

SOIL SURVEY OF WICOMICO COUNTY, MARYLAND.

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DESCRIPTION OF THE AREA.

Wicomico County is situated in the southern part of the Eastern Shore of Maryland, about in the middle of the Delaware-Maryland-Virginia Peninsula. The county is bounded on the north by Sussex County, Del., and Dorchester County, Md., from which it is separated by the Nanticoke River; on the east by Worcester County; on the south by Worcester and Somerset Counties; and on the west by Dorchester County. A little more than one-half of its boundary consists of straight lines; the rest is formed by streams and is irregular. The county is roughly rectangular in shape. It has an area of 378 square miles, or 241,920 acres.¹

Wicomico County is a part of the physiographic province known as the Atlantic Coastal Plain, a more or less eroded plain of low elevation lying along the coast from New York to Mexico. The section within the county is all relatively low and the differences in relief are slight. There are three topographic divisions possible. The first consists of the tidal marshes along the Nanticoke and Wicomico Rivers and tidal estuaries lying about at sea level. This division is not extensive. The second division includes most of the eastern part of the county and a considerable proportion of the central and southwestern parts. Here the surface in general is level to flat, but interspersed with numerous low swales and ridges that give it a hummocky or billowy appearance. Considerable areas lie only a few feet above the normal water level of the streams, and in places the country grades almost imperceptibly into the marshes. The third division comprises the northwestern corner of the county and a part of the central section. In these regions a prevalingly undulating to gently rolling surface is developed. Here the elevation is higher and much better natural drainage obtains.

The drainage of the county is fairly well established, though the streams as a rule are rather sluggish and considerable areas are covered with swamps. In the western part of the county there are extensive salt marshes along the Nanticoke and Wicomico Rivers. The elevations range from only a few feet above sea level in the western part to a maximum of 84 feet in the vicinity of Parsonsburg in the east-central part.

The only large streams in the county are the Nanticoke River, which forms the western county boundary and expands in its lower

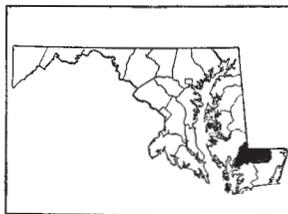


FIG. 34.—Sketch map showing location of the Wicomico County area, Maryland.

¹ Planimeter measurement of land area.

course into a broad tidal estuary; the Wicomico River, which rises within the county and is navigable for steamboats as far as Salisbury, in the central part of the county; and the Pocomoke River, which rises in Delaware and forms the eastern boundary separating Wicomico from Worcester County. There are many creeks, such as Barren, Rewastico, and Quantico Creeks which flow into the Nanticoke; Rockawalking, Beaverdam, Tonytank, and Passerdyke Creeks, which flow into the Wicomico River; and Nassawango Creek, which eventually reaches the Pocomoke River; but none of these are of any size or commercial importance.² Most of the smaller streams on the western boundary, from the mouth of the Wicomico River northward, are tidal estuaries which extend only a short distance inland. These streams afford excellent drainage for the land adjacent to the Nanticoke River, but are insufficient to give adequate drainage to some comparatively large areas that lie only a short distance back from the river.

Wicomico County was organized in 1732. The early settlers came from the Western Shore and were mostly of English descent. Settlement began along the banks of the rivers and gradually extended back into the interior of the county. Salisbury, the county seat and largest town in the county, was founded at its present site because of its having a good harbor and being at the head of navigation on the Wicomico River, giving the early settlers of the central and interior parts a more convenient shipping point.

The present population is fairly evenly distributed. There are some rural sections that are quite thickly settled, but in these sections agriculture is secondary to the fishing industry, as in the vicinities of Tyaskin, Wetipquin, and Whitehaven. The population of Wicomico County, according to the 1920 census, is 28,165, of which 20,612 are classed as rural. The density of the rural population is 55.6 persons per square mile. The population of the most important towns is Salisbury, 7,553; Sharptown, 713; Pittsville, 368. Smaller towns and villages are scattered throughout the county. Salisbury, a railroad junction point and the most important town, is situated in the center of the best farming area in the county, and handles a large volume of agricultural freight. Fruitland, Pittsville, and Mardela Springs are other important shipping points.

The railroad service in the county is good. The transportation is handled by the Delaware and Norfolk divisions of the Pennsylvania Railroad system and the Baltimore, Chesapeake & Atlantic Railway. The Pennsylvania Railroad enters the county at Delmar and passes through Salisbury and Fruitland. This is the main line of the peninsula, operating trains from Norfolk to New York. The Baltimore, Chesapeake & Atlantic Railway enters the county near Mardela Springs and passes through Rockawalking, Hebron, Salisbury, Walston, Parsonsburg, Pittsville, and Willards. Through express trains to New York and Philadelphia are operated during the period when perishable products are coming on the market. Regular steamboat service is maintained between Salisbury and other points along the Wicomico River, to and from Baltimore. Another line operates on the Nanticoke River, touching at Sharptown, Tyaskin,

²Maryland Geol. Surv., vol. 10, p. 310.

and Nanticoke. Numerous smaller craft carry produce to the larger wharves for transfer to the larger boats. Parts of the county some distance from the railroads are usually sufficiently close to water transportation to avoid long hauls. The county has a good road system, including a number of State roads of modern construction. The ordinary earth roads are kept in good repair during the summer season, but become badly rutted and difficult to travel in the winter. Near the larger bodies of water there are some shell roads that give very satisfactory service.

Schools and churches are conveniently located in different sections of the county. All parts of the county are supplied with telephone service, and this service is constantly being extended. Automobiles are owned by a large number of farmers, and motor trucks are being used considerably by the farmers to bring their produce to market. Tractors are operated on some farms. Rural mail delivery routes cover all sections of the county, so that mail reaches practically every farm daily. A number of farms are equipped with electricity for light and power.

New York, Philadelphia, and Baltimore are the most important markets for the produce of Wicomico County, and when prices warrant produce is shipped to other eastern cities. The local markets consume only a small proportion of what is produced.

CLIMATE.

Wicomico County has a moderate climate. The mean annual temperature at Salisbury is 56° F. During the summer season, which is long, the days are hot and oppressive, as the relative humidity of this section is high, but excessive temperatures are rare and persist for only short periods, and the nights in most cases are quite cool and tempered by the prevailing breeze that crosses the peninsula. July is the hottest month, with an average temperature of 76.7° F. and an absolute maximum of 100° F. The highest temperature on record, however, 106° F., occurred in August. The winter months are usually quite mild. There are periods when the weather is rather severe, but these are of short duration. Zero weather, though not unknown, very seldom occurs; the absolute minimum temperature is -9° F., in January. There is considerable freezing and thawing during the winter and early spring and this often injures crops planted on poorly drained and heavy-textured soils. January is the coldest month with an average temperature of 36° F. During the winter months there is considerable rain and the atmosphere is damp and penetrating.

The mean annual precipitation is 42.28 inches. The rainfall is fairly evenly distributed throughout the year, but is slightly heavier during the growing season, when most needed. Occasionally there are dry spells as well as periods of excessive rainfall during the growing season, but these never result in complete crop failure, although they may cause a decrease in yields. There are some severe thunderstorms in the summer, but crop losses from hail and windstorms are comparatively light. The snowfall in this area is very light.

The average growing season is 182 days, the average date of the last killing frost in the spring being April 22 and of the first killing

frost in the fall October 21. The latest recorded killing frost in spring occurred on May 12 and the earliest in the fall on October 11. Crop failures very seldom result from frost.

There is very little difference in the climate over the county. However, it is noticeable that farms located close to Chesapeake Bay are less susceptible to frost than the inland farms. The climatic conditions in connection with the soils of the county largely influence the kind of farming that is carried on, especially the growing of truck crops for the early market. While the climatic conditions here are not as favorable as in the counties farther south in the peninsula, they are sufficiently favorable to produce good returns from this type of farming.

The following table, giving the normal monthly, seasonal, and annual temperature and precipitation, as recorded at the Weather Bureau station at Salisbury, presents the more essential details of the local climate.

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

[Elevation, 23 feet.]

Month.	Temperature.			Precipitation.		
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1913).	Total amount for the wettest year (1917).
	° F.	° F.	° F.	Inches	Inches.	Inches.
December	37.8	73	-3	3.32	2.15	1.85
January	36.0	72	-9	3.58	4.49	2.34
February	36.4	74	-2	2.58	2.00	2.19
Winter	36.7	74	-9	9.48	8.64	6.38
March	44.6	85	1	3.90	4.11	7.36
April	54.4	96	25	3.35	2.63	2.09
May	64.2	98	28	3.46	2.18	2.86
Spring	54.4	98	1	10.71	8.92	12.31
June	71.4	100	41	4.08	2.70	6.36
July	76.7	100	49	3.75	1.49	8.38
August	75.9	106	48	4.73	4.40	4.83
Summer	74.7	106	41	12.56	8.59	19.57
September	69.5	98	35	3.15	2.82	2.66
October	58.9	89	26	3.77	5.41	7.68
November	46.4	78	10	2.61	.83	.82
Fall	58.3	98	10	9.53	9.06	11.16
Year	56.0	106	-9	42.28	35.21	49.42

AGRICULTURE.

