lies closer to the surface or is exposed.

The Penn loam is a residual soil from shale and sandstone. The principal areas are located east of Sheva and Chalk Level, and west of Cascade in the southwestern corner of the county. Locally areas of this type and the associated Lehigh silt loam are called "meadows."

The surface is flat or gently undulating, the areas generally occupying basinlike situations somewhat lower than the surrounding Granville and Wadesboro soils, but as a rule slightly higher than the Lehigh silt loam. In the southwest corner of the county it varies from the typical in occupying a ridge of considerable elevation. Most of the type is not well drained. The flat surface does not favor run-off, and the proximity to the surface of the shaly substratum pre-

vents the downward percolation of water, keeping the soil too wet in wet seasons. On the contrary, during dry periods crops suffer badly for the want of capillary water, the supply of which is small in a shallow soil. Where the shaly material lies at considerable depth below the surface, however, this soil produces good crops.

The Penn loam is not very extensive, and it is of only local importance. Most of it is under cultivation. Of the rest part is used for pasture and part is in forest. Corn, wheat, and clover are the leading crops. Corn yields 20 to 30 and occasionally 40 bushels per acre, and wheat 15 to 25 bushels. Red clover does well, reseeding over a long period of years. This land is valued at \$20 to \$35 an acre.

In most areas this is a desirable soil, and it seems to be put to the uses for which it is best adapted, namely, the growing of corn, wheat, and clover. Since these crops do well, the raising of cattle and hogs would apparently be profitable.

LEHIGH STONY SILT LOAM.

The surface soil of the typical Lehigh stony silt loam consists of a gray to brownish-gray silt loam, which has a decidedly floury feel when dry, and contains numerous sandstone fragments. At 6 to 8 inches this passes into a gray to drab silty clay loam, mottled with yellow, which in turn rests at 18 to 24 inches on a gray or brown shale or very fine grained sandstone. In some places the surface soil is a very fine sandy loam, but the principal areas are very silty, the areas of the sandy variations being too small to map.

This soil is derived from the weathering of very fine grained, metamorphosed sandstone, shale, and mudstone, of the Triassic age. The principal areas are along the north side of Bannister River from Clark Bridge to a point south of Mount Airy. A small area occurs at Leaksville Junction. The type occupies high ridges and moderate slopes and is well to excessively drained.

This type is not very extensive, and it is not an important agricultural soil. Very little of it is under cultivation. The greater part supports a growth of oak and old-field pine. Where the stones have been removed and where the shale substratum occurs below a depth of 24 inches good yields of corn and wheat have been obtained.

LEHIGH SILT LOAM.

The surface soil of the Lehigh silt loam consists of a light-gray or gray to brownish-gray silt loam, which when dry has a decided floury feel. This grades at 10 to 15 inches into gray or drab silty clay loam, which passes quickly into gray to drab, plastic, sticky clay, generally mottled with yellow. When dry the subsoil is extremely tough and hard. Usually the underlying sandstone and

shale are within the 3-foot section; they are frequently within 12 inches of the surface, and in places exposures of these rocks are seen. Locally areas of this type are known as "meadows."

The Lehigh silt loam occurs in the Triassic belt. The principal areas are situated on the State line in the southwest corner of the county, east of Sheva, west of White Falls Mill, and along Bannister River southwest of Markham Bridge. The areas are low and have a flat to gently undulating surface and poor drainage.

This soil is not very extensive. Nearly all of it has been cleared, but only a small proportion is under cultivation at the present time. In places the type supports a growth of willow oak, red oak, ash, and pine. Corn is grown to a small extent, but most of the cleared land is used for pasture. In wet seasons crops suffer from too much water, and during dry periods they practically dry up.

WADESBORO STONY FINE SANDY LOAM.

For the most part the Wadesboro stony fine sandy loam consists of a fine sandy loam, similar to that of the fine sandy loam of the series, with a large quantity of sandstone fragments scattered over the surface. Most of these fragments are dark colored and very hard, appearing to have undergone considerable metamorphism. There are, however, included areas of Granville soil, the most important occurring south of Dry Fork and Markham Bridge. Small areas of Penn material also are scattered through the type. In places the Penn, Wadesboro, and Granville soils are so intermingled that separation is impracticable.

