U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS—MILTON WHITNEY, Chief.

SOIL SURVEY OF ACCOMAC AND NORTHAMPTON COUNTIES, VIRGINIA.

BY

E. H. STEVENS.

W. EDWARD HEARN, INSPECTOR, SOUTHERN DIVISION.

[Advance Sheets—Field Operations of the Bureau of Soils, 1917.]

WASHINGTON:
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1920.

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., July 1, 1919.

SIR: I have the honor to transmit herewith the manuscript report and map covering the survey of Accomac and Northampton Counties, Virginia, and to recommend that they be published as advance sheets of Field Operations of the Bureau of Soils, 1917, as authorized by law.

Respectfully,

MILTON WHITNEY,
Chief of Bureau.

Hon. D. F. HOUSTON,
Secretary of Agriculture.

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SOIL SURVEY OF ACCOMAC AND NORTHAMPTON COUNTIES, VIRGINIA.

By E. H STEVENS.—Area Inspected by W. EDWARD HEARN.

DESCRIPTION OF THE AREA.

The Eastern Shore area, comprising Accomac and Northampton Counties, is situated in the extreme eastern part of Virginia, and forms the southern extension of the Maryland-Delaware-Virginia peninsula. The area borders the Atlantic seaboard on the east, and is geographically separated from the remainder of Virginia by Chesapeake Bay on the west. It is bounded on the north by Worcester County, Md., and on the northwest for a short distance by Somerset County, Md., from which it is separated by the Pocomoke River. The southern extremity terminates at Cape Charles, the upper of the so-called "Virginia capes," which guard the entrance to Chesapeake Bay. Norfolk, the nearest large city, is 36 miles by boat southwest of the village of Cape Charles, in lower Northampton County, while the cities of Baltimore, Philadelphia, and New York, some 250, 210, and 300 miles distant by rail, respectively, may be reached in less than a half day's journey northward from Cape Charles.

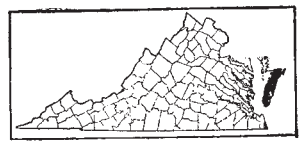


FIG. 1.—Sketch map showing location of the Accomac and Northampton Counties area, Virginia.

The area, which has a northeast-southwest trend, is about 75 miles in length. It is relatively narrow, however. The mean width of the mainland in Accomac, the upper of the two counties, is only about 8 miles, while in Northampton County the gradually tapering peninsula has an average width of scarcely 6 miles. Including the coastal islands on the Atlantic side, the broad marshes and shallow bays lying between these and the mainland, and the outlying bodies of salt marsh adjacent to Chesapeake Bay, a mean width of about 15 miles is attained. The two counties have a land area of 682 square miles, or 436,480 acres, of which Accomac County contains 470 square miles, or 300,800 acres, and Northampton 212 square miles, or 135,680 acres.

The Eastern Shore area embraces three main physiographic divisions: 1, The mainland: 2, the coastal islands; 3, the marshes.

The mainland constitutes that division with which this report primarily has to deal, for though the coastal islands and the marshes

add greatly to the area of the two counties, their agricultural importance is but slight. The mainland contains practically all of the cultivable, productive soils of the region, and there are many other conditions essential to successful farming.

The coastal islands, low and sandy, occur as a chain along the Atlantic Ocean, roughly paralleling the area throughout its length, and varying from 1½ to 8 miles in distance from the mainland. These islands, bars which vary in width from a few hundred feet to about one-half mile, form an almost continuous line, broken only by narrow inlets leading to the bays, channels, and marshes lying between them and the mainland.

The salt marshes, embodying the third prominent physiographic feature, are present in extensive tracts on both sides of the peninsula. These are most widely developed along the eastern or Atlantic side, where they occupy a considerable portion of the intervening territory between the beaches and the mainland. Large areas also are found along the western or Chesapeake Bay, side in the northern two-thirds of Accomac County.

The topography of the Accomac and Northampton mainland is prevailingly level. The surface features vary from the flat foreland country bordering Chesapeake Bay and its estuaries to the level to undulating upland plain occupying the central and most of the eastern parts of the peninsula. The foreland country is also developed on the Atlantic side of the area, although as a rule it is difficult to trace and is rather different in character from that which lies along Chesapeake Bay. Along the west side of Great Machipongo River, opposite Bradford and Bell Necks, is a strip of territory about 1 mile in width and 10 miles long, which is similar to the Chesapeake forelands.

The lower division constitutes the youngest formation of the area except the coastal islands and marshes, which are yet undergoing changes, due to the influences of waves, tides, and winds. In Accomac County the forelands rise gradually from Chesapeake Bay and the bordering marshes, which merge into the mainland, with a gradient in many places of only a few feet to the mile. This is also true of Northampton County, only in this county the marshes are entirely absent. Here the bay shore is marked by bluffs, from 5 to 30 feet in height, which are capped in many places by Coastal beach material reworked into sand dunes, often rising 30 or more feet above the original level of the bluffs themselves. These sand dunes are most prominent west of Cheapside and in Savage Neck (Northampton County). The forelands, though flat and well defined, are higher in elevation than in Accomac County. The waves are cutting back the Chesapeake shore line in Northampton County, and the presence of bluffs, as well as the absence of marshes, is due to this agency.

The forelands are much less extensively developed on the east side of the peninsula. From its lower end northward to a point east of Machipongo their mean width is but a few hundred yards. There they broaden out and occur in a modified form, chiefly as necks of well-drained land, partly or wholly surrounded by Tidal marsh. Above Wachapreague, in Accomac County, the forelands are poorly defined, rising from 3 to 10 feet or more in a rather abrupt escarpment along the borders of the marshes and bays, and the slope from the interior is somewhat more rapid than that toward Chesapeake Bay. North of Pastoria relatively high elevations prevail on the sea side.

As a rule there is a rather abrupt topographic break between the lower terraces and the upland plain. Low escarpments are found throughout Northampton County on both sides of the peninsula. The escarpment toward Chesapeake Bay is continuous and easily traceable from Exmore to Cheapside, in most places closely paralleling the Bay Side Road. Similarly, in Accomac County a pronounced scarp is found just west of the Bay Side Road between Savageville and Craddockville. The seaward-terrace bluff is not continuous, but is well defined in lower Northampton County, and also from Machipongo northward to Keller. Smaller remnants of escarpments occur in several places elsewhere in the area.

Roughly, two main highways, the Bay Side and Sea Side Roads, mark the boundaries between the forelands and the uplands. Above Parksley the railroad approximately coincides with the merging of the two divisions. The forelands are extremely flat in this part of the area, and comprise practically all of the territory between the railroad and Chesapeake Bay. Above Modest Town the upland extends in most places practically to the Atlantic side of the peninsula.

While the upland plain is to a large extent level, it is marked by more surface inequalities than the forelands. The contour becomes increasingly uneven in the northern part of the area. Over much of the uplands the dominantly level topography is broken only by low ridges, usually not more than 200 yards in width, which often partly and sometimes wholly inclose basinlike depressions. The ridges are found most frequently in the interior districts, some of them serving to divide the watershed of the peninsula. A few scattered mounds and ridges, composed of wind-transported sand, rise above the general level of the uplands. One of the most prominent of these is situated near Drummond Ponds, in Accomac County.

The northeastern part of Accomac County, above Assawoman, has a decidedly more rolling land surface than the remainder of the area. The relatively abrupt rise in elevation from the shore of the seaward side has facilitated the carving of deeper drainage channels, which

are fed by numerous small tributaries. Some of the stream slopes in this locality are rather sharp, although no large areas are too steep for cultivation. Erosional modifications are not alone responsible for the "billowy" topography, however. Apparently the land surface in many places has natural inequalities, due to the different conditions under which the sediments were originally deposited. Numerous areas of sand have been built up by the wind, and add to the uneven topography.

The salt marshes on both sides of the peninsula have a flat surface, with variations of only a foot or two in elevation. Usually the highest areas of marsh are found nearest the mainland.