From colonial days the Eastern Shore has been an important agricultural section of Maryland. Not only are its soils productive, but its resources of sea food and the large numbers of wild fowl that annually visit its waters have added to the food supply and income of its inhabitants, and a comfortable living has been within reach of all with a minimum of effort. Wicomico County has shared in these advantages.

Prior to the Revolutionary War corn and tobacco were the important field crops; after that corn, wheat, and oats were grown extensively. Enough livestock was kept to supply the local needs, the stock being allowed in the early days to run on the open ranges. Thus there grew up a type of general farming that persisted without marked change for practically a century. During this period the transportation of all agricultural products was carried on by wagons and boats.

A marked development of agriculture in Wicomico County followed the building, in 1884, of the New York, Philadelphia & Norfolk Railroad, now a part of the Pennsylvania System. This improvement in the means of transportation made possible the shipment of perishable products to the important markets of the North and caused the growth of an important trucking industry.

The trend in agriculture is indicated to some extent by the statistics of farms and farm lands given in the following table:

Number and average size of farms and improved land per farm 1880 to 1920, inclusive.

Year.	Number of farms.	Proportion of land in farms.	Average size of farms.	Im-proved land per farm.
		<i>Per cent.</i>	<i>Acres.</i>	<i>Acres.</i>
1880.....	1, 701	83. 3	116. 0	57. 0
1890.....	1, 838	84. 4	109. 0	59. 3
1900.....	2, 314	87. 3	89. 6	52. 9
1910.....	2, 678	83. 3	73. 9	40. 7
1920.....	2, 504	70. 7	67. 0	39. 3

During the 40 years covered by the foregoing table the number of farms has increased, and the proportion of land in farms has decreased slightly, but only in the last decade. The size of the farms has decreased, being only 57 per cent of what it was in 1880, and the percentage of improved land in farms has decreased very materially. These facts are significant in that they show a change to a more intensive type of agriculture. It will be noted that the upward trend in the number of farms was consistent until the last decade, when there was a slight decline. The decrease then was probably caused in part by the abnormal wages paid in the cities during the war period, causing certain of the farmers to turn from their farms to more remunerative work.

An important feature of the agriculture of Wicomico County is the great increase in comparatively recent years in the value of farm property. The value of all farm property, including land, buildings, fences, machinery, and domestic animals, in 1880 was \$1,660.49 per farm of 116 acres. In 1920 it was \$4,749.00 per farm of 67 acres. This increase indicates a decided improvement in the economic condition of the farming class.

The following table, giving the acreage and production of the more important crops as reported by the census for the years 1879 to 1919, inclusive, will also show the change that has taken place in the agricultural industry of the county, the shift from corn to truck crops being clearly brought out and the greater diversification being notable.

Acreege and production of principal crops as reported by the census for years 1879-1919, inclusive.

Year.	Corn.		Wheat.		Potatoes.		Sweet potatoes.		Hay. ¹	
	<i>Acres.</i>	<i>Bushels.</i>	<i>Acres.</i>	<i>Bushels.</i>	<i>Acres.</i>	<i>Bushels.</i>	<i>Acres.</i>	<i>Bushels.</i>	<i>Acres.</i>	<i>Tons.</i>
1879.....	41,214	447,519	3,720	27,034	-----	28,931	333	38,461	237	409
1889.....	36,452	284,735	2,008	20,565	246	16,675	277	25,425	1,681	2,153
1899.....	40,550	582,960	3,282	41,110	1,192	88,535	639	73,127	2,996	3,400
1909.....	39,161	612,236	4,367	45,430	1,606	159,621	1,119	159,474	5,268	7,829
1919.....	32,571	795,701	3,339	48,401	2,038	161,376	3,513	573,163	5,039	8,275

Year.	Peaches.		Apples.		Strawberries.		Vegetables. ²
	<i>Trees.</i>	<i>Bushels.</i>	<i>Trees.</i>	<i>Bushels.</i>	<i>Acres.</i>	<i>Quarts.</i>	
1879.....	-----	-----	-----	-----	-----	-----	-----
1889.....	194,652	29,911	41,607	17,291	-----	-----	-----
1899.....	171,962	5,032	91,933	65,439	2,678	4,136,710	-----
1909.....	47,170	2,710	53,476	16,501	2,700	4,651,010	5,821
1919.....	45,695	21,167	30,529	19,140	1,555	1,796,998	9,081

¹ From cultivated grasses.

² Includes tomatoes, cantaloupes, watermelons, cabbage, cucumbers, beans, etc.

The production of truck crops for the northern markets dominates the agriculture of Wicomico County. General farming is still carried on, but trucking is gradually taking its place. The most important truck crops are potatoes, sweet potatoes, watermelons, cantaloupes, tomatoes, and strawberries. The principal farm crops grown are corn, wheat, rye, and hay. The raising of livestock is not carried on very extensively, but cows and hogs are raised in a small way on practically every farm. The raising of poultry has shown a decided increase in the last few years. A very few farms are devoted entirely to the raising of livestock and poultry.

The true importance of the trucking industry can best be seen by a comparison of the value of its chief products with the total value of agricultural products. The 1920 census gives the value for all agricultural products as \$5,139,004. Of this amount the value of vegetables and fruits alone reaches \$2,786,237, or more than 50 per cent of the total, or \$1,000,000 more than that of any other class of products. Potatoes, sweet potatoes, and strawberries are the important truck crops reported separately by the census. In 1919, 2,038 acres were planted to potatoes, with a yield of 161,376 bushels. Much of this production is shipped from the county. Sweet potatoes are raised more extensively than potatoes. In 1919, 3,513 acres were planted and the production was 573,163 bushels. A part of this crop is used by the local canneries, but the greater part is sold in markets outside the county.

The raising of strawberries is quite extensively carried on in all parts of the county, and especially in the eastern half. Although the acreage has declined since 1909, there were 1,555 acres in the crop in 1919, and the production amounted to 1,796,998 quarts. Most of the berries are sold in outside markets, but a considerable quantity is taken by the local juice plants, for which some varieties are expressly grown. During the picking season fast-freight trains composed entirely of refrigerator cars are operated to New York and Philadelphia.

Besides these three truck crops, enumerated separately, the census reports 9,081 acres in miscellaneous vegetables. The most important

of these, as near as could be determined by observation in the field, are cantaloupes, watermelons, cucumbers, and tomatoes. Peas, beans, cabbage, and onions are of minor importance. The tomatoes are sold mainly to local canners, a few being shipped to the city markets or to canners in near-by counties. The cantaloupes, watermelons, and cucumbers are mostly shipped to the northern markets.

Corn, rye, wheat, and hay are the most important of the general farm crops. According to the census, corn occupied 32,571 acres in 1919 and produced 795,701 bushels. The larger part of the corn crop is used for the feeding of farm stock and the fattening of hogs. Wheat is grown in all parts of the county. In 1919, 3,339 acres were devoted to wheat, with a production of 48,401 bushels. A part of the wheat crop is handled by local millers. Baltimore is the leading market for grain shipped out of the county. Rye is the next important small grain. There were 1,988 acres in rye in 1919, and the production was 22,886 bushels. Part of this crop also is taken by local mills.

There has been a decided increase in the acreage of hay and forage crops during the last 20 years. In 1899 the acreage was 3,494; in 1909, 13,684 acres; and in 1919, 19,272 acres. The details of this class of crops for 1919 are given in the following table:

Production of hay and forage crops in 1919.

Crop.	Acres.	Tons.	Crop.	Acres.	Tons.
All tame or cultivated grasses	5,039	8,275	Wild or salt grasses.....	294	455
Timothy alone.....	138	175	Small grains cut for hay	593	626
Timothy and clover mixed	468	872	Annual legumes cut for hay	1,196	1,420
Clover alone	3,351	5,108	Silage crops	156	1,411
Alfalfa	531	1,239	Coarse forage.....	6,339	2,852
Other cultivated grasses.....	569	881			

Production of orchard fruits is not as important to-day as formerly. There are a few small commercial orchards, but most of the trees are in home orchards. The orchard fruits most generally grown are apples, pears, and peaches. The 1920 census shows the number of apple, peach, and pear trees as 30,529, 45,695, and 4,233, with a yield of 19,140, 21,167, and 8,789 bushels, respectively. Fruit is shipped to outside markets; some fruits, especially pears, are taken by local canners, and a considerable part of the apple crop is used in the production of cider.

Poultry raising has not been greatly developed, but at the present time the industry is on the increase. Some farmers have rather large incubator plants and make a business of shipping day-old chicks, which are marketed mostly in New Jersey, Pennsylvania, and Maryland. Local merchants usually trade in poultry and eggs, shipping to northern markets. According to the census, the value of poultry and eggs produced in 1919 was \$428,026.

The livestock industry is not important in Wicomico County. The total value of domestic animals of all kinds in 1920 was \$951,940, and of this \$616,257 represents the value of horses and mules. The number of dairy cows in 1920 was 3,145, about 1½ to the farm, with a total value of \$225,076. There were 5,864 hogs in the county,

valued at \$89,673. At the present time hogs are raised on practically every farm, but mainly to supply home needs or for sale in local markets. The few beef cattle raised are sold locally. There are only a few small flocks of sheep in the county.