The Wadesboro stony fine sandy loam occupies White Oak and Betterton Mountains and numerous small knolls and ridges southwest of Mountcross, the belt of occurrence extending practically through the middle of the Triassic formation. The areas range in elevation from 50 to about 200 feet above the general elevation of the surrounding country. Some of the slopes are gentle, but in many cases they are too steep for cultivation. About 10 per cent of the type is farmed; the rest supports a forest consisting mainly of white oak, red oak, and chestnut oak.

The stones have been removed from areas under cultivation, and good yields of corn and wheat are produced. On the included areas of Granville soil a fine grade of bright tobacco is grown. All kinds of fruit and vegetables do well.

On account of its stoniness, steepness, and general elevation, this soil is not suited to general farm crops. The growing of apples and peaches on a commercial scale could probably be made successful on selected areas.

WADESBORO FINE SANDY LOAM.

The surface soil of the Wadesboro fine sandy loam consists of a gray to yellowish-gray fine sandy loam which at 6 to 8 inches passes into a yellowish or reddish-yellow, heavy fine sandy loam. This changes quickly to a brick-red, moderately friable clay. The typical subsoil is identical in color with that of the Cecil fine sandy loam and approaches it closely in structure, and where this type is adjacent to a member of the Cecil series it is difficult to draw a sharp line of demarcation between them. In places the surface soil is a sandy loam, but these coarser textured areas are small and indefinite. Near Mount Airy the type is quite stony; such areas are shown on the map by stone symbols.

The Wadesboro fine sandy loam is found developed throughout the region of the Triassic formation. It is derived from the weathering of sandstone, much of which appears to have undergone metamorphism. The principal areas are located in the southwestern part of the county in the vicinity of Bachelors Hall, Mountcross, and Lanier Mill, and in the vicinity of Mount Airy, Renan, and Straightstone in the northeastern part of the county. The type occupies high, gently rolling to rolling situations and has a topography similar to that of the Cecil soils. It is well drained.

Much of this type is under cultivation, and it produces good yields of corn, wheat, and tobacco. It is farmed in the same manner as the Cecil sandy loam and fine sandy loam, and is valued at the same figure as those soils.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Wadesboro fine sandy loam:

Mechanical analyses of Wadesboro fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
211725.....	Soil.....	4.9	8.6	3.8	23.6	19.8	28.2	10.9
211726.....	Subsoil.....	1.2	2.6	1.2	7.4	10.1	23.5	54.0

WHITE STORE FINE SANDY LOAM.

The White Store fine sandy loam consists of a gray to yellowish-gray or brownish-gray fine sandy loam, passing at 8 to 10 inches into a yellowish fine sandy loam, slightly heavier than the surface soil. This in turn grades at 14 to 20 inches into a dull-red, brownish-red, or yellowish-brown, plastic, heavy clay, normally mottled with gray in the lower part of the 3-foot section. The subsoil is tough and brittle when dry. South of Bachelors Hall the soil resembles that of the Irèdell series to a marked degree, although the typical

White Store material resembles more closely that of the Susquehanna series as mapped in other areas. Along the road from Bachelors Hall to Oak Hill the type is broken by many small areas of Granville and Penn material.

The White Store fine sandy loam is derived from the weathering of sandstone and shale. It occurs in various sized areas throughout the Triassic region, the most prominent areas lying south of Bachelors Hall and in the vicinity of Clark Bridge east of Chatham. The type occupies undulating to gently rolling areas, and the surface drainage is well established. Internal drainage is inclined to be slow and imperfect.

About one-half of the type has been cleared of the natural growth of oak and pine and placed in cultivation. The type is not extensive and is not an important agricultural soil. On areas where the heavy clay subsoil lies relatively deep tobacco does very well, though it is inclined to become spotted and woody during seasons of more than normal rainfall. Wheat gives good results. This type could no doubt be improved by some system of underground drainage.

Below are given the results of mechanical analyses of samples of the soil and subsoil of the White Store fine sandy loam:

Mechanical analyses of White Store fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
211705.....	Soil.....	2.6	7.4	4.9	24.4	18.2	30.2	12.4
211706.....	Subsoil.....	.7	3.0	1.6	6.5	6.9	30.0	50.4

WICKHAM LOAM.