The coastal islands are featured by the presence of sand dunes which are often shifted and altered by heavy winds. These are seldom more than 10 or 15 feet in height. The dunes are most conspicuous on the larger islands, such as Parramore, Hog, and Assateague Islands, which also contain considerable areas of level land on the landward sides. Chincoteague Island is the most important of the coastal islands. It does not front directly on the ocean, but lies back of Assateague Island, from which it is separated by a narrow channel. Undoubtedly at one time it was a part of the latter island. Chincoteague Island has several farms, and is thickly settled. Its inhabitants are dependent upon sea products for their livelihood, however, and agriculture is only of secondary importance.

Several islands in Chesapeake Bay are worthy of mention. Most important are Tangier, Watts, and Fox Islands, all in Accomac County. Tangier Island lies about 16 miles west of Onancock. With an area of less than 2 square miles, 90 per cent of which is marsh, this little island has over a thousand inhabitants, who depend upon fish, oysters, and crabs for their livelihood. The high land on the island is taken up mostly by houses, and all the remaining tillable land is devoted to gardens. The streets are about 8 feet wide, and there are no horses, the traffic being handled mainly by wheelbarrows. This little island is undoubtedly one of the most unique and picturesque in America. Watts Island lies between Tangier Island and the mainland, and is much smaller than Tangier. It contains about 40 acres of very good soil, which is not at present cultivated on account of its location. Fox Island, a few miles south of Crisfield, Md., is composed of tidal marsh. The presence on these islands of soil types and marsh similar to those of the peninsula proper indicates that they were once a part of the mainland. Their isolation is due to tidal cross-currents in connection with wave action.

The fresh-water streams of the area are bordered by narrow strips of swampy bottom land as a rule. No terraces of consequence have been developed.

Probably there is no point in Accomac or Northampton Counties with an elevation exceeding 50 feet above sea level, unless perhaps a few sand dunes along Chesapeake Bay in the lower county may attain this height. As a rule, the foreland division lies below the 25-foot elevation line, while the upland plain lies between 25 and 45 feet above sea level. The elevation of the drainage divide, or "backbone" of the area, is remarkably even, the variation throughout the two counties being, in all probability, less than 10 feet. Elevations of several points, taken from Bulletin 274 and the maps of the United States Geological Survey, are as follows: Wagram Mill Pond, 8 feet; Franklin City, 4 feet; cross-roads 2½ miles west of Greenbackville, 25 feet; Hallwood, 16 feet; Bloxom, 22 feet; Parksley, 43 feet; Keller, 42 feet; Exmore, 37 feet; and Eastville, 37 feet. The drainage divide lies slightly to the eastern side of the median line of the peninsula; consequently the longer and more gradual slope is toward Chesapeake Bay.

The primary drainage of the Eastern Shore area consists of tidal estuaries, locally called creeks, which penetrating from each side of the peninsula, suddenly narrow to small branches on reaching the head of tidewater, comparatively short distances into the uplands. Most of these are tributary to Chesapeake Bay. The Pocomoke River, Onancock, Pungoteague, Nandua, and Occohannock Creeks are navigable to large boats, while small sailing craft and motor boats find access to numerous landings on all other important estuaries on either sides of the peninsula. On the whole, the secondary drainage of the area is fairly good. The branches and streamlets are frequent, especially on the Atlantic side, and a majority of the farms are connected with some branch, though ditching has been found necessary in many instances. The main drainage divide of the peninsula is generally nearly flat and the surface drainage over a large part of it inadequate. This territory would be still more poorly drained than it is, but for the excellent underdrainage afforded through the porous material which underlies all the soils of the area—an outstanding feature to be discussed later in this report.

The Chesapeake forelands in Accomac County contain the poorest drained lands of the area. Particularly above Onancock, a very few drainage ways reach up into the interior of the lower terraces, thus leaving these naturally flat lands without sufficient outlets for good surface drainage. Opposite Bloxom, Hallwood, and Makemie Park, a large part of the forelands is semiswampy.

In Northampton County the foreland plain is fully as well drained as the uplands. Here, the relatively high elevation, combined with the deep penetration of the estuaries and their many ramifications, has provided excellent surface drainage nearly everywhere. The

seaward side of the area is excellently drained, with the exception of a narrow belt of land between Birdsnest and Wachapreague.

The channels of main upland streams increase gradually from mere shallow drainage ways near their sources to quite pronounced depressions near the margin of the upland plain. Valleys, however, are inconsequential. The junctions of the streams with confluent estuaries mark the points where base level has been reached, and cutting has ceased. Most of the streams of the area are moderately swift flowing, but comparatively few of them carry a sufficient volume of water for the development of power. In former years a number of small waterpower flour mills were scattered through the uplands, but most of these have been abandoned, and now few are in operation, all in Accomac County. The largest of these are at Drummond Ponds and at Wattsville.

The water supply for farm use is everywhere adequate. Along several estuaries on the Chesapeake side of the peninsula are located a number of small artesian wells.

Accomac County was organized under the provincial Government in the early part of the seventeenth century, and included the present domain of both counties of the area.[1] In 1642 the name of the county was changed to Northampton, and about 1662 the territory was divided, forming the present counties of Accomac and Northampton.

The first permanent settler on the Eastern Shore was Thomas Savage, one of the colonists who accompanied Capt. John Smith to Virginia in 1607. In 1619 he settled in what is now known as Savage Neck in Northampton County. The court records at Eastville, the present county seat of Northampton County, date from 1632 without a break, and are said to be the oldest continuous set of court records in the United States.

The early settlers were nearly all English, from whom the present white population is largely descended. In 1634 the Eastern Shore of Virginia had about 1,000 white inhabitants. The population increased to 2,000 in 1653. The early settlers located near navigable water, which afforded the only convenient means of transportation. The county seat of Northampton County has been at Eastville since 1680, and that of Accomac County, at Accomac, formerly called Drummondtown, since 1786.

The present population is equably distributed throughout the area, exclusive of islands and marshes. There are a few very thickly settled localities, notably in the vicinity of Sanford, but, as a rule, these are districts where agriculture is secondary in importance to the fish, oyster, and crab industry. For example, Chincoteague Island probably has more inhabitants per square mile than any other

[1] Historical data taken from Early History of the Eastern Shore of Virginia.—WISE.

area of like size in the two counties, yet very little farming is done. A like condition exists on Tangier Island.

The population of Accomac County, according to the 1910 census, was 36,650, of which native whites constituted 63.6 per cent, foreign-born whites 0.2 per cent, and negroes 36.2 per cent. The same census reports the population of Northampton County as 16,672, of which native whites made up 43.1 per cent, foreign born 0.9 per cent, and negroes 55.9 per cent. The entire population of the area is classed as rural.

The most important towns, with their populations, are Cape Charles, 2,000 inhabitants; Chincoteague, 1,500; Tangier, 1,400; Onancock, 1,001; Parksley, 700; Onley, 300; Exmore, 300; and Franklin City, 200. The two county seat towns, Accomac and Eastville, are of little importance, except as the seat of county government. There are numerous villages and hamlets of lesser size scattered throughout the area, many of them off the railroads, where they were located in times when public roads and navigable waters offered the only means of transportation. Most of the railroad towns are growing.

The Eastern Shore area is served mainly by the New York, Philadelphia & Norfolk Railroad, a subsidiary of the Pennsylvania, over which through freight and passenger service to Philadelphia and New York is maintained. The southern terminus is at Cape Charles, where ferry connections to Norfolk are made. Large barges, which carry 28 freight cars each, are operated between Cape Charles and Port Norfolk, giving direct freight service to southern points. The New York, Philadelphia & Norfolk Railroad is double tracked throughout, and follows closely the geographic center of the area to the Maryland line. Lower Northampton County is served by the Cape Charles branch of this railroad. The Baltimore, Chesapeake & Atlantic Railway, another subsidiary of the Pennsylvania, operates a steamboat line between many points on the Chesapeake side of the peninsula and Baltimore, and a branch of the Pennsylvania has its terminus at Franklin City, in extreme northeastern Accomac County. Thus it is seen that the area is admirably supplied with transportation facilities. The products of localities near tidewater, which in many places are a considerable distance from shipping points, are carried by water to various steamboat wharves to Cape Charles, or to Franklin City at very reasonable rates.