Dairying is not carried on extensively, but there are a number of dairy farms that supply the towns and villages in the county. Practically all farms have at least one cow to supply the home needs. The Holstein is probably the most popular breed, but a number of Jersey and Guernsey cattle are owned in the county. The value of dairy products, excluding home use, in 1919, was \$131,917.

As a general rule the adaptation of different soils to the different crops is recognized and observed in the selection of fields for planting. Potatoes, sweet potatoes, cantaloupes, cucumbers, and watermelons are planted on sandy types of the Sassafras series. Strawberries give better results on the Elkton, Keyport, and Portsmouth soils. The general farm crops are planted on the heavier textured soils of practically all the series represented in the county, and corn is also grown on some of the lighter textured soils, which have been found to give good results with this crop. The legumes are mostly planted on the better drained soils of fairly heavy texture.

The farmhouses range from the large substantial dwellings of the well-to-do farmers to the smaller but comfortable houses of the smaller farms. The buildings as a rule are painted and kept in good repair. Most of the houses are built back from the roads and have attractive surroundings. The barns are of sufficient size to give room for housing the stock and storing the feed crops. On most of the farms there are smaller outbuildings, such as potato houses, packing houses, corncribs, garages, and machine sheds. Modern machinery is in common use, and windmills and gasoline engines for pumping water and other power requirements, and farm tractors are used on many farms. Both mules and horses are used for farm work. They are generally of medium weight and fairly well bred.

The land for corn is usually plowed to a depth of 5 to 7 inches and the seed bed prepared by harrowing and rolling. The seed is planted the latter part of April or the early part of May, depending on the locality and the condition of the soil, and the crop is cultivated three or four times, a cover crop frequently being sown at the last cultivation. Corn is sometimes topped and the blades pulled from the stalk, but over a large part of the acreage the crop is cut and both stalks and blades used for fodder. A few corn harvesters are used. When corn is to be followed by wheat, it is cut close to the ground and shocked in rows far apart and the wheat sowed between the rows; later the corn is husked, the fodder removed, and wheat sowed in the unplanted space. When wheat is sowed on land on which corn has been topped and stripped, the seed bed is prepared by disking and harrowing. Some cornfields are pastured after the blades and ears have been removed. As a general rule very little commercial fertilizer is applied to corn.

In preparing the land for potatoes, pine straw and barnyard manure are applied to the soil and the land is broken as early in the spring as possible, depending on the season and the condition of the soil. Potatoes are planted during the latter part of March or the first of April in a shallow furrow in rows $2\frac{1}{2}$ to 3 feet apart, seed potatoes usually being quartered and planted by machinery. Fertilizer is

applied to the row and then followed with a cultivator to mix the soil and fertilizer together and prevent burning of the seed. After planting, the middles are usually loosened up and the field is leveled with a harrow. Cultivation is begun soon after the plants break through and in a normal season the crop is cultivated four or five times, the last cultivation usually being given about two weeks before the crop is harvested. Potatoes are sprayed for the Colorado beetle and where necessary for blight. The benefits derived from spraying are becoming fairly well recognized.

When potatoes are planted for the early market they are dug as early as possible, and the prime potatoes are barreled in the field and hauled to the shipping point. A large part of the crop is shipped in sacks or in bulk. Irish Cobbler, Green Mountain, and McCormick are the principal varieties grown. Both northern and home-grown seed is used. Where home-grown seed is produced, small yields of small potatoes are obtained from late plantings of northern seed, and these are held for planting the succeeding year's crop. A large part of the late commercial crop of potatoes is stored. Potato houses are becoming popular, but a very large number of the farmers still bury their crop in mounds in the fields, constructed to give proper drainage and aeration.

Sweet potato plants are sprouted in hotbeds, and the plants are set at intervals of 18 to 20 inches in rows about $2\frac{1}{2}$ feet apart. Transplanting is done by machine, with tongs, or by hand. From 10,000 to 11,000 plants are set to an acre. When sweet potatoes follow a cover crop, manure is not usually applied, but in other cases a rather heavy application of coarse manure is given. The manure is plowed under and the land is very thoroughly worked up before the plants are set, a sufficient number of diskings and harrowings being given to mix the manure thoroughly with the soil. The rows are marked, the fertilizer is sown, and a bed is thrown up with one round of the plow. Cultivation, consisting of one or two hoeings about 10 or 12 days after the crop is planted, is followed by working with a cultivator equipped with a vine-turning attachment. When the vines get large it is necessary for a man to precede the cultivator and turn the vines with a stick. In harvesting the vines are cut and the tubers plowed out and either hauled to the shipping point or the potato house. Some of the crop is kept until the winter or early spring and then sold in hampers. The principal varieties are the Big Stem Jersey, Yellow Jersey (Up River or Little Stem Jersey), used mostly for shipping, and also a few others grown for home consumption.

Strawberries are a two-year crop. The plants are propagated from young plants lifted from year-old beds and set out as soon as growth of the old bed starts in the spring. The first year strawberries are cultivated very carefully to keep the beds clean. The second year they do not receive any cultivation unless the bed is going to be continued another year, as is often the case, when an effort is made to keep the grass out. The plants are usually set out in new land or in land that has been idle for some time. Land for strawberries is usually given an application of fertilizer at the rate of 300 to 400 pounds per acre. Sometimes a topdressing of fertilizer and barn-yard manure is given the second year. The matted-row system is used. The berries are picked during the day and taken to the

shipping point in the early morning or late in the afternoon. The varieties considered best for shipping are the Gandy, Missionary, and Chesapeake; the Climax and Superior have only fair shipping quality and the Success is usually grown only for the canneries and juice factories.

Tomatoes are grown on a large number of farms as a cash crop. The tomatoes are sold mostly to local canners, and some are grown under contract. The Greater Baltimore and Bonny Best are important varieties. The Marvel and Norton, wilt-resisting varieties, have proved very satisfactory.

Practically every farmer in the county practices some system of crop rotation. Where wheat is grown, a rotation consisting of wheat, grass (two years), potatoes, and soybeans, is followed; where corn is an important crop, the rotation includes corn, rye, or some similar crop, wheat, and grass; the grass in some instances being left two years. Where strawberries are grown, a three-year rotation usually consists of strawberries the first year and early part of the second year, followed by late potatoes or a legume the same year and by corn or sorgo (saccharine sorghum) the third year.

Fertilizers are used on practically every farm. According to the latest census, 2,124 farms reported the use of fertilizer in 1919, with a total expenditure of \$515,849, or an average expenditure per farm of \$243.43. The most commonly used mixture for potatoes contains about 7 per cent nitrogen, 6 per cent phosphoric acid, and 5 per cent potash, usually applied in quantities ranging from 1,000 to 2,000 pounds per acre. Sweet potatoes are not fertilized as heavily as potatoes, but usually are given about 800 to 1,000 pounds of a 3-6-6 or 3-8-4 fertilizer per acre. Some use a 2-10-5 formula with good results. Mixtures of 2-8-2 or 3-10-4 grade are applied to corn. For strawberries about 400 pounds per acre of a 7-6-5 or 5-8-5 fertilizer is used. Tomatoes are usually given from 400 to 600 pounds per acre of a 2-8-2 fertilizer. Very little home-mixed fertilizer is used.

Barnyard manure is used quite extensively. All the manure produced locally is applied to the land, and large quantities are shipped in from the cities. Where fish scrap is available it is used considerably. The use of lime is increasing. It is purchased as hydrated lime, burnt lime, or ground limestone. The first is the most popular, because, being shipped in bags and being in finely pulverized condition, it is easy to handle and apply and acts quickly. Considerable lime is obtained from the burning of oyster shells.

Much use is made of hired labor on the farms of the county. In 1919, the last year for which census figures are available, the total expenditure for farm labor was \$322,923. This was expended on 43 per cent of the farms, at the rate of slightly more than \$300 per farm.

In normal times farm labor is fairly easy to obtain and wages are reasonable. A large number of the farm laborers are negroes. The wages vary considerably with the locality and the kind of farming. A farmer usually keeps one hand the year round, hiring extra help by the day or week as required. In gathering truck crops laborers are paid by the quart, basket, or barrel, depending on the crop to be harvested.

In the matter of tenure of farm lands the conditions in Wicomico County approximate the average for the State, the percentage of

owner-operated farms being 4 per cent greater than the State average. The exact percentage is 72.1, with 27.3 operated by tenants and 0.6 per cent by managers. The leases usually provide for a division of the crops, very little land being rented for cash.

The average assessed value of land in the county, according to the 1920 census, is \$40.47 per acre. The selling price of farm land in 1921, the year of the survey, ranged from \$10 to \$250 an acre. The important factors in influencing the land prices in this section are location with regard to markets, nearness to hard-surfaced roads, schools, churches, productive conditions, drainage conditions, presence of merchantable timber, and the condition of the buildings and other improvements.

A very large part of the agricultural produce of the county is marketed through the Wicomico Farmers' Association. This organization is composed of a large part of the farmers in the county. The association builds and owns storage sheds and employs auctioneers to sell the produce of its members. The association is becoming stronger and more efficient each year. Some produce not handled by the association is sold to buyers at the different shipping points, or shipped directly to commission houses in Wilmington, Baltimore, New York, Philadelphia, and Boston.