The Wickham loam typically consists of a reddish-brown to brown loam, 8 to 10 inches deep, grading into a reddish-brown or deep-red clay or clay loam which is friable in structure. In some places the surface soil is a gray fine sandy loam underlain at 12 to 18 inches by friable, reddish-brown sandy clay. These areas are small and generally are closely associated with areas of loam. The most conspicuous are found along Roanoke River, south and northwest of Wards Bridge, and along Pig River at Davis Ford. Frequently the surface soil is a decided deep-red clay loam, but these areas are small. Some water-rounded quartz gravel is usually found scattered over the surface, and it is often encountered in road cuts and excavations to a depth of 2 to 4 feet. The gravel is mixed with the subsoil in such a way as to show clearly the alluvial origin of the material. On some of the slopes the residual material is close to the surface and sometimes is exposed.

This type is found at intervals along Roanoke and Pig Rivers. It occurs as level to slightly undulating areas 10 to 25 feet above the overflow level of the streams, and is well drained.

The Wickham loam is not very extensive, and it does not play an important part in the agriculture of the county; locally, however, it is highly prized for growing corn and wheat. It also produces good yields of heavy export tobacco. All the type is under cultivation. Corn yields 30 to 40 bushels per acre, and wheat 15 to 25 bushels.

This type, on account of its heavy texture, requires more care in plowing and cultivation than most of the sandy soils, as it has a tendency to form clods if plowed when too wet. It is naturally a very productive soil, and with more intensive methods better results would be obtainable.

ALTAVISTA FINE SANDY LOAM.

The Altavista fine sandy loam consists of a gray to yellowish-gray fine sandy loam or loamy fine sand, passing at 10 to 14 inches into a compact, friable yellow clay, containing considerable sand. The lower part of the 3-foot section usually is mottled with gray and sometimes with red; it gradually becomes heavier with depth and is occasionally quite plastic when wet. In some places the surface soil is decidedly silty in texture, and in others it is quite coarse, approaching the sandy loam type. The variations mapped with the type are indefinite and of small extent. In poorly drained areas a heavy, sticky, mottled clay is within 10 inches of the surface. In a general way the Altavista fine sandy loam is the terrace equivalent of the Granville or Durham soils of the upland.

The Altavista fine sandy loam occurs on the terraces or second bottoms at various points along the larger streams. It is of alluvial origin, having been laid down in its present position when the streams flowed at a higher level than at the present time. The most prominent areas are found along Dan River at Oak Hill, along Pig River north of Swanson Ford, along Roanoke River northwest of Wards Bridge, and along Bannister River southeast of Chatham. It occurs on level to gently undulating areas 5 to 15 feet higher than the first-bottom Congaree soils. Except for a few small areas, it is well drained.

This is a good agricultural soil, but on account of its small extent it is of minor importance. It is practically all under cultivation and produces a good grade of bright tobacco. Where properly handled it gives favorable yields of corn and wheat. Sweet potatoes do well, and on fields where clover and cowpeas have been grown it produces a good grade of heavy export tobacco.

The farmers handle this soil in about the same manner as the upland soils. As is common with all the sandy soils of the region, it could

be improved for growing corn and wheat by applying organic matter and lime.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Altavista fine sandy loam:

Mechanical analyses of Altavista fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
211743.....	Soil.....	1.2	8.5	5.1	33.9	18.6	26.2	6.2
211744.....	Subsoil.....	3.8	8.2	4.9	21.1	12.6	21.3	27.8

CONGAREE FINE SANDY LOAM.

The surface soil of the Congaree fine sandy loam consists of a brownish to reddish-brown fine sandy loam or loamy fine sand which at 10 to 14 inches gradually passes into a somewhat compact, heavy fine sandy loam of a reddish-brown color. The lower part of the 3-foot section usually is mottled with gray and yellow. Both soil and subsoil contain a large mixture of small mica scales, which give it a very slick, greasy feel. Patches of sandy and fine sandy material are included with this type. The subsoil is not very uniform in color, texture, or structure. Frequently the soil section includes alternate layers of sand and silt.

The Congaree fine sandy loam is an alluvial soil, consisting of material washed from the surrounding uplands and to a small extent from the Appalachian Mountains and deposited along the stream courses during periods of overflow. It occurs in comparatively narrow strips along all the principal streams and rivers. The surface is predominantly level along the smaller streams, but along the rivers the type usually occupies a slight ridge next the stream and is often made up of hummocks and swales. The smaller streams have cut comparatively shallow channels, and along their courses the type is subject to overflow. However, the rivers have cut channels sufficiently deep to prevent overflow and, except during periods of high water, the type is well drained.