The highways are excellent in summer, but often cut up badly in winter because of the softening effect of freezing and thawing. Considerable work has been done in improving the roads within the last few years, and undoubtedly the problem of maintaining hard roads in winter will be speedily solved. Nearly all the improved roads are sand-clay. A few short reaches of shell road have been constructed with gratifying results.

All parts of the area are supplied with conveniently located churches and schools. Telephone service is general and increasing. Automobiles, including the more expensive makes, are very generally owned, and the use of motor trucks is rapidly increasing. There are few rural mail delivery routes, because of the many post offices, of which the two counties have 88.

The local markets of the area are of little relative importance and consume but a small part of the production. All of the railroad stations and steamboat wharves, however, are important shipping points, particularly Cape Charles.

New York, Philadelphia, Baltimore, and all of the larger eastern cities and markets for the products of the Eastern Shore of Virginia. In the last few years many potatoes have been shipped to Havana, Cuba.

CLIMATE.

Accomac and Northampton Counties have a very favorable climate. The only available data covering weather conditions within the area are contained in a four-year record at Wachapreague, Accomac County, and a six-year record at Eastville, both covering a rather short period for the establishing of dependable means. For this reason records of weather observations at Norfolk, Va., and Pocomoke City, Md., as well as those at Wachapreague and Eastville, are given, and these should enable one to form an excellent idea of climatic conditions throughout the two counties. The Norfolk records approximate conditions in lower Northampton County, while those gathered in Pocomoke City are applicable to upper Accomac County.

Attention is called to the marked variation in climate between Norfolk and Pocomoke City.

The mean annual rainfall at Norfolk is 49.54 inches; at Pocomoke City, 39.59 inches; at Eastville, 39.20, and at Wachapreague, 37.89 inches. The rainfall is well distributed throughout the year, the heaviest rainfall, as a rule, occurring during the growing season. Severe droughts are uncommon.

At Norfolk the mean annual temperature is 59.1° F.; at Eastville, 59.7° F.; at Wachapreague, 56.5° F.; and at Pocomoke City, 57.4° F. The summers are long and warm, but the temperatures are moderated by the cooling sea breezes which characterize the climate of the Eastern Shore of Virginia. The winters, though marked by brief spells of severe weather, are generally mild. The proximity of salt water has a moderating influence on temperature at all seasons. The zero mark is seldom reached in winter. The maximum range of temperature at Pocomoke City is 105° F.; at Wachapreague, 95° F.; and at Norfolk, 100° F.

At Norfolk the average date of the last killing frost in spring is March 24; of the first in the fall, November 13. The latest frost in the spring recorded at Norfolk was on April 26, while the earliest in the fall occurred on October 15. At Eastville the latest killing frost in the spring occurred on April 11 and the first in the fall on November 3, the average dates being April 1 and November 8, respectively. At Wachapreague the average last killing frost in spring falls on April 2 and the first in the fall on November 8. The latest killing frost in the spring was recorded on April 10 and the earliest in fall on October 28. The average date of the last killing frost in spring at Pocomoke City is April 19, and of the first in fall October 22. The earliest recorded killing frost in the fall was on September 23 and the latest in spring was on May 25.

The data indicate a normal growing season at Norfolk of 233 days, or over 7 months; at Eastville, 220 days; at Wachapreague, 219 days (probably too high); and at Pocomoke City, 185 days. Thus the normal growing season on the Eastern Shore varies from about 6 months in northern Accomac County to approximately 7 months in lower Northampton County.

The records show conclusively that there is considerable difference in climate between the southern and northern extremities of the area, more than would be expected within a range in latitude of about 70 miles. There are several causes of this difference. In the first place, the moderating effect of the Gulf Stream is more marked near the lower extremity of the peninsula than in the upper part of the area. Further, the narrowing of the peninsula in Northampton County intensifies the tempering influence of surrounding bodies of water, and also gives more "sweep" to the winds, resulting in freer air circulation. It is noticeable that farms located on the sea side of the peninsula, as well as those near Chesapeake Bay, are less susceptible to frosts than inland farms. The peninsula is so narrow near its lower extremity that the modifying influence of the waters extends to all parts in the interior.

The inherent climatic features of the area bear an important part in the rapid and successful development of the present type of farming—the growing of truck crops for early markets. Furthermore, the marked local climatic differences within the area itself have led to the adoption of different systems of producing certain crops, which have borne excellent results. These systems of cropping and their relation to the climate of the two counties will be discussed in the chapter on agriculture.

The following tables give the normal monthly, seasonal, and annual temperature and precipitation as recorded at the Weather Bureau stations at Norfolk, Eastville, and Wachapreague, Va., and Pocomoke City, Md.

Normal monthly, seasonal, and annual temperature and precipitation at Norfolk, Norfolk County.

[Elevation, 91 feet. Length of record, 45 years.]

Month.	Temperature.			Precipitation.			
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1909).	Total amount for the wettest year (1889).	Snow, average depth.
	°F.	°F.	°F.	*Inches.*	*Inches.*	*Inches.*	*Inches.*
December	43.0	75	6	3.49	1.91	0.77	2.7
January	40.4	80	6	3.37	1.49	4.88	2.0
February	41.8	81	2	3.75	2.99	4.21	3.8
Winter	41.7	81	2	10.61	6.39	9.86	8.5
March	47.7	92	14	4.28	1.35	7.52	.4
April	56.0	95	24	3.79	3.11	11.87	.0
May	66.2	98	38	4.07	4.20	4.58	.0
Spring	56.7	98	14	12.14	8.66	23.97	.4
June	74.4	102	49	4.33	6.00	4.75	.0
July	78.4	102	57	5.80	4.41	10.69	.0
August	76.7	100	56	5.97	5.81	5.93	.0
Summer	76.5	102	49	16.10	16.22	21.37	.0
September	71.7	100	40	4.06	.56	5.41	.0
October	61.1	89	31	3.91	1.43	7.56	.0
November	51.2	80	18	2.72	.52	2.55	.5
Fall	61.3	100	18	10.69	2.51	15.52	.5
Year	59.1	102	2	49.54	33.78	70.72	9.4

Average date last killing frost in spring, Mar. 24; first in fall, Nov. 13. Actual latest recorded in spring Apr. 26; actual earliest in fall, Oct. 15.

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

[Record—1910 to 1915, inclusive.]

Month.	Temperature.			Precipitation.		
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1912).	Total amount for the wettest year (1913).
	°F.	°F.	°F.	*Inches.*	*Inches.*	*Inches.*
December	42.2	75	11	3.63	2.88	1.36
January	41.4	74	8	4.00	4.39	3.59
February	40.4	75	10	2.47	3.60	1.95
Winter	41.3	75	8	10.10	10.87	6.90
March	48.0	89	21	3.58	5.42	4.08
April	56.5	94	29	2.58	2.98	2.16
May	66.3	94	34	3.04	3.24	6.27
Spring	56.9	94	21	9.20	11.64	12.51

Normal monthly, seasonal, and annual temperature and precipitation at Eastville—Continued.

Month.	Temperature.			Precipitation.		
	Mean.	Absolute maximum.	Absolute minimum,	Mean.	Total amount for the driest year (1912).	Total amount for the wettest year (1913).
	°F	°F	°F	*Inches.*	*Inches.*	*Inches.*
June	72.2	97	42	4.39	3.30	5.46
July	78.0	101	56	3.75	1.47	5.18
August	77.0	99	54	4.13	3.48	3.53
Summer	75.7	101	42	12.27	8.25	14.17
September	71.8	95	39	1.72	2.39	1.71
October	62.5	88	33	3.48	1.05	4.97
November	49.7	79	25	2.43	2.70	1.48
Fall	61.3	95	25	7.63	6.14	8.16
Year	59.7	101	8	39.20	36.90	41.74

Killing frost: Average last in spring, Apr. 1: average first in fall, Nov. 8: latest in spring, Apr. 11: earliest in fall, Nov. 3.

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

[Four-year record, 1914–1917.]