After agriculture, lumbering is probably the most important industry of Wicomico County. A report³ of the State forester of Maryland is drawn upon for the following facts: Forty-six per cent of the area of Wicomico County is in woodland. According to a forest survey made in 1908, 23 per cent of this was hardwood, 38 per cent pine, 39 per cent mixed hardwood and pine. The lumber cut in 1914, which amounted to 3,949,470 cubic feet, valued at \$592,318, exceeded that of all but two other counties in the State. In the number and size of its wood-using industries the county probably stands second among the counties of the State. Salisbury is the home of these industries. Among the products of the mills and factories of especial value to agriculture are crates, baskets, and other containers for shipping truck crops and fruits.

The production of sea foods is carried on principally in the western part of the county, along the Nanticoke and Wicomico Rivers, and small quantities of fish and oysters are shipped from that section during the season. A number of the farmers have their own boats, usually equipped with a motor, and spend part of their time catching fish and oysters for home use or market.

SOILS.

The soils of Wicomico County are prevailingly light colored; that is, they range in color from gray to brown, with the exception of the dark-colored Portsmouth and St. Johns soils, which occupy only small areas. Practically all of the county was forested until reclaimed for agricultural purposes, and therefore there was little opportunity for the accumulation of vegetable matter in the soil. In areas now forested, however, there is a thin veneer of leaf mold on the surface which darkens the upper layer of virgin soils. In the case of the Portsmouth and St. Johns soils a swampy condition has existed, which

³ The Forests of Maryland, by F. W. Besley, 1916.

has favored the growth of vegetation and the partial decay of the plant remains.

There is no accumulation of calcium carbonate in the soils of the county; but, on the other hand, field tests indicate that the soils, except the St. Johns, Portsmouth, and some areas of the Elkton, are not strongly acid in character.

Two conditions probably have been most influential in determining the soil differences of the region, namely, topography and drainage. Where the topography is gently rolling and the drainage is well established, the Sassafras and Norfolk soils have developed; where the topography is slightly undulating and the surface drainage is good but the subsoil drainage not so good, the Keyport soils appear; and where the topography is level or the surface somewhat lower than the surrounding country and both the surface drainage and subdrainage are inadequate, the Elkton, St. Johns, and Portsmouth soils are found.

The materials from which the soils of this area are derived consist of unconsolidated sands, silts, and clays. The marked effect of drainage on the characteristics other than texture has already been referred to. Among other things, drainage, or rather the lack of it, has given the mottled or variegated colors of the subsoils, the result of imperfect and irregular oxidation of the iron compounds contained in the soil material.

There are extensive tidal marshes or "foreland plains" lying between the mainland and the Wicomico and Nanticoke Rivers and the numerous estuaries extending into the mainland of Wicomico County. While not subjected to constant inundation, very little of this Tidal marsh lies entirely above normal high tides and has not reached the stage in soil formation where it can be classed texturally as a type. Bordering the streams are narrow strips of alluvial material so variable in texture, color, and structure that no type distinction could be assigned to it. Such areas are subject to overflow and in many places are either covered or saturated with water during a greater part of the year.

In all the soils of Wicomico County, except the Norfolk, there are three more or less distinct layers in the 3-foot section. The upper one is prevailingly friable and mellow; the second—the subsoil—is noticeably heavier than the upper and contains a larger proportion of silt and clay; the third—the lower subsoil—is a loose, gravelly and sandy material, appearing ordinarily at depths between 28 and 36 inches below the surface.

On account of the low, flat surface of much of this county, this substratum of open, porous character is advantageous, improving the drainage of all the soils and making possible the cultivation of some areas that otherwise would remain too wet for crop production.

According to the Maryland Geological Survey, the geology of this county is quite simple and uniform. The deposits are of Pleistocene age and belong to the Columbia group. They have been elevated above sea level in comparatively recent time, in a geological sense. These beds consist of clay, sand, and gravel. All the soils of the area have been derived from these materials.

The soils of Wicomico County are grouped in six series on the basis of differences in color, origin, and drainage conditions. The series are further divided into types on the basis of texture, i. e., the rela-

tive proportion of mineral particles of different grades which compose the surface soil. Fifteen true soil types, with two phases and three miscellaneous types, are developed in the county and shown on the accompanying map.

The Sassafras series, in which are included the highest lying and best drained soils of the county, is distinguished by the brown color of the surface soils and the reddish-yellow to yellowish-brown color of the subsoil, which rests on beds of sand or light sandy material, in some places containing gravel, at depths varying from 28 to 36 inches. Four types, the sand, loamy sand, sandy loam with a deep phase, and fine sandy loam, are mapped.

The types of the Norfolk series are characterized by their gray to grayish-yellow surface soils and pale-yellow subsoil. This series is well drained. Two types, the sand and loamy sand, are mapped.

The types of the Keyport series are intermediate in position between the better drained soils of the Sassafras and the lower lying areas occupied by the Elkton series. The surface soils of the Keyport series are light brown in color and pass at 6 to 8 inches into a pale-yellow subsurface layer continuing to about 12 to 15 inches. Below this appears the typical subsoil, consisting of a mottled yellow, gray, or drab, stiff, slightly plastic sandy clay. Normally at 28 to 30 inches a substratum composed of mottled yellow and gray sand or yellowish sandy loam mottled with gray or russet brown is encountered. The Keyport series in many places appears to have a Sassafras or Norfolk surface soil and the typical Elkton subsoil. The sandy loam and the fine sandy loam, with a heavy-subsoil phase, are mapped in this area.

The types of the Elkton series are distinguished by their light-gray to dark-gray surface soils and mottled yellow or yellowish-brown and gray to drab, slightly plastic sandy clay or clay subsoil. As in the series already described, a substratum of sandy material is reached within the soil section, at depths ordinarily between 24 to 30 inches below the surface. The soils of this series occupy flat to level areas and are naturally poorly drained. The poor drainage has caused intermittent wet and dry stages, with lack of aeration, and the forest cover has given a scant supply of organic matter, so that the surface soil is frequently compact and stiff. Four types, the sandy loam, fine sandy loam, loam, and silt loam, are mapped in this county.

The St. Johns series includes types with dark-gray to black surface soils, underlain at 6 to 18 inches by a compact hardpanlike layer of sand of brown color and granular structure. Where this layer is near the surface the underlying material has a pale-yellow to orange color; whereas in areas in which the layer appears some distance below the surface a brown to grayish color continues throughout the 3-foot section. One type of this series, the sandy loam, is mapped.

The types correlated with the Portsmouth series have dark-gray to black surface soils, typically high in organic matter. The subsoil is a mottled yellow or yellowish-brown and gray to gray and drab sandy clay to clay. These soils are developed in slightly depressed areas where surface drainage has not been developed and where a rank growth of vegetation has flourished. In this county the Portsmouth fine sandy loam and loam are mapped.

The miscellaneous materials included in this survey are Meadow, Swamp, and Tidal marsh. These materials are sufficiently described in subsequent chapters of this report.

The following table gives the names and actual and relative extent of the several soils mapped in Wicomico County:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Sassafras sand.....	24,000	9.9	Tidalmarsh.....	15,168	6.3
Sassafras loamy sand.....	22,400	9.3	Elkton loam.....	10,944	4.5
Elkton sandy loam.....	19,648	8.1	Norfolk loamy sand.....	9,536	4.0
Portsmouth fine sandy loam.....	18,432	7.6	Key port sandy loam.....	7,872	3.3
Elkton silt loam.....	18,112	7.5	Swamp.....	6,784	2.8
Elkton fine sandy loam.....	17,728	7.3	Portsmouth loam.....	6,528	2.7
Key port fine sandy loam.....	15,296	7.1	St. Johns sandy loam.....	6,272	2.6
Heavy-subsoil phase.....	1,984		Sassafras fine sandy loam.....	6,016	2.5
Sassafras sandy loam.....	8,704	6.4	Meadow.....	4,416	1.8
Deep phase.....	6,784				
Norfolk sand.....	15,296	6.3	Total.....	241,920	-----

SASSAFRAS SAND.

The surface soil of the Sassafras sand consists of a brownish-gray medium-textured sand ranging in depth from 2 to 10 inches. This layer contains very little organic matter and is incoherent. The subsoil grades from a yellowish-brown sand in the upper part into a reddish-brown or orange-colored loose sand, which extends to depths of 3 feet or more. A slight change in texture occurs in many places in the lower subsoil, the material becoming somewhat coarser. In some places the surface soil is almost gray and the subsoil somewhat gray, more like the color of the Norfolk sand, but Sassafras sand always retains some tinge of reddish brown.

North of Parsonsburg and Pittsville the Sassafras sand and Norfolk sand are so intermingled that it is almost impossible to separate them satisfactorily on a map of the scale used in this survey, and some Norfolk is included with the Sassafras sand, and vice versa. In some sections of the southeastern part of the county the Sassafras sand occurs in ridges associated with more poorly drained soils. Some of the ridges and intervening depressions are so small, and the intermingling of the soils is so intricate, that they have been mapped in each instance with the predominating type. In a few areas quartz gravel is encountered in the subsoil.

The largest and most important areas of Sassafras sand lie along the Nanticoke and Wicomico Rivers and their tributaries. Other smaller areas are scattered over the county. The type occupies the more rolling and undulating parts of the county. It is usually developed on the slightly higher elevations, for the most part on ridges or along the high banks of streams. The drainage is generally excessive and the type, while suited to special crops in normal years, can be used satisfactorily for general crops only in wet seasons.