This type is very important in the agriculture of the county. Practically all of it is under cultivation, and it is highly prized for the production of corn. Along Roanoke River a considerable acreage is devoted to heavy export tobacco. Some wheat is also grown.

The Congaree fine sandy loam is a productive soil and is very easily handled. Corn yields 25 to 50 bushels per acre in normal seasons, and in some cases higher yields have been obtained. In good seasons wheat yields 15 to 20 bushels per acre. Watermelons

give good results. Good yields are obtained on this soil practically without the use of commercial fertilizer.

This soil is usually sold in connection with the upland types, and no definite selling value can be given.

CONGAREE SILT LOAM.

The surface soil of the Congaree silt loam consists of a brown to reddish-brown, mellow, friable silt loam, ranging in depth from 6 to 10 inches. The subsoil is a light-brown to chocolate-brown, compact silt loam which usually grades into silty clay loam or clay in the lower part of the 3-foot section. In some places the subsoil at about 20 inches is a mottled yellow and gray or bluish, sticky silty clay. Frequently there are included with the type small areas of loam and silty clay loam. Both soil and subsoil contain large quantities of mica scales.

The Congaree silt loam is developed in somewhat continuous strips along Dan and Roanoke Rivers and some of the larger creeks. It occupies uniformly flat areas, and along rivers it is found bordering the upland. The areas adjoining the upland are often wet and poorly drained, but as a whole the type is well drained except for an occasional overflow.

This type is not very extensive, but the better drained areas are highly valued for corn production. Nearly all the type is under cultivation, and it is entirely devoted to corn, the yields of which are slightly higher than on the Congaree fine sandy loam. The part in timber supports a scattering growth of ash, birch, willow, and some willow oak. In places there is a fairly good growth of grass, which provides summer pasturage.

This soil could be greatly improved by artificial drainage and applications of lime.

MEADOW (CONGAREE MATERIAL).

The type mapped as Meadow (Congaree material) represents areas of first-bottom alluvial soils which are so variable in texture that definite separation into types can not be made. The soil is mainly a brown to reddish-brown sandy material interbedded with silt and silty clay of a brown to drab color. Occasionally areas of fine sandy loam and silt loam, several acres in extent, are included with the type. Frequent borings show about 6 to 8 inches of reddish-brown silt loam passing into a clean fine sand which, in turn, rests on grayish silty clay loam at 30 to 36 inches. Like all the Congaree soils, the Meadow contains a large mixture of fine mica scales. In the north-eastern part of the county, along Black and Allen Creeks, the soil included with the Meadow has an Indian-red color, and if of large

extent would be mapped separately as representing the Bermudian series.

Meadow is found along practically all the streams in the county, occupying low, wet areas cut up by sloughs in which water stands for considerable periods of time. It includes some fairly well drained tracts, however, and much of the type, where not subject to too frequent overflows, is under cultivation. Good yields of corn are obtained. By far the greater part of the type supports a growth of willow, ash, birch, and sycamore, and furnishes good summer pasture. If some system of drainage on a large scale were undertaken, much of this land could be permanently reclaimed and would produce good crops.

ROUGH STONY LAND.

Rough stony land in Pittsylvania County is confined to Smith Mountain, in the northwestern corner of the county, and a small part of Turkey Cock Mountain, on the county line northwest of Callands. These mountains rise to a considerable elevation above the surrounding country, Smith Mountain reaching 900 to 1,100 feet. The slopes are steep and practically covered with rocks, mainly gneiss and schist, which vary in diameter from 1 inch to many feet.

This land is nonagricultural. It supports a poor growth of poplar, oak, chestnut oak, chestnut, hickory, huckleberry, and laurel. Goats and possibly sheep could be pastured at a profit.

SUMMARY.

Pittsylvania County is situated in the southern part of Virginia, on the North Carolina State line. It has an area of 1,012 square miles, or 647,680 acres. The topography in general is gently rolling to rolling, but in places becomes somewhat hilly. White Oak Mountain extends through the central part of the county in a northeast-southwest direction and Smith Mountain forms a very conspicuous physiographic feature in the northwest corner.

The county slopes toward the southeast and is drained by the Dan, Bannister, and Roanoke Rivers. Drainage is well established.

The population is entirely American, of predominantly English descent. The rural population, which in 1920 amounted to 56,493, is well distributed over the county, averaging 55.7 persons to the square mile. Chatham is the county seat, and Danville is the largest town, with a population in 1920 of 21,539.