Month.	Temperature.			Precipitation.		
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1915).	Total amount for the wettest year (1917).
	°F.	°F.	°F.	*Inches.*	*Inches.*	*Inches.*
December	37.6	70	10	2.60	.52	2.00
January	38.7	72	13	3.64	6.98	3.34
February	39.1	70	6	2.95	2.13	2.31
Winter	38.5	72	6	9.19	9.63	7.65
March	44.0	75	14	4.43	.....	7.29
April	53.4	96	28	2.61	1.91	.....
May	65.7	95	39	3.20	1.76	4.05
Spring	54.4	96	14	10.24	.....	.....
June	70.1	101	48	4.98	5.66	6.37
July	75.5	96	57	4.34	3.26	5.55
August	75.9	96	52	2.73	2.56	.....
Summer	73.8	101	48	12.05	11.48	.....
September	70.2	94	38	1.39	.36	1.85
October	59.9	85	30	3.54	2.45	5.50
November	48.0	80	21	1.48	91	.85
Fall	59.4	94	21	6.41	3.72	8.20
Year	56.5	101	6	37.89	.....	.....

Killing frost: Average last in spring, Mar. 31: average first in fall, Nov. 6: latest in spring, Apr. 10: earliest in fall, Oct. 28.

Normal monthly, seasonal, and annual temperature and precipitation at Pocomoke City, Md.

[Twenty-one years, 1894 to 1914.[

Month.	Temperature.			Precipitation.			
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1904).	Total amount for the wettest year (1910).	Snow, average depth (1894 to 1908).
	°F.	°F.	°F.	Inches.	Inches.	Inches.	Inches.
December	40.6	74	8	3.45	5.83	3.26	2.5
January	38.8	72	4	2.84	1.07	4.17	2.6
February	36.4	75	−4	3.49	3.06	2.04	4.3
Winter	38.6	75	−4	9.78	10.96	9.47	9.4
March	46.9	88	13	3.66	2.26	3.39	1.9
April	54.7	93	25	3.26	1.95	5.07	T.
May	64.7	94	35	2.82	1.95	3.03	.....
Spring	55.4	94	13	9.74	6.16	11.49	1.9
June	72,7	98	46	3,61	3,04	3.85	.....
July	77.8	101	54	3.60	4.13	5.19	.....
August	76.1	100	53	4.30	2.83	9.23	.....
Summer	75.5	101	46	11.51	10.00	18.27	.....
September	70.4	95	41	3.08	1.63	3.46	.....
October	59.8	91	29	3.10	2.70	4.47	.....
November	49.5	81	17	2.48	1.82	2.05	.2
Fall	59.9	95	17	8.66	6.15	9.98	.2
Year	57.4	101	−4	39.69	33.27	49.21	11.5

Killing frost: Average first in fall, Oct. 22; average last in spring, Apr. 19; earliest in fall, Sept. 23; latest in spring, May 25.

AGRICULTURE.

Since its earliest settlement the Eastern Shore area has been preeminently agricultural in its pursuits, and from the first its inhabitants lived in comparative comfort upon the products of the land, supplemented by an abundance of sea food and game. Tobacco and corn were the main crops for many years, and tobacco was long used as a medium of exchange. The larger planters shipped their tobacco to England, but the smaller growers traded with the representatives of English houses. Warehouse receipts representing the quantity of tobacco stored passed as money. In 1645 tobacco sold at 3 pence a pound. Wheat was mentioned in 1646 (court records). Sheep were owned, some owners having large flocks. Steers and oxen were used as beasts of burden in the pioneer days, and there were no horses prior to about 1645, when a boatload came from New England.[1]

[1] Early History of the Eastern Shore of Virginia,—WISE.

The Revolutionary War brought a change in agriculture by cutting off the export trade with the mother country and creating a demand for cereals to feed the provincial army, and with the beginning of the nineteenth century the tobacco acreage had greatly decreased. Oats and corn became the main crops. Oats was an income crop and practically all was shipped, except that reserved for seed. Before the Civil War oats seldom, if ever, sold for more than 30 cents a bushel. At one time quite an industry in dried peaches was developed, the fruit being peeled and air dried. Boat shipments were made to outside markets. A little corn was sold. Sweet potatoes were grown for home use. The development of sweet potatoes as a commercial crop began about 1835, but the growth of this industry was slow before the war, 2 acres being an exceptionally large planting. Range cattle were raised, also sheep for wool and home use, and hogs for home use.

After the Civil War the truck industry began to assume importance. As yet, however, the only means of transportation to outside markets was by boat, and the uncertainties thereof retarded the expansion of this type of farming, so that not until after the building of the New York, Philadelphia & Norfolk Railroad, in 1884, did truck growing become paramount in the agriculture of Accomac and Northampton Counties. Prior to the coming of the railroad land and timber were cheap, and it is safe to state that many farms sold for less than one-tenth of the price they now command.

A comparison of United States census figures from 1880 to 1910, inclusive, is highly significant in showing the more recent changes in the agriculture of the two counties. Later figures would assuredly show even more striking developments. It might be well to state here that the statistics are typical in their relation to the expansion of truck farming in the United States during the last three decades and that in sharp contrast to some localities the truck-growing industry on the Eastern Shore of Virginia has developed naturally, uninfluenced by speculation in land or by colonizing schemes. The growth of this type of farming has followed closely the rapidly increasing demand for early truck products in the cities, and the improvement of transportation and marketing facilities.

The following figures, based on the United States Census, will serve to show the various phases connected with the steady transition of the agriculture on the peninsula.

Number and average size of farms and percentage of improved land in farms, 1880 to 1910, inclusive.

Year.	Accomac County.				Northampton County.			
	Number of farms.	Proportion of land in farms.	Average size of farms.	Improved land per farms.	Number of farms.	Proportion of land in farms.	Average size of farms.	Improved land per farm.
		Per cent.	*Acres.*	*Acres.*		*Per cent.*	*Acres.*	*Acres.*
1880	2,145	52.8	79.2	39.2	781	54.6	106.9	60.5
1890	2,292	53.8	75	36	705	55.5	120.3	64.9
1900	2,772	59.4	69	34	975	56.9	89.2	48.6
1910	2,977	57.7	62	27.9	1 298	54.5	64.3	35.2

The above table shows a rapid increase in the number of farms, with a closely corresponding decrease in size. The larger average size of farms in Northampton County prior to 1900 may be attributed to the fact that its inhabitants in former times were wealthier, as a rule, than those of the upper county. The old plantations were much larger than those of Accomac County. Another factor is that more fishermen and seafaring people have always resided in Accomac County than in Northampton County. Farming is of secondary importance to these people, hence their farms are small and tend to reduce the average size of farms.

A striking feature of the progress made on the Eastern Shore of Virginia in comparatively recent years is the increase in value of farm property. For Northampton County the value of all farm property, including land, buildings, machinery, and domestic animals, was $1,909 per farm of 106.9 acres in 1880, and in 1910 it was $5,205 per farm of 64.3 acres—an increase of about 450 per cent per acre of land. Figures for Accomac County show an increase in value of all farm property of about 300 per cent per acre of land for the same period.

Fertilizer expenditures increased from $24,807 in 1879 to $470,751 in 1909 for Northampton County, 93.4 per cent of the farms reporting an average expenditure of $388.41 for fertilizer in the latter year. In Accomac County $38,452 was expended for fertilizers in 1879 and $512,748 in 1909, 93.7 per cent of the farms expending $184 per farm. Labor expenditures in Northampton County increased from $124,280 in 1899 to $311,857 in 1909, and in Accomac County from $217,530 in 1899 to $406,150 in 1909.

That the population of the area has kept pace with the expansion of truck growing is shown by census figures, which denote an increase in the number of inhabitants from 1880 to 1910 of 66.6 per cent and 82 per cent for Accomac and Northampton Counties, respectively. In 1910, the population of Accomac County per square mile was 73 and of Northampton 69.8.

The following table shows the production of the most important crops in the census years from 1879 to 1909, inclusive. Attention is directed to the almost total abandonment of general farming within this period, the various truck crops having been rapidly adopted, the result of which has been that the general farm crops formerly grown as "income crops" have almost entirely disappeared.

Acreage and production of principal crops.

ACCOMAC COUNTY.