A large part of the Sassafras sand is under cultivation; the rest is in mixed hardwood and pine forest. The growth of trees is inferior as compared with growth on the other Sassafras soils.

The principal crops on the Sassafras sand are sweet potatoes, watermelons, cucumbers, cantaloupes, and tomatoes. Some corn also is

grown. Sweet potatoes are the principal crop. The yields range from 250 to 300 bushels per acre. Watermelons, cantaloupes, cucumbers, berries, tomatoes, potatoes, and other truck crops do well. Corn gives good yields in normal years, but the returns from wheat are only fair. Cowpeas, soybeans, and vetch are grown to some extent as cover crops.

This soil is adapted to the growing of early truck crops. It is warm, early, well aerated, easily penetrated by roots, very easily tilled, and responds quickly to the application of manure or the turning under of green-manure crops. It requires more liberal fertilization than the other Sassafras soils and is much in need of organic matter.

Land values are influenced by the location, use to which the particular tract is adapted, and whether or not it is sold in conjunction with other soils. Where sold separately the price ranges from \$25 to \$100 an acre.

SASSAFRAS LOAMY SAND.

The surface soil of the Sassafras loamy sand consists of a light-brown to grayish-brown loose sand or loamy sand, 8 to 10 inches deep. The soil typically is of medium texture, although areas of coarser material occur, and in a few areas considerable gravel is present. The subsoil, to a depth of 30 inches, consists of a yellowish-brown to reddish-brown loamy sand, a little more coherent than the surface soil, and in places approaching a light sandy loam. Below 30 inches the material becomes coarser, and in places contains considerable gravel. The lower subsoil is commonly more porous than the upper layer and generally has a reddish tinge.

The principal variation appearing in the Sassafras loamy sand is an approach to the Norfolk loamy sand. This condition occurs generally on the level areas, where the upper part of the profile resembles the Norfolk but the lower part is typical Sassafras. In the vicinity of Rockawalking there is a rather large area mapped as Sassafras loamy sand, intermingled with which there are considerable areas of Sassafras sand and Sassafras sandy loam. They are included because too small and indefinite to map separately.

The Sassafras loamy sand is distributed in all parts of the county. Some rather large areas lie near Rockawalking and west of Mardela Springs. The topography as a whole is gently undulating, but some areas are nearly level. In general the drainage is good, becoming excessive in places.

From 60 to 70 per cent of this type is under cultivation. Where forested the growth consists of loblolly pine, red oak, white oak, maple, hickory, some cedar, small holly trees, and a dense undergrowth of myrtle, dogwood, and smilax.

The same crops are produced on this type as on the Sassafras sand, but the yields are generally larger. The soil is warm and early and good yields are obtained. Sweet potatoes and early potatoes are grown probably more extensively than other crops. Corn and wheat yield about the same as on the Sassafras sand. Tomatoes, cucumbers, sweet corn, cantaloupes, and watermelons give fair yields. Berries and tree fruits do very well on this type. Some cowpeas, rye, and soybeans are grown as green-manure crops. The yields of the field crops are somewhat less than on the Sassafras sandy loam.

The Sassafras loamy sand responds readily to fertilizer treatment but heavy applications are necessary on account of its open, leachy nature. The quantities applied, however, are usually about the same as on the Sassafras sandy loam.

Land values depend on location and improvements. Farms in which this soil forms a large part of the acreage are held for \$25 to \$100 an acre.

In order to maintain the productiveness of this soil it is necessary to incorporate organic matter by liberal applications of barnyard manure and the turning under of green manures. The growing of legumes should be encouraged. Cowpeas are probably better adapted to this type than any other legume. Liming should prove beneficial.

SASSAFRAS SANDY LOAM.

The surface soil of the Sassafras sandy loam consists of a light-brown to brown, mellow, light sandy loam, with a depth of 8 to 10 inches. This is underlain by a reddish-yellow or yellowish-brown heavy sandy loam or sandy clay loam extending to 22 to 30 inches, where it passes rather abruptly into a dull-red or reddish-yellow sand or loamy sand. Typically below 30 inches a stratum of sand is encountered, but this stratum is not as uniformly present as in most other soils in the area. In places the subsoil is a plastic sandy clay. Small mica flakes appear in the soil and subsoil. Where this type is exceptionally well-drained the reddish-brown color is more pronounced.

The surface soil of the Sassafras sandy loam is rather uniform in texture and structure throughout the county. A few variations are encountered, such as a variation in the depth of the surface soil and the occurrence of gravel in small areas. The latter areas commonly lie along the slopes. The gravel consists of small rounded fragments of quartz. There are a few areas of loamy sand intermingled with the Sassafras sandy loam. These are small, and because the two soils grade into each other it was impracticable to establish definite boundaries. Also included with this type are a number of spots of Norfolk sandy loam. The small size of these areas made it undesirable to attempt to show them on the map. Such spots have a gray to grayish-brown surface soil and a yellow, friable, sandy clay subsoil. They are slightly less productive than the Sassafras sandy loam.

The Sassafras sandy loam is known locally as "red clay land." It is a soil of moderate extent, but is important agriculturally. As regards drainage conditions, ease of handling, and natural productiveness it is one of the better soils of the county.

The Sassafras sandy loam is developed in all sections of the county. It occupies flat to slightly rolling areas. The good drainage is due in part to the presence of the porous substratum. The friable heavy-textured subsoil, however, is retentive of moisture and the crops do not suffer during ordinary droughts. The Sassafras sandy loam can be tilled under a wide range of moisture conditions, and in many areas cultivation can be carried on a few hours after heavy rains.

Practically all of the Sassafras sandy loam is under cultivation. A very small proportion of it is forested, the growth consisting of mixed pine and hardwoods. Myrtle, sassafras, and some small maples and holly form the brushy vegetation.

The most important crops on this type are potatoes, sweet potatoes, corn, cucumbers, cantaloupes, and annual legumes grown for soil improvement. Watermelons, strawberries, and tomatoes also are grown successfully. The Sassafras sandy loam is adapted to a wider range of crops than any other soil type in the county.

Potatoes yield 100 to 350 bushels per acre, averaging probably 150 bushels. Sweet potatoes average about 225 bushels per acre; corn, 35 to 40 bushels; tomatoes, 5 to 8 tons; and hay, 1 to 1½ tons.

The Sassafras sandy loam is easily tilled and does not bake or clod when dry. It responds readily to applications of manure and fertilizers. It could probably be further improved by liming and by practicing definite crop rotations including a leguminous crop.

The selling price of the type varies considerably, averaging about \$150 an acre. The farms usually include some other type, and the price depends to some extent on what this type is, as well as upon location and character of improvements.

Sassafras sandy loam, deep phase.—The surface soil of the Sassafras sandy loam, deep phase, consists of a light-brown to brownish-gray sand or loamy sand passing at a depth of 6 to 8 inches into yellow or reddish-yellow loamy sand, and at 18 to 24 inches into a reddish-yellow or yellowish-red loam, sandy clay, or sandy clay loam. At 30 to 32 inches it passes into a light reddish yellow loamy sand or coarse loamy sand to sandy loam, but in places the substratum is a coarse, plastic sandy clay. Gravel appears in the soil and subsoil of many areas.

The soil differs from the typical Sassafras sandy loam not only in its greater depth to a heavy subsoil, but in having commonly a considerably lighter color at the surface, apparently due to much lower organic content. It dries out to a light-gray color.

The topography in general is slightly undulating, but some flat areas exist. The drainage varies in different areas from good to excessive. As a rule the type is retentive of moisture.

This phase is developed in irregular-shaped areas throughout the county. A few small areas of typical Sassafras sandy loam are included with the deep phase. These are too small to be shown satisfactorily, especially as the two soils merge and the boundaries are indistinct.

This phase is not as productive as the typical soil, but is considered one of the better soils of the county. It is used in the production of the same crops as the typical Sassafras sandy loam, but requires heavier application of fertilizers and even then the yields are lower. On the other hand, it is an early soil and very easily tilled.

In order to bring this phase up to a high degree of productiveness the addition of organic matter in the form of stable manure and green-manure crops is necessary. Liming to correct acidity is another means that should be employed more generally in attempts to improve soil of this type. The adoption of definite systems of crop rotation is suggested as tending to a consistent practice of soil-improvement methods.

Land of the phase sells for \$75 to \$150 an acre, depending chiefly on location with respect to good roads and shipping points and upon the character of farm improvements.

SASSAFRAS FINE SANDY LOAM.

The surface soil of the Sassafras fine sandy loam is a grayish-brown fine sandy loam with an average depth of 10 inches. This is underlain by a reddish-brown heavy fine sandy loam to a depth of 30 to 36 inches, where it grades into a stratum of rather coarse, plastic sandy loam or loamy sand.

The topography of this type is gently undulating. In some places it occupies ridges and is somewhat higher than the surrounding soils, but ordinarily the change from type to type is not marked by any difference in the relief.

Drainage on the Sassafras fine sandy loam is good. The open texture of the subsoil and the underlying sandy stratum insures good internal drainage and aeration. This type, however, is not as well drained as the other Sassafras soils in the county.

The Sassafras fine sandy loam is one of the less extensive soils of Wicomico County, covering only 6,016 acres, or 2.5 per cent of the total area. The most important areas lie in the central and south-eastern parts of the county, and there are a few scattered areas in other sections.