On the whole, transportation facilities are adequate, but some sections are 12 to 18 miles from a shipping point. Danville is the principal market for tobacco and other farm crops.

The mean annual precipitation is about 40 inches, and the mean annual temperature about 59° F. The summers are long and hot, and the winters moderately cold.

This is primarily an agricultural district. Tobacco, corn, wheat, oats, and cowpeas are the chief crops grown, with clovers, grasses, potatoes, sorghum, melons, vegetables, and numerous small fruits and berries as supplementary crops grown to meet in part the local needs. Tobacco, of the bright-yellow smoking variety, is the money crop. No general system of rotation is followed, but many farmers grow tobacco, wheat, and herd's grass in rotation, or corn, wheat, and cowpeas. All the farmers keep one or two milk cows and a few hogs. The wheat, corn, and hay are consumed on the farm or sold locally. Practically all crops are fertilized. Farm labor is scarce, and most of the work is done on the share system. Farm lands range in price from \$15 to \$100 an acre.

The upland soils of Pittsylvania County are residual in origin, derived from granite, gneiss, schist, diorite, sandstone, and shale. They are prevailing gray to yellowish gray in color and quite sandy. The subsoils for the most part vary from red to yellow.

The soils of the Cecil series are the most important in the county. They have gray to red surface soils and red, brittle clay subsoils. This series is derived from granite, gneiss, and schist. It is represented in this county by four types and one phase. Tobacco, corn, wheat, and cowpeas do well on these soils.

Of the Louisa series, the fine sandy loam and gravelly fine sandy loam, the latter with a steep phase, are mapped. This series is characterized by grayish surface soils and friable, red clay subsoils, which contain much mica. Tobacco, wheat, and corn do well on these types.

The Durham series is represented by the sandy loam and fine sandy loam types. This series is characterized by a yellow, friable subsoil. The Durham soils are derived from gneiss and granite, and are very desirable for tobacco.

The Appling series represents soils that are intermediate between the Cecil and Durham. The subsoils are reddish yellow in color. Tobacco, corn, wheat, and cowpeas do well on the sandy loam and fine sandy loam of this series.

Only one member of the Davidson series, the clay loam, is recognized. This series is characterized by its smooth, deep-red, friable clay subsoil. It is derived from diabase and hornblende schist. All grain crops do well on the Davidson clay loam.

Of the Iredell series the sandy loam and loam are mapped in this survey. These soils are derived from diorite and diabase and have a heavy, yellowish, plastic clay subsoil. They are fairly well adapted to tobacco and wheat.

The Wilkes series is represented by the sandy loam and fine sandy loam types. They are derived from diabase and gneiss, and the areas

really represent a mixture of the Appling, Durham, and Iredell soils.

The Granville series is represented by the fine sandy loam and sandy loam types. It is derived from sandstone and resembles the Durham series. The Granville soils are highly prized for tobacco.

The Penn soils are derived from sandstone and shale and are characterized by their Indian-red color. The series is represented in Pittsylvania County by the loam and fine sandy loam types. These are good grain soils.

The Lehigh series is derived from sandstone and shale and is found in close association with the Penn series. The stony silt loam and silt loam members are mapped in this survey.

The Wadesboro series is derived from sandstone and resembles the Cecil series. It is represented in this county by the fine sandy loam and stony fine sandy loam types.

The White Store series is characterized by its heavy, plastic, dull-red or red and gray mottled clay subsoil. It is derived from sandstone and shale and is represented by only one type, the fine sandy loam, in this county.

Nearly all the upland soils are easy to handle, and they could readily be made more productive by the addition of organic matter and lime, deeper plowing, more frequent shallow cultivation, and the rotation of crops.

The old-alluvial material, occupying the terraces or second bottoms, comprises soils consisting of gray fine sandy loam with a yellow, friable clay subsoil, classed in the Altavista series, and brown to reddish-brown loam underlain by red, friable clay, classed in the Wickham series. Each series is represented by one type, both of which are good farming soils. The former produces a good quality of tobacco, and the latter is a fine grain soil.

The soils of the first bottoms are of recent-alluvial origin. They are brown to reddish brown in color and in a majority of cases are quite sandy. Most of the first bottoms are well drained and devoted almost wholly to corn. The first-bottom soils are classed in the Congaree series, of which the fine sandy loam and silt loam are mapped, and in Meadow, which consists of Congaree material of variable texture.