Year.	Corn.		Oats.		Wheat.		Hay.		Potatoes.		Sweet potatoes.	
	Acres.	*Bush.*	*Acres.*	*Bush.*	*Acres.*	*Bush.*	*Acres.*	*Tons.*	*Acres.*	*Bush.*	*Acres.*	*Bush.*
1909....	32,327	643,438	100	998	205	1,953	2,548	4,082	14,519	1,360,360	14,811	2,426,149
1899....	40,143	638,120	1,106	14,100	360	3,180	3,500	4,000	4,067	418,541	12,495	2,009,814
1889....	37,671	488,745	3,701	48,065	329	3,645	1,808	2,611	1,977	124,454	7,477	1,247,057
1879....	42,331	508,339	6,947	38,334	1,834	17,219	1,721	1,285	.....	217,574	3,839	491,790
NORTHAMPTON COUNTY.												
1909....	18,387	471,414	155	2,878	.....	.....	552	801	16,109	1,658,657	4,121	697,144
1899....	16,007	270,490	766	11,210	25	250	[1] 2,000	2,400	7,408	850,514	3,509	519,525
1889....	12,496	146,408	2,090	22,255	.....	.....	1,190	1,257	2,295	157,001	1,815	194,432
1879....	22,992	208,453	7,140	48,415	95	997	.....	.....	.....	.....	.....	.....

[1] Estimated.

At the present time the production of truck crops for northern markets dominates the agriculture of Accomac and Northampton Counties. General farming is carried on only to a sufficient extent to supply local needs for such crops, and live stock is kept only to meet the demands of local markets and for home use. The chief truck crops in the order of their importance are Irish potatoes, sweet potatoes, strawberries, cabbage, and onions, the former two far outdistancing the latter in their importance. Corn is the principal general crop. The various forage crops, of which the legumes are most widely grown, stand second among the general farm crops. Small grains are not produced to any extent. There are a few farms in northern Accomac County devoted mainly to the production of general farm crops.

Live-stock industries occupy a prominent place on only a few farms. Of the various live-stock enterprises poultry and hog raising are the most general, practically every farmer engaging in them more or less.

Some idea of the relative importance of the truck industry may be gained from the 1910 census figures, which show that in Accomac County in 1909 the total value of all agricultural products was $3,403,176, of which vegetables were valued at $2,071,997, or 60 per cent of the total. The total value of all agricultural products in Northampton County in 1909 was $2,176,270, of which

vegetables were produced to the value of $1,521,000, or 70 per cent of the total.

Irish potatoes constitute the main crop of the area. Especially in Northampton County the farming system is so centered in this crop that when, through crop failure or low prices, Irish potatoes are not profitable as a rule the year's business is conducted at a loss. The 1910 census reports that in 1909, 14,519 acres in Accomac County and 16,109 acres in Northampton County were devoted to this crop, with yields of 1,360,360 bushels and 1,658,657 bushels, or 494,676 barrels and 603,148 barrels, respectively.[1]

Except that reserved for home consumption and for seed for the second crop—a very small proportion of the total—the entire Irish potato crop is sold to outside markets.

Sweet potatoes in 1909 occupied 14,811 acres in Accomac County and 4,121 acres in Northampton County, yielding 882,236 barrels (2,426,149 bushels) and 253,508 barrels (697,144 bushels), respectively. Like Irish potatoes, this crop is practically all shipped to outside markets. Some sweet potatoes are bought by local canning factories, chiefly one at Hallwood. The sweet potatoes reserved for home consumption are generally of a different variety than the market potatoes. As a rule the seed potatoes are produced by the use of a different method of propagation than the market crop.

Although corn, the chief general farm crop of the area, occupies about the same acreage as Irish and sweet potatoes combined, in point of value it ranks much lower than either of the latter crops. In 1909, according to United States census figures, 32,327 acres in Accomac County and 18,387 acres in Northampton County were devoted to this crop, producing 643,438 bushels and 471,414 bushels, respectively. Most of the corn is grown in connection with Irish potatoes, being planted between alternate rows about two weeks before digging begins. (Pl. I, fig. 1.) Corn is used on the farm for feeding work stock and fattening hogs, only a very small proportion being sold locally. Great dependence is placed on corn fodder as forage.

Since 1909 the acreage of alfalfa has considerably increased. All of the hay is fed on the farm, and it is invariably necessary to supplement the forage crops raised in the area by a considerable quantity of hay from outside sources. The production of sufficient hay and forage in Accomac and Northampton Counties to supply local needs is an important problem, and the farmers are constantly experimenting with various forage crops in an effort to increase the production.

[1] The shipping package used on the Eastern Shore of Virginia for Irish and sweet potatoes is the barrel. It was deemed advisable to make use of figures in terms of barrels in this report, because of their familiarity to farmers of Accomac and Northampton Counties. Prior to 1916 the barrel in use held 11 pecks, or 2¾ bushels. Beginning in 1916 the standard 3 bushel barrel was used. The figures as given are in accordance with the size of barrel in use in the year to which they refer.

The following table shows the production of the various hay and forage crops in the area in 1909, census figures of 1910 being used.

Production of hay and forage crops, 1909.

Crop.	Accomac County.		Northampton County.	
	Acres.	Yield.	Acres.	Yield.
		Tons.		*Tons.*
Timothy alone	167	333	.....	.....
Clover alone	2,091	3,229	386	480
Timothy and clover mixed	250	438	24	27
Alfalfa	9	22	24	118
Millet or Hungarian grass	25	54	8	16
Other tame grasses	6	6	110	160
Total tame grasses	2,548	4,082	552	801
Grains cut green	736	1,212	237	350
Coarse forage	86	74	933	945

The 1910 census reports that in 1909, 1,430 acres in Accomac County and 1,295 acres in Northampton County were utilized for raising miscellaneous vegetables. Of these, cabbage and onions are most important. The cabbage industry is engaged in most extensively in the vicinity of Cape Charles and Eastville, in Northampton County, while the production of onions is largely localized in the vicinity of Onancock, on the Chesapeake side of the peninsula. Other vegetables within this class are tomatoes, lima or "butter" beans, peas, turnips, watermelons, cantaloupes, radishes, lettuce, asparagus, and beets. The production of many of these is in an experimental stage. The tomato crop is bought by small local canning factories. All other vegetables except watermelons and cantaloupes are marketed outside the area. The local market absorbs the latter crops.

Strawberries are quite extensively grown, especially in Accomac County, where in 1909 993 acres yielded 1,680,711 quarts. During the shipping season, in May, special express trains are operated to Philadelphia and New York to facilitate the marketing of the strawberry crop.

Apples, peaches, and pears are the main orchard fruits. They are consumed locally and at home as a rule. Figs were grown to some extent prior to 1918. The severe weather of the winter of 1917–1918 destroyed practically all the trees.

Poultry raising is an attractive minor interest throughout the area. The value of poultry and eggs sold in 1909 was $342,458 in Accomac County and $105,069 in Northampton County, according to the census. Local merchants usually trade in poultry and eggs, shipping them to the northern city markets.

The value of all animals sold and slaughtered in 1909 totaled $227,844 and $94,321 in Accomac and Northampton Counties, respectively; 11,224 hogs were sold or slaughtered in the former county in 1909 and 5,894 in the latter, mainly for local and home consumption. With proper care, hog raising is very profitable, because of the waste products, such as small potatoes, which are available as feed. The industry is gaining in importance. In 1909, 566 calves and 643 other cattle were sold or slaughtered in Accomac County and 155 calves and 517 other cattle in Northampton County. A few beef cattle are raised on some of the coastal islands, being turned out on the range. The chief difficulty here is with water supply.

Dairying is carried on to a less extent than the demands of the area warrant. The country is poorly adapted to dairy farming.

Some horses and mules are raised, and a very good strain of driving horses has been developed on the Eastern Shore of Virginia. On Chincoteague Island ponies are raised on the range, a round-up and sale being held annually. These ponies attain a weight of 600 or 700 pounds.