The greater part of this type is under cultivation, and the rest is in forest consisting of a mixed growth of pine, oak, beech, gum, some cedar and holly, and an undergrowth of myrtle and smilax.

The principal crops are potatoes, sweet potatoes, corn, cucumbers, cantaloupes, and watermelons. The yields obtained are practically the same as on the Sassafras sandy loam. Strawberries, one of the principal crops in the county, are not grown as extensively on the Sassafras soils as on the Elkton soils.

The Sassafras fine sandy loam is fairly easy to cultivate, especially in the best drained areas, although in dry weather it has a tendency to bake and harden and considerable care must be taken in handling it. The cultural methods and fertilizer practice are practically the same as on the Sassafras sandy loam.

The addition of organic matter, liming to correct acidity, and the practice of systematic crop rotations, in which a leguminous crop should be included, are some of the things necessary to be done to build up and maintain this soil in the best condition.

NORFOLK SAND.

The Norfolk sand has a surface soil of gray to grayish-yellow sand with a depth of 6 to 8 inches. This is underlain by a pale-yellow to brownish-yellow sand extending to a depth of 3 feet or more. In some places where it occurs in depressions the surface soil is considerably grayer and the subsoil occasionally contains some gray mottlings.

The Norfolk sand is developed in all parts of the county, but is most typical in the eastern part. Some small areas have been mapped with the Sassafras sand in the south-central part of the county. The topography is slightly undulating to rolling, and as a rule the type lies at a higher elevation than the surrounding soils. It commonly occupies long, narrow ridges. The drainage is excessive being influenced by both relatively high positions and the porous nature of the soil and subsoil.

Over half of this type is under cultivation, the remainder being in forest of pine, oak, sassafras, dogwood, and some holly and cedar. The trees are not as large as on the heavier soils in the county.

The Norfolk sand is a fairly good soil for cucumbers, cantaloupes, sweet potatoes, and watermelons, but it is not used very extensively for any of the general crops except corn. Sweet potatoes and cantaloupes are the principal crops and good yields are obtained with fertilization. Cowpeas and soybeans are grown to some extent as a cover crop.

This type is a well-aerated, loose, warm, and early soil, and these qualities, with the addition of organic matter, make it a good truck soil. On account of its loose and porous structure it is less retentive of moisture and fertilizers than the heavier soils and it is necessary to apply larger amounts of fertilizer to obtain the best results. Organic manures also are very essential.

Land values of the Norfolk sand are not very high, except where its proximity to a town increases its value for building sites over its agricultural value.

In order to bring the Norfolk sand up to a high state of production it is necessary to add organic matter by applying stable manure or by turning under green-manure crops. Crimson clover and rye make fairly good growth on this soil, and these crops afford means of keeping up the supply of organic matter by their use as winter cover crops.

NORFOLK LOAMY SAND.

The Norfolk loamy sand has a surface soil of gray to grayish-yellow loamy sand, 6 to 8 inches deep. The subsoil is a pale-yellow to yellowish-brown loamy sand extending to a depth of 3 feet or more. There is considerable variation in the texture of the subsoil material from place to place. In some places it is sand showing little if any loaminess and in others it approximates a sandy loam. The surface soil, however, is fairly uniform.

The Norfolk loamy sand is developed in all sections of the county. It occupies gently undulating country, and may be developed on low ridges less pronounced than those on which the Norfolk sand appears. The drainage is usually very good.

About three-fourths of the Norfolk loamy sand is under cultivation; the rest bears a mixed forest of loblolly pine and hardwoods.

In agricultural value the Norfolk loamy sand differs little from Norfolk sand. It is used principally for truck crops, for which it is very well adapted. The principal crops are sweet potatoes, cucumbers, cantaloupes, and watermelons. This soil does not retain added fertilizers and manures well. Cowpeas and soybeans are grown as green-manure crops and pine straw and stable manure are applied in an effort to maintain the supply of organic matter in the soil. The methods for improving this type are the same as recommended for the Norfolk sand.

Land values on this type are moderate. The farms are seldom composed of this type alone, and prices vary with the nature of the associated soils.

KEYPORT SANDY LOAM.

The surface soil of the Keyport sandy loam is a gray to grayish-brown sandy loam with a depth of 7 to 10 inches. Below this layer and extending to 18 inches there is encountered a layer of pale-yellow or grayish-yellow sandy loam, and below this to about 30 to 36 inches is a gray, yellow, and reddish-brown, mottled sandy loam. The substratum consists of a grayish-yellow loamy sand. The Keyport sandy loam differs from the Sassafras sandy loam in that it is not so well drained and has a mottled subsoil, and from the Elkton sandy loam in that it is better drained and has a mottled yellow subsoil instead of a mottled gray subsoil.

The Keyport sandy loam appears in all parts of the county; it is most extensively developed north of Salisbury. Normally it occurs in small, irregular-shaped areas between areas of Sassafras and Elkton soils or in depressed locations between areas of Sassafras soils. It also occupies low, narrow ridges within areas of the Elkton soils. The topography is flat to gently rolling.

The drainage of the Keyport sandy loam is fair. This type is considerably better drained than the Elkton soils but not as well drained as the Sassafras soils. Good results are obtained without artificial drainage, but the productiveness of the type can be considerably increased by ditching and tiling. The Keyport sandy loam ordinarily is so situated that it can be very easily drained.

More than half of the Keyport sandy loam is under cultivation. Most of the rest is in forest consisting of pine, oak, gums, maple, and beech, with a fairly heavy undergrowth of huckleberry, myrtle, smilax, and other shrubs.

The crops grown on this type are the same as on the Sassafras sandy loam, the crop adaptations of the two soils being very much alike. The yields on the Keyport sandy loam are sometimes as high as on the Sassafras, but because of the poorer drainage of the Keyport the yields fall off in wet seasons. The cultural methods and fertilization are the same as on the Sassafras sandy loam.

Land values on this type range from \$60 to \$100 an acre, the price depending on location and on the condition of land and buildings. The land is usually sold in conjunction with some other type and this has an influence on the price.

The first requisite in improving the Keyport sandy loam is adequate drainage, and on land of such high agricultural value tile drains should be preferred to open ditches. The suggestions given in connection with the Sassafras sandy loam apply with equal force to this type.

KEYPORT FINE SANDY LOAM.

The surface soil of the Keyport fine sandy loam is a light-brown to grayish-brown fine sandy loam with an average depth of 8 inches. This is underlain by a light brownish yellow or pale-yellow fine sandy loam, which at 12 to 18 inches passes into a yellow fine sandy clay mottled with gray and reddish brown. From 30 to 36 inches there appears a stratum of grayish-yellow loamy fine sand. The surface soil of this type is quite friable and easy to cultivate. The immediate surface has a grayish color when dry. In the subsoil the gray color increases with depth and at 36 inches is normally the predominating color.

This type is developed in the same relative position, with respect to the Elkton and Sassafras soils, as the Keyport sandy loam. The areas are comparatively small and are widely scattered over the county.

The Keyport fine sandy loam has a flat to slightly undulating topography. Drainage is fairly well established, being intermediate in this respect between the Elkton and the Sassafras soils. Crops seldom suffer from too much moisture.

The Keyport fine sandy loam is nearly all under cultivation. The small part that remains in forest supports a growth of pine, oak, gum, holly, and an undergrowth of myrtle, huckleberry, and other shrubs.

Potatoes, sweet potatoes, corn, and strawberries are the main crops. Good yields of these crops are obtained. Cucumbers, cantaloupes, tomatoes, and some other truck crops are grown in a small way. In favorable seasons the yields of all crops closely approach those on the better Sassafras soils.

Land of the Keyport fine sandy loam ranges in price from \$40 to \$125 an acre.

The best yields are obtained on this type where drainage is well established. In other sections of this peninsula tile drainage has been installed with good results, and the value of the type in Wicomico County would warrant similar improvement here.

Plowing under green cover crops and the addition of barnyard manure will improve the soil physically as well as increase the supply of organic matter, which is deficient. Leguminous crops adapted to this section of the State should be grown in carefully planned rotations. The addition of lime will correct the acidity that exists in most of the type.

Keyport fine sandy loam, heavy-subsoil phase.— The surface soil of the Keyport fine sandy loam, heavy-subsoil phase, is a grayish-brown sandy loam 8 or 10 inches deep. This is underlain by a light-gray heavy sandy loam, extending to 15 to 18 inches, where it passes into heavy, stiff, plastic clay loam, mottled brown, yellow, and gray. As the depth increases the gray becomes the predominating color. At about 30 inches the subsoil contains considerably more sand, but it still has a decidedly sticky feel. In some places the surface soil is a sandy loam, but these areas were comparatively small in extent and were included with this phase.

The heavy-subsoil phase of the Keyport fine sandy loam is found most extensively south and southeast of Delmar. In topography and in relative position with regard to associated soils, it is similar to the typical soil. The drainage, because of its compact subsoil, is not quite so good.

The farm methods, yields, land values, and steps for improvement are practically the same as on the Keyport fine sandy loam.

ELKTON SANDY LOAM.