Rough stony land consists of steep, rocky areas occupying Smith and Turkey Cock Mountains. This land is nonagricultural, and all of it is in timber.

[PUBLIC RESOLUTION No. 9.]

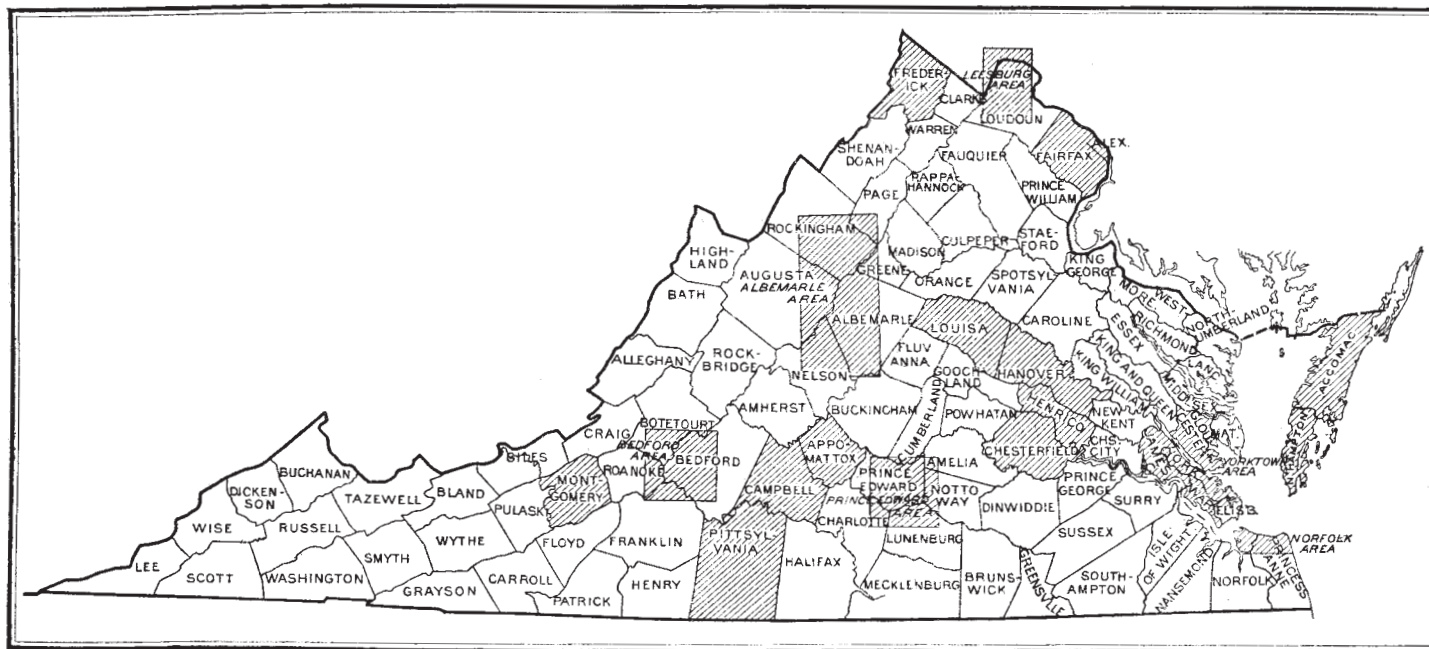
JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, be amended by striking out all after the resolving clause and inserting in lieu thereof the following:

That there shall be printed ten thousand five hundred copies of the report on field operations of the Division of Soils, Department of Agriculture, of which one thousand five hundred copies shall be for the use of the Senate, three thousand copies for the use of the House of Representatives, and six thousand copies for the use of the Department of Agriculture: *Provided*, That in addition to the number of copies above provided for there shall be printed, as soon as the manuscript can be prepared, with the necessary maps and illustrations to accompany it, a report on each area surveyed, in the form of advance sheets, bound in paper covers, of which five hundred copies shall be for the use of each Senator from the State, two thousand copies for the use of each Representative for the congressional district or districts in which the survey is made, and one thousand copies for the use of the Department of Agriculture.

Approved, March 14, 1904.

[On July 1, 1901, the Division of Soils was reorganized as the Bureau of Soils.]



Areas surveyed in Virginia, shown by shading.

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