The preceding paragraphs, containing statistics of the 1910 census, show that the farmers of Accomac and Northampton Counties practice a very intensive type of farming, which results in the production of a large quantity of truck crops. The greatest development of the truck industry within the area, however, has taken place since 1909, the year to which the census figures refer, and for this reason the following table, showing the approximate production of the chief truck crops from 1911 to 1916, inclusive, is given. This table is based upon careful estimates furnished by the courtesy of the Eastern Shore of Virginia Produce Exchange, a growers' cooperative organization, through which the bulk of the truck crops of Accomac and Northampton Counties are marketed. The figures refer to both counties, not being available for each county separately:

Production of truck crops, 1911 to 1916, inclusive.

Year.	Bushels Irish potatoes.	Bushels sweet potatoes.	Hampers [1] onions.	Crates [2] strawberries.	Crates [3] cabbage.
1911	2,403,838	1,845,990	44,733	30,616	48,109
1912	4,598,170	2,874,231	89,828	81,508	48,727
1913	7,649,510	3,525,368	97,252	49,356	84,188
1914	7,083,664	2,281,623	65,095	45,778	110,395
1915	7,839,492	2,367,040	201,488	58,991	88,666
1916	7,719,249	3,736,983	69,156	48,610	90,156

[1] Hamper=five-eights bushel.
[2] Strawberry crate=32 quarts.
[3] Cabbage crate=about two-thirds barrel, or 2 bushels. Some cabbage is shipped in barrels.

The foregoing figures indicate a phenomenal increase in the production of Irish potatoes since 1909, as well as considerable expansion in other truck industries. Though no statistics are available, it is probable that the increased production of Irish potatoes has been accompanied by a greater acreage devoted to corn. The growth in importance of the Irish potato crop during this period has been greatest in Accomac County, and at present Accomac County leads Northampton by a considerable margin in total production of Irish potatoes.

No data are available relative to the present value of forest products of the area. This, however, is an important industry, supplying a large local demand and also to some extent shipping timber out of the area. The predominant tree is the loblolly pine, which in this locality makes a rapid, healthy growth. Almost every farm possesses a woodlot. A farm without one is considered rather undesirable. As a rule, timber is in small tracts, but there are many areas of forest several hundred acres in extent and a few of two or three thousand acres. The virgin timber, of course, has been removed, and the demand which has given rise to the present industry has necessitated cutting small trees in many instances. Lumber for barrels is produced within the area, as well as a large part of that for building and other purposes. When it is considered that a local demand for nearly 4,000,000 barrels is annually met, some idea of the importance of forest products may be gained. The annual value of the timber output approaches $1,000,000.

Although not an agricultural industry, the fisheries of the area merit mention here. Products of the sea have long been of importance, providing employment for many residents of both counties, and yielding a bountiful supply of cheap food for all of the inhabitants of the Eastern Shore of Virginia. At the present time fish, oysters, crabs, and clams are shipped to city markets in large quantities during their respective seasons, and large quantities are consumed locally. Fish shipments are mainly made from Willis Wharf, Wachapreague, and Chincoteague. During the fishing season, which extends from April to November, practically every home on the peninsula is daily reached by fish vendors. Many of the farmers own boats, and fishing trips often prove profitable as a means of supplying food in the home. There are several factories in the area manufacturing fertilizers from fish, small steamers plying the near-by waters of Chesapeake Bay and the Atlantic Ocean in quest of menhaden, which furnish both a valuable oil and the "scrap" used as a feed or fertilizer.

The various crop adaptations of soils throughout the area are quite generally understood and observed in the selection of fields. Irish and sweet potatoes give best results from year to year on the Sassa-

fras sandy loam and fine sandy loam, and these soils are more commonly planted to these crops than other types. It is recognized that Irish and sweet potatoes, particularly the latter, do better than other crops on the more sandy types of the area, such as the Sassafras loamy sand. The Keyport fine sandy loam is considered to be well suited to the production of early cabbage, and the more poorly drained types, those of the Elkton, Keyport, and Portsmouth series, are held to be fully as well adapted to the raising of strawberries and onions as other soil types of the area. By some farmers strawberries are thought to do fully as well on the Sassafras soils as on the Keyport and Elkton types, but ordinarily the crop is planted most extensively on the sandier members of the Elkton and Keyport series. (See Pl. I., fig. 2.) The heavier-textured soils of the area are considered best for general farm crops, and the better-drained soils are known to grow legumes more successfully than those poorly drained.

The farm buildings range from the large, substantial, and attractive dwellings of the many well-to-do farmers to the small negro tenant houses scattered throughout the area. Many farmsteads are built at some distance from the roads, and have spacious, well-kept lawns. Buildings as a rule are neatly painted and well kept, giving the appearance of prosperity. Barns are generally ample, and many of them are large, with generous room for stock, as well as for the storage of hay, feed stuffs, and machinery. There are often a number of smaller outbuildings, such as potato-storage houses, grain bins, and garages, grouped about the main barn. On the better farms gasoline engines and windmills are commonly employed for pumping water, and many modern lighting systems are in use. The farm machinery is modern, such implements as riding plows and cultivators, disk harrows, two and three row fertilizer distributers, Irish and sweet potato planters, potato sprayers, graders, and weeders, being in common use. Potato diggers are not generally employed, the planting of corn between the rows rendering their use impracticable. A few gang plows are operated. Perhaps the most universal article of farm equipment is the horse cart, a two-wheeled cart without springs, with which much of the hauling incident to the truck industry is done. Though of small capacity, the great facility with which they can be handled, especially in the woods, renders them indispensable. They are manufactured in various blacksmiths' and wheelwrights' shops throughout the area; but many are bought in the cities. A sweet-potato-vine cutter, which is manufactured locally, is in general use and has proven valuable to the farmers. The work stock consists mainly of mules. Mules and horses are of heavy weight as a rule and excellent breed. Good cattle are kept, though there are a few purebreds.

In preparing land for Irish potatoes, pine straw, or "shatters," is commonly applied in the winter, either alone or composted with stable manure. Plowing is commenced as early as possible, ordinarily in February. Fall plowing is not generally done. When a cover crop is to be turned under, as is often the case, some farmers disk the land before plowing, but the general practice is to disk after plowing, and to follow the disk with a spike-tooth harrow.

Potato planting begins about the middle of February in lower Northampton County and continues progressively up the peninsula, where in upper Accomac it is completed about April 1. The rows, which are 2½ to 3 feet apart, are usually marked with a shallow furrow. Then the fertilizer is sown, the common way being one row at a time. Two and three-row fertilizer distributors are often used on the larger farms. It is considered a good method to follow the fertilizer distributor with a cultivator, to mix the material thoroughly with the soil, thereby obviating the danger of burning the seed. As a rule seed potatoes are quartered. Planting is done by machinery, except in the cases of small growers. Fully 80 per cent of the potato growers use planters. After planting the middles are loosened with a cultivator and the field is leveled with a harrow. Cultivation is begun soon after the plants break through. Each cultivation is followed by a weeder until the plants reach a height of about six inches. In a normal season the potato crop is given six to eight cultivations. These are more frequent in dry weather.

The potato crop is sprayed two or three times for the Colorado potato beetle, the first being about May 20, when the bug first appears, the second about June 5, when the young bugs begin to hatch, and the third about 10 days later. When potatoes are dug early, the third spray is often dispensed with. It is realized, however, that if the third spray is given, even after the crop is beyond danger of injury, it will do much toward controlling the pest in the following season. Arsenate of zinc or lead, and Paris green are the spray materials used. Bordeaux mixture is used to some extent for blight.

About two weeks before digging begins the crop is laid by, and it is an almost universal practice to plant corn between alternate rows at this time. Digging extends from about June 10, near Cape Charles, to August 1, in northern Accomac County. The crop is plowed out where corn is planted, the plowing serving as the first cultivation for the corn. The prime potatoes are picked up, graded, and barreled in the field and hauled directly to the shipping point. The remaining potatoes are often graded by machine, and this practice is growing in favor. Plate II, fig. 1, shows a good field of Irish Cobbler potatoes near Onancock.