The Elkton sandy loam consists of a gray to light-gray sandy loam with a depth of 8 to 10 inches. The subsoil is a gray to grayish-white heavy sandy loam to sandy clay mottled with bluish gray and yellow. In many areas the texture of the material becomes sandier and the color light gray below a depth of 30 inches. In forested areas, and where the soil is associated with the Portsmouth soils, the upper few inches are a little darker in color, owing to larger content of organic

matter. This type hardens when dry, and even where the soil has a relatively large content of sand it clods noticeably when plowed.

Variations from the typical occur in various parts of the county. In the eastern part, for instance, some areas of Elkton sand have been mapped with the sandy loam. This sand has a surface soil of gray to dark-gray sand about 10 inches deep, and a subsoil of gray to whitish or mottled gray and yellow sand, extending to a depth of about 3 feet. The area of this soil is small. It has all the general characteristics of the types of the Elkton series.

Areas of the Elkton sandy loam occur in all sections of the county. Commonly they are small, but some of considerable extent lie north and south of Mardela Springs and north of Parsonsburg.

The topography of the Elkton sandy loam is flat. It frequently occupies saucerlike depressions in the uplands entirely surrounded by better drained soils. The drainage of the type is poor, the water table standing close to the surface.

A considerable part of the type is under cultivation; the rest supports a rather dense growth of white oak, black oak, willow oak, water oak, black gum, sweetgum, pine, beech, maple, dogwood, and a thick undergrowth of myrtle, huckleberry, and other shrubs.

Corn, potatoes, sweet potatoes, tomatoes, and strawberries are the principal crops. As a rule the truck crops, with the exception of strawberries, do not do as well on this soil as on the better drained soils in the county. The farmers generally recognize this type as being better suited to corn and strawberries than to other crops.

The Elkton sandy loam does not warm up very early in the spring, it is not as easily handled as some of the better drained soils, and more care must be exercised in cultivating it. In general the farm practices on this type are similar to those on better drained soils. Because of inadequate drainage this is not a dependable soil type. During periods of excessive rainfall crops are likely to drown out; they also are likely to suffer seriously during droughts. When the drainage is good the yields obtained are in general moderately good.

Land values on this type range from \$25 to \$70 an acre. The value varies with the drainage conditions, location, and improvements.

The first step in improving this type is to establish adequate drainage. Organic matter should be incorporated in the soil. An effective way to do this is to plow under pine straw, coarse stable manure, or green-manure crops. Rather heavy applications of lime are necessary to correct acidity. With improvement in drainage and with modern methods of management this type can be made a reliable and productive soil.

ELKTON FINE SANDY LOAM.

The Elkton fine sandy loam consists of a gray to dark-gray fine sandy loam, 8 to 12 inches deep. Below this soil layer the material is a heavy fine sandy loam to sandy clay of basic gray color mottled with yellowish and reddish brown. In most areas this second layer extends to a depth of 30 inches, where the material becomes sandier and in some places sand, the color being prevailingly gray.

Areas of this type occur in different parts of the county. The principal areas lie northwest of Allen and in the southeastern part of the county.

In topography the Elkton fine sandy loam is flat, with the surface in most places somewhat depressed, and lower than the Keyport or the

Sassafras soils. The drainage is not adequate, the drainage channels being poorly developed.

Some of the type is under cultivation, but the larger part is uncleared. The forest consists of pine, white oak, sweetgum and black gum, and dense undergrowth of huckleberry, myrtle, holly, smilax, and other shrubs and vines.

Corn, strawberries, potatoes, and sweet potatoes are grown on this soil, and fairly good yields, especially of corn and strawberries, are obtained. The type of farming followed on this soil, the kinds of fertilizers used, and cultural methods employed are similar to those on the better drained soils.

Land of the Elkton fine sandy loam type ranges in price from \$15 to \$75 an acre, depending on location, improvements, and condition of the soil.

As with the other Elkton types, the first step toward permanent improvement is the establishing of an adequate drainage system. Pine straw and other coarse litter, stable manure, and green-manure crops should be plowed under. This not only adds fertility but improves the physical condition of the soil, making it more porous and allowing better aeration. Crop rotations including a legume are recommended. Rather heavy applications of lime are necessary to correct acidity.

ELKTON LOAM.

The surface soil of the Elkton loam is a fairly heavy dark-gray to gray loam containing a sufficient quantity of coarse sand to give it a decidedly gritty feel. The subsoil is a gray plastic clay loam to clay showing yellowish-brown or reddish-brown mottlings. At an average depth of 30 inches a stratum containing considerable sand is encountered. The material of this stratum is a sticky sand to sandy clay of gray to grayish-white basic color and marked in places with yellowish or brownish mottlings. The Elkton loam is low in organic matter, crusting when dry and clodding when tilled in a wet condition. The surface becomes almost white when thoroughly dry. The lower subsoil is always moist, and in places is in a saturated condition much of the time.

Small areas of the Elkton loam are scattered throughout the county. In many places the boundaries are hard to determine. The type is generally confined to the low, more or less poorly drained flats or depressions. In areas where the upper subsoil is not impervious and the sandy stratum appears within the lower subsoil the natural drainage is fairly good, but in areas where the upper subsoil is stiff the establishing of an adequate system of drains is necessary to successful utilization of the type for cultivated crops.

Probably one-half of this type is in cultivation, the rest being forested with white and black oak, pine, beech, sweetgum and black gum, and a dense undergrowth of myrtle, huckleberry, smilax, and other vines and shrubs.

The Elkton loam, because of its poor drainage, is not a dependable soil. Crops have a tendency to drown out in periods of excessive rainfall, and are adversely affected by long droughts. During favorable years the crop yields are lower than on the Keyport soils. Where good drainage is established the yields of crops on this type almost equal those on the better drained soils. Potatoes, strawberries, and

corn are the principal crops. Ordinarily these give moderate yields. Winter cover crops are likely to heave, owing to the effect of alternate freezing and thawing on this wet soil.

Land values on the Elkton loam vary, the price depending on location and improvements. The type is seldom sold by itself; it is commonly included in farms with other types of soil, which have an effect on prices.

The first step to be taken in the improvement of this type is to establish adequate drainage. Organic matter should be incorporated in the soil by plowing under pine straw or coarse stable manure, not only for its fertilizing effect but also for its effect on the physical condition of the soil. The soil in most areas is acid, and rather heavy applications of lime will be necessary to correct this condition.

ELKTON SILT LOAM.

The surface soil of the Elkton silt loam consists of a gray to dark-gray silt loam with a depth of 6 to 10 inches. The subsoil is a light-gray, drab, or bluish-gray plastic silty clay loam to clay, showing in places some yellow or yellowish-brown mottling, especially in the lower part. From 28 to 36 inches the texture of the subsoil becomes more variable, ranging from a sandy clay to a light sandy loam or even loamy sand. The water table in this type is high, and in many places the lower 2 or 3 inches of the subsoil is saturated. The soil is low in organic matter and unplowed surfaces are hard when dry and have a nearly white, chalklike appearance.

The Elkton silt loam is fairly uniform in its characteristics over most of the county. There are, however, a few included areas of Portsmouth silt loam, the total area of which did not warrant separation. The Portsmouth soil is darker than the Elkton and more poorly drained.

The Elkton silt loam occurs almost entirely in the western part of the county. Extensive areas lie east and west of Royal Oak, north of Whitehaven, and northeast of Nanticoke. Smaller areas are scattered over the county.

The Elkton silt loam occupies low, flat areas. The drainage is poor, and this is responsible for the poor physical condition and low producing power of the type. In some places water stands on the surface for several days after rains. Aeration thus is impeded. In many places the soil puddles when wet and bakes when dry, and it has a tendency to clod when cultivated.

A large part of this type is still in forest consisting of white, black, red, and willow oak, sweetgum and black gum, loblolly pine, maple, beech, and hickory. It is locally known as "white oak land."

Agriculturally this type of soil is not very important, but in favorable years fairly good crops are obtained on the small areas cultivated. It is not a dependable soil, being affected both by wet weather and droughts. Low yields are common and in some instances complete failures occur. Corn, strawberries, potatoes, tomatoes, and hay are the principal crops. Corn and strawberries give fair yields in most seasons. This type makes rather good pasture land and a large acreage is used for this purpose.

The Elkton silt loam is cold and crops are planted late in the spring. Farm practices, including the cropping system and use of fertilizers, are the same as on the other Elkton soils, but as the silt

loam is heavier, tillage operations are somewhat more difficult. Freezing and thawing cause this type to heave and this occasionally ruins winter crops. Where the soil has been drained it is much more dependable and its producing power is greatly increased.

Land values range from \$10 to \$50 an acre, depending on location, general improvements, and condition of the soil.

The most important step in the improvement of the Elkton silt loam is drainage, which can be provided in a number of cases without a great deal of expense. After drainage, probably the building up of the supply of organic matter is of most importance. The soil is also very much in need of lime, being decidedly acid in most areas. Improvement in the yields may also be expected from well-planned crop rotations in which the legumes are included.

ST. JOHNS SANDY LOAM.