The Irish Cobbler is the variety universally planted. Most growers in Northampton County, particularly in the lower districts, use northern grown seed, which generally comes from Maine. Northern seed matures a week or more earlier than the home-grown seed which the farmers of Accomac County largely plant. The use of both types of seed potatoes results in a longer marketing period than would otherwise be possible, and thus is an important factor in maintaining good prices for the crop, the influx of which to northern markets within a short period might seriously affect prices.

In the production of home-grown seed northern seed is used. The seed crop is planted early in August, preferably on land not used for the early crop, and the potatoes are harvested as late as the weather will permit. Small yields are the rule, and the potatoes themselves are small. This has not been found to react disadvantageously, however, upon the succeeding crop. As a matter of fact, the small seed potatoes will plant a larger area than the larger northern seed, 2½ to 3 barrels of home grown or about 4 barrels of northern grown seed being required per acre planted.

Generally, seed potatoes are kept in mounds of soil located in protected parts of the fields. These mounds are constructed as follows: First, a circular plot the size of the mound is leveled off a few inches below the surface of the ground. This is covered with a layer of pine straw, 6 inches in thickness, upon which are piled the potatoes. These are covered with about 18 inches of loose pine straw, which in turn is blanketed with a 6-inch layer of earth. A small opening for ventilation is left at the apex of the mound. This method of keeping seed potatoes has proven comparatively satisfactory, but is inferior to the storage-house method, and many houses are being constructed.

Seed sweet potatoes are kept through cold weather in the same manner as Irish potatoes. It is necessary, however, to give them somewhat heavier protection.

The first step in the production of sweet potatoes is the preparation of the hotbeds. These are located in a protected place, generally on the south side of a woodlot, and care is taken that they should have unobstructed sunlight. They are run east and west whenever possible. A pit is first dug, about 6 inches deep, 6 to 8 feet in width, and of the necessary length to bed the desired amount of seed. The wall on the north side is made about 18 inches, and the south wall about 10 inches, in height. A 4-inch layer of pine straw is spread on the bottom, and is covered with a fresh fermenting layer of stable manure 8 inches in thickness. Above the manure is placed a 3-inch layer of sandy soil, preferably clean sand, upon which is placed the seed potatoes, one-half inch to one inch apart. The potatoes are then covered with a 2-inch layer of sand, and cold frames or cloth covers are laid over the top, the former being more desirable. Many farmers disin-

fect their seed by dipping them 5 to 8 minutes in a corrosive sublimate solution, 1 ounce to 8 gallons of water.

March 10 to April 1 is the time of bedding. The beds are watered thoroughly when completed, again in about 10 days, and thereafter every 4 or 5 days. Ten days before drawing the sprouts the beds are aired by lifting the frames or cloth, and 3 to 5 days before drawing the frames are removed. The sprouts are transplanted from May 10 to June 1.[1]

The preparation of sweet-potato land is done very thoroughly. The first operation is manuring. Often, however, this crop follows a cover crop of wheat and crimson clover, and in that case manure is not generally applied. The manuring is done in March, using 60 to 100 horse-cart loads per acre of stable manure, composted with pine straw and woods mold. Uncomposted pine needles or mold are sometimes used when manure is not available. The manure is next turned under by a very shallow plowing and then is disked. At the time of working in the manure, salt is commonly broadcasted at the rate of 400 to 500 pounds per acre. The disking is followed by a spike-tooth harrow, after which the field is plowed again and the manure is turned out. The disking and harrowing is again done, and is continued until the manure is very thoroughly mixed with the soil, 2 to 6 plowings being employed.

In planting, the rows are first marked, then the fertilizer is sown, and a low bed is thrown up with one round of a turn plow. The largest and strongest plants are selected from the beds, and are set by means of tongs or by transplanting machines. Small fields are sometimes set by hand. The rows are spaced 2½ feet apart and the plants 18 to 20 inches apart in the rows. Some growers plant in checks 25 inches apart, but the extra labor involved makes this method rather undesirable. Check rows can not be set with a transplanting machine. Ten thousand to 11,000 plants are required to set an acre of sweet potatoes.

The first cultivation takes place from 10 to 12 days after setting. One or two hand hoeings are usually necessary. The crop is cultivated about as Irish potatoes. For the early cultivations a simple vine turning attachment is used on the cultivator. When the plants are larger, a man precedes the cultivator, turning the vines with a stick.

Two methods are used for the propagation of the sweet potato crop in Accomac and Northampton Counties. The first method, by means of rooted sprouts from the tubers, is followed for the main or market crop. The second method is by cuttings of the vine, and is often used to grow small potatoes for seed purposes. The cuttings are made

[1] For further information regarding sweet potatoes, see Bul. 19, Virginia Truck Experiment Station, "Sweet Potato Culture."

from long vines produced by the early crop which are cut into sections two joints long. These are set in July, and are handled in the same manner as the rooted sprouts, or "slips."

The harvesting of the sweet-potato crop extends from early in August to November. Digging is strung out, and comparatively small quantities are shipped by individuals at a time to avoid glutting the market. In digging it is first necessary to cut the vines, which at the time completely cover the ground in a dense mat. Various types of vine cutters are used. The potatoes are then thrown out with an ordinary turn plow, graded and barreled in the field, and hauled to the shipping point.

After the crop has been harvested many farmers temporarily fence off their sweet-potato fields, pasturing hogs and sometimes cattle on the remaining vines and small potatoes.

The main variety of sweet potato is the Big Stem Jersey. The Little Stem Jersey is also grown to a considerable extent. The Hayman or Southern Queen is grown for home and local use, but is shipped only in seasons of exceptional prices.

The strawberry is a two-year crop. The plants are propagated by means of runners, and are cut from year-old beds and set out as soon as growth of the old beds starts in the spring. Many growers in starting a strawberry patch interplant with Irish potatoes, thus making the rows 5 feet apart. The first year strawberries are cultivated all the season. They receive no cultivation the second year, however. The matted-row system is used. Fertilizer is not always applied, though usually a light application is made just before blooming. After one year's bearing strawberry beds are generally plowed up. A few farmers leave them for a second crop. They are marketed the last of May and early in June. A late potato crop is often planted after strawberries.

The onion crop is started from sets, which are commonly brought in from outside the area. Some sets are now being raised by local growers, however. In preparing the land barnyard manure is used. The crop is planted very early—from the last of February to the middle of March—and the sets are planted by hand 3 or 4 inches apart in 28-inch rows. Moderately heavy applications of fertilizer are used, and sometimes the crop is top-dressed with additional amounts of the same fertilizer. Cultivation is frequent and the fields are kept free from weeds. Onions are marketed from the 1st to the 15th of July. After the crop is harvested corn or late Irish potatoes are generally planted. The Yellow Danvers is the main variety.

Cabbage plants are generally set in the fall, and attain only a slight growth before winter. They withstand cold weather fairly well if sufficient growth of leaves is attained to protect the terminal bud.

Sometimes considerable injury to the crop results from severe winter freezes. Heavy applications of commercial fertilizer are required, and it is considered a good practice to top-dress in the spring with nitrate of soda. The crop is marketed in May and is shipped in crates. The Early Wakefield is a popular variety.

Where corn follows Irish potatoes no fertilizer is used, that left from the potato crop being ample. Where corn is grown as an independent crop light applications are often made, but it is common for corn to follow a cover crop, and thus little fertilizer is used directly upon corn itself. In laying by the corn crop in September a cover crop is usually planted between the rows. Rye and a mixture of wheat and crimson clover are the most common crops used for this purpose, though cowpeas are often planted. Just before the stalks begin to die in the fall the gathering of fodder begins. The tops, just above the ears, are first cut and bundled and then the leaves are stripped from the lower part of the stalk and tied into bundles. The fodder is cured in the field and later stacked. The gathering of corn is practically the last operation in the fall, and is postponed until after other necessary work is finished, often extending well into winter.

Other truck crops and general farm crops are produced under good methods, and the farmers in this region thoroughly recognize the value of intensive culture. Fruit trees, nevertheless, receive little care.