The surface soil of the St. Johns sandy loam is a dark-gray to black sandy loam, ranging from 6 to 18 inches deep. This is underlain by a compact layer, a few inches thick, of fine sand or sand having a brown color and granular structure resembling coffee grounds. Below this layer is a grayish-yellow to yellowish-gray, or, rarely, gray sand. The surface soil when dry has a decidedly grayish color. In most places the compact brown layer lying below the surface soil can be penetrated with a soil auger, but in some places it has the character of semihard rock. The land is locally known as "iron mine." While the brown layer is very prominent in this area, it has not reached the high state of consolidation and compactness that is typical of the St. Johns sandy loam as mapped in Sussex County, Del.

The St. Johns sandy loam occurs mainly in the eastern part of the county, where it occupies low, wet lands with a flat surface. As mapped it includes small areas of other types of the series and of the Portsmouth sandy loam, with which the St. Johns soils are closely associated.

Between 65 and 75 per cent of this land is under cultivation. The areas not cleared support a forest growth of pine, oak, gum, holly, and some maple, with an undergrowth of myrtle, buckberry, smilax, and other shrubs and vines that thrive on a moist soil. Practically the same crops are grown and the same cultural methods are used on this type as on the Portsmouth soils. There is little difference in the yields on these soils. The price of land is moderate.

The main problems in the improvement of this type are to break up the hardpan and provide adequate drainage. Rather heavy applications of lime are needed to correct the acidity.

PORTSMOUTH FINE SANDY LOAM.

The Portsmouth fine sandy loam is a very dark gray to black fine sandy loam, containing considerable organic matter, 8 to 12 inches deep. Below this layer and extending to 24 or 30 inches the material of the subsoil is a light-gray fine sandy loam more or less mottled with yellow or rusty brown. The lower subsoil and substratum change gradually into a light-gray or almost white, compact, and sometimes sticky sand. In some places this is saturated with water. Locally the upper subsoil contains thin layers or pockets of heavier material.

The Portsmouth fine sandy loam is developed most extensively in the eastern part of the county, generally in close association with the Elkton, St. Johns, or other Portsmouth soils. It occupies flat swales and saucerlike depressions. The most extensive area of the Portsmouth fine sandy loam is in the vicinity of Pittsville and Willards. Some small areas of Portsmouth loam and St. Johns sandy loam have been included with the Portsmouth fine sandy loam in a few places where accurate separation was impracticable.

Probably 50 per cent of this type is in mixed forest similar to that on the other poorly drained soils. The areas that have been drained and cultivated are used for the production of corn and strawberries. Fairly good yields are obtained on these improved areas, but the type is not a reliable soil in its natural state. Land values are somewhat lower than in the case of Elkton soils.

In order to make the Portsmouth fine sandy loam a regularly productive soil, adequate drainage is absolutely necessary. By using open ditches for the mains and tiling for the laterals a large part of this type can be reclaimed and built up to a rather high state of productivity. Rather large quantities of lime must be used to correct the acid condition found in virgin areas.

PORTSMOUTH LOAM.

The surface soil of the Portsmouth loam is a black to grayish-black loam to mucky loam, 8 to 15 inches deep. This layer is underlain by a black or gray loam to clay or sandy clay, mottled with yellow or rusty brown, and this in turn at about 20 to 30 inches by a gray or whitish sand. The surface soil as a rule contains considerable organic matter, the proportion being sufficient to give the soil of some areas a mucky or chaffy consistency. The surface soil when dry is a dark-gray or grayish brown, appearing gray or almost whitish on the surface. When the surface soil is wet, however, it has a black or a dark-gray appearance. The sandy material forming the subsoil below 24 inches and the substratum is normally grayish white in color; in texture it varies from sticky sand to a compact sand containing little if any clay and saturated with water.

The Portsmouth loam is found principally in the eastern and southeastern parts of the county, the largest area lying southwest of Powellville. The surface of the areas is flat or depressed. The natural drainage is poor, and in order to bring the land to a state where it will be of some agricultural value, as has been done in other places, it will be necessary to install some sort of drainage system. Probably a combination of open ditches and tile drains will be found most efficient, though the original cost will be greater than where ditches alone are employed.

The Portsmouth loam at present is not of much importance in the agriculture of the county. The greater part is in forest consisting of a rather heavy stand of loblolly pine and hardwoods mixed. In most of this forest there is a dense undergrowth of myrtle, bay, huckleberry, smilax, and other vines and shrubs.

Where this type has been drained and cleared it has proved to be a fairly strong soil. It warms up rather late in spring and requires careful handling, but yields good crops of corn and strawberries and fairly good crops of potatoes. The soil in its natural state is decidedly acid, and liming is necessary to complete its reclamation.

MEADOW.

Along practically all fresh-water streams in Wicomico County there are strips of poorly drained alluvial material. These strips extend from the head of the stream to its mouth, or to the point where Tidal marsh is developed. The strips are mapped as Meadow and Swamp, the better drained areas being called Meadow.

Areas mapped as Meadow represent materials of widely varying color, texture, and structure; in other words, Meadow comprises poorly drained alluvium in which no effort at type distinction was considered feasible, owing to variability, the texture of the surface soil ranging in short distances from sandy to silty clay loam, and of the subsoil from sand to sandy clay.

In its native state Meadow supports a dense forest growth of water-loving species. When cleared and drained the type makes good pasture land, and the few areas cultivated return good crops. Corn and potatoes give the best results. A considerable part of the land mapped as Meadow could be reclaimed at moderate cost.

SWAMP.

Swamp consists of low-lying alluvial areas along the fresh-water streams of the county, subject to standing water and swampy conditions throughout the year. The largest areas of Swamp are along the Pocomoke River and its tributaries.

The soil material in areas mapped Swamp shows the same variability as in Meadow, the separation of the two types being made on the drainage conditions. Swamp in its present state is nonagricultural land.

A considerable proportion of the Swamp area could be drained by deepening and cleaning out the stream channels, and clearing, ditching, and tiling the land; but under present conditions the expense of reclamation would be too high to be economically feasible.

TIDAL MARSH.

The areas of marshy land lying near sea level and subjected to tidal inundation by salt or brackish water are classed as Tidal marsh. The composition of the soil material in such areas varies considerably. The surface soil consists of a dark-brown to a bluish-gray, slimy or plastic silty clay loam or loam. The upper part of the surface soil contains roots of the coarse grasses and considerable decomposed organic matter. The subsoil is normally dark gray or bluish gray, slightly heavier in texture than the surface soil, and contains less organic matter. Soil and subsoil are saturated the year round.

Tidal marsh occurs along the Wicomico and Nanticoke Rivers. The areas have a uniformly flat surface, which ordinarily lies 2 to 4 feet above low-tide level. A few areas are slightly higher than the typical mark and form a gradation zone, at least in drainage, between the Elkton soils and the more typical Tidal marsh. The Tidal marsh areas are covered with a dense growth of salt grasses and other marsh-loving plants.

Agriculturally Tidal marsh has very little value. The only method of reclamation is by diking. In some places the land is of such character that cattle can be pastured on it part of the time, and other areas produce marsh grasses that are cut for hay.

SUMMARY.

Wicomico County is situated in the southeastern part of the Eastern Shore of Maryland, in the middle of the Delaware-Maryland-Virginia Peninsula. It has an area of 378 square miles, or 241,920 acres.

The county lies in the Coastal Plains province. The topography is flat to gently rolling. The drainage of the county, which is fairly well established, is carried by the Nanticoke, Wicomico, and Pocomoke Rivers and their tributaries.

The county has 28,165 inhabitants, of which 20,612 are classed as rural. The population is fairly evenly distributed, with a density for the rural population of 55.6 persons per square mile.

The transportation facilities are good. Hard roads are built through the county and most of the earth roads are kept in good condition. Schools and churches are located at convenient points throughout the county.

The climate is moderate, with a mean annual temperature of 56° F. The rainfall averages 42.28 inches and is evenly distributed through the year. The average growing season at Salisbury is 182 days.

Both trucking and general farming are carried on in the county. The principal general farm crops are corn, wheat, rye, and hay; the truck crops include potatoes, sweet potatoes, strawberries, cantaloupes, watermelons, cucumbers, and other vegetables. Some orchard fruits are marketed. The livestock interests are of secondary importance.

Where trucking is carried on rather intensive systems of cultivation are employed. Crop rotations and the use of commercial fertilizers are general.

Land values vary considerably. The low, imperfectly drained lands can be obtained very cheaply, while the higher, well-cultivated land near good shipping points and with modern improvements brings a high price.

Lumbering and fishing are important industries in the county.

The farmers are fairly well organized into buying and selling associations.

The soils of the county are classed in the Sassafras, Norfolk, Keyport, Elkton, Portsmouth, and St. Johns series. The better drained Sassafras types are the equal of any trucking soils in the country. Practically all the soils of the area are easily handled, respond readily to proper treatment, and hold improvement well.

The Sassafras sand, loamy sand, sandy loam with its deep phase, Norfolk sand, and Norfolk loamy sand are suited to the production of early truck crops, including cantaloupes and watermelons. The Sassafras sandy loam is the best general purpose soil in the county. The Keyport soils rank next to the Sassafras in agricultural value. The Elkton, Portsmouth, and St. Johns soils, where drained and limed, give good returns. Meadow, Swamp, and Tidal marsh are poorly drained areas along the streams and tidal estuaries. In their natural state they have no agricultural use except in favorable areas for pasture. With drainage, which would not be difficult in the case of Meadow and Swamp, but which would require diking and pumping in the case of Tidal marsh, they can be reclaimed and used for crop production.

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