The farmers of Accomac and Northampton Counties quite generally practice the rotation of crops, although they introduce many variations from year to year, owing to the variety of crops which they grow. The long growing season makes it possible to produce as many as three crops upon the same land in a season, and thus it has been easy to develop a short rotation, which at the same time is of great value in conserving soil productivity. In Accomac County, where sweet potatoes occupy almost as great an acreage as Irish potatoes, the following is the common form of rotation practiced: Irish potatoes, followed by corn, planted in alternate rows, in July. In September a cover crop of rye or wheat and crimson clover mixed or cowpeas is sown between the corn rows. The cover crop is turned under the following spring and sweet potatoes are planted. In a few cases a cover crop is planted after sweet potatoes in the fall. The third year Irish potatoes are again planted.

In Northampton County a somewhat different rotation is commonly practiced, owing to the fact that fewer farmers engage extensively in growing sweet potatoes. It is a three-crop, one-year rotation, and consists of Irish potatoes, followed by corn, in which is sown a cover crop. The following spring Irish potatoes are again planted.

The farmers who practice this rotation endeavor to vary it every few years, introducing cowpeas or perhaps cabbage followed by cowpeas, thus resting the land for one year and restoring the soil after several years' continuous planting with Irish potatoes. Some farmers, especially in northern Northampton County, follow more generally the rotation practiced in Accomac County. These rotations are very adaptable, and are adjusted to the introduction of other crops without seriously interfering with the general scheme.

Immense quantities of commercial fertilizer are annually used in the area, as well as manures, and composts. The 1910 Census reports that in 1909 $512,748 was expended for fertilizer in Accomac County, 2,788 farms using fertilizer averaging $184 in value. In Northampton County 1,212 farms used fertilizer to the value of $470,751 in 1909, an average of $388.41 per farm reporting. With the great stimulus in truck farming since that year and the high prices brought about by causes incident to the war, present fertilizer expenditures undoubtedly are more than double the figures of 1909.

For Irish potatoes in normal times a fertilizer containing 5 to 7 per cent ammonia, 6 to 8 per cent phosphoric acid, and 5 to 7 per cent potash is used. The commonest formula prior to 1915 was 7–6–5.[1] The potash shortage has resulted in the use of a fertilizer lacking this ingredient, and in 1916 and 1917 the common formula was 7–8–0. From 1,200 to 1,800 pounds per acre is applied, the average being about 1,500 pounds. The lack of potash had not been reflected much in the crops up to 1918, though in 1917, in fields where potatoes followed potatoes the previous year, there was in many instances a noticeable falling off in yield, as well as a less healthy appearance of vines. The late or seed crop receives 400 to 500 pounds less fertilizer than the early crop.[2]

Irish potatoes are grown during a season of the year when the soil activities are not as vigorous as in warmer weather. They consequently require more fertilizer than sweet potatoes. From 800 to 1,000 pounds is used for the latter crop, the common formulas normally being 3–6–6, 3–8–4, and 3–8–5. The present formulas are 3–8–0 and 5–7–0.

For onions 500 to 1,000 pounds of commercial fertilizer is applied when the crop is planted, and sometimes this is supplemented by a light top-dressing of the same fertilizer. The present formula ranges from 5–8–0 to 7–8–0, but commonly a 5–6–5 mixture is employed for this crop. Cabbage requires very heavy fertilizing, as much as a ton to the acre being used. Sometimes a top-dressing of nitrate of soda is applied.

[1] Fertilizer formulas in this report stated in the order—nitrogen, phosphorus, potash.

[2] For more detailed information, see Bulletin 21, Virginia Truck Experiment Station, Norfolk, Va., "Potato Fertilizers."

Corn is not fertilized, except when grown independently, the residue from the potato crop being ample to secure good yields.

Farm manures are made good use of. Manure is sometimes imported in carload lots. Composts are probably used more in Accomac and Northampton Counties than in any other section of the United States. Vegetable mold and pine straw are used on every farm. Fish scrap and seaweed are utilized to some extent. Acid phosphate is sometimes used in maintaining a stand of alfalfa.

The application of lime is becoming common and is resulting satisfactorily, though the price has heretofore been rather high—from $5 to $10 a ton. Care has to be exercised in sowing lime on potato land, as too heavy an application causes scab.

Most of the farm laborers are negroes, particularly in the lower county. Formerly labor was abundant, but during the last few years the high wages to be obtained in Northern industrial cities has resulted in an alarming shortage, and in 1917 it was necessary during the potato harvest to bring laborers from without the area. Colored laborers are not hired by the month, as a rule. By the week, they receive $5 to $6 with board; by the day, $1 to $1.50 with board; and about 15 cents per hour. In the potato harvest 10 to 15 cents per barrel is paid for picking up potatoes. Two cents per quart is paid for picking strawberries. Ten to fifteen cents per basket is paid for picking peas and beans. Laborers receive $1.50 per day and board while pulling fodder.

The 1910 census reports 4,275 farms in the area—2,977 in Accomac County and 1,298 in Northampton. In the upper county the average size was 62.3 acres in 1910, of which 27.9 acres were classed as improved land, while in Northampton the average farm contained 64.3 acres, 35.2 acres being improved land. The size of farms is steadily decreasing. There are a number of farms in both counties containing several hundred acres. These, however, are usually divided into several tenant farms, and the census tabulates each tenancy as a farm. Many small farms of from 10 to 30 acres are found on the Chesapeake side of upper Accomac County in the vicinity of Hopkins and Sanford, the owners relying in part upon the products of the water for a livelihood.

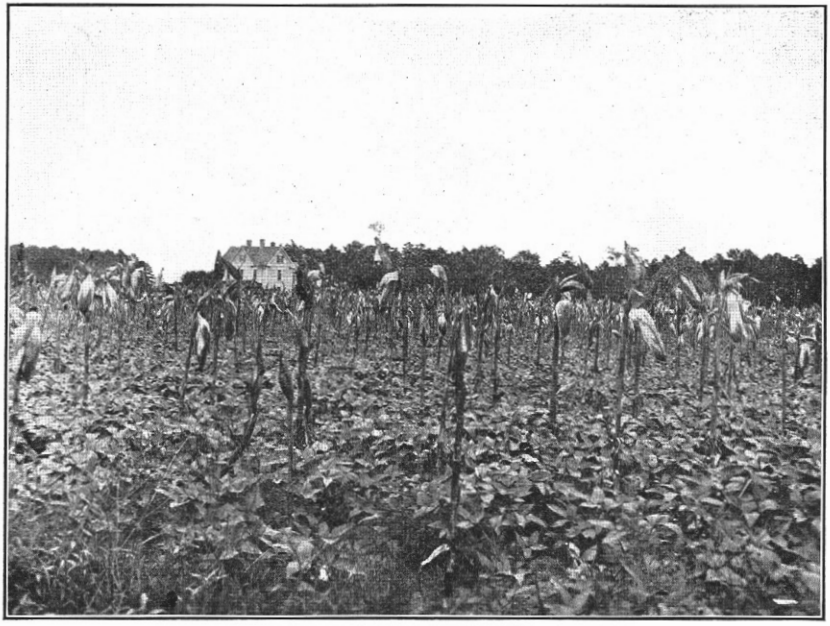
In 1910, 42.1 per cent of the farms of Accomac County were operated by owners, 57.6 per cent by tenants, and 0.3 per cent by managers. In Northampton County, 43.8 per cent were operated by owners, 56.1 per cent by tenants, and 0.1 per cent by managers. Of the rental systems, share rent predominates. If the landlord furnishes both land and equipment, he receives two-fifths to one-half of the crops. The expenses are shared by the contracting parties, according to the ultimate division of the crops. If the tenant is able

to furnish the equipment, the landlord receives one-third of everything sold from the farm and bears one-third of the expenses for seed, fertilizer, and packages. Cash rent varies. A common rate is $10 an acre. The negro tenant farmer usually operates under the close supervision of the owner.

The 1910 census reports the average acreage value of land in Accomac County as $46.66 and in Northampton County as $53.98. These figures refer to land only and do not embrace buildings. They are based upon assessed valuations, and are, therefore, lower than the actual sale value. Land values have increased since 1910. Farm land in the area ranges in price from $40 to more than $300 an acre, depending upon soil, drainage, location with respect to shipping points, improvements, and climate. The location is an important consideration to truck farmers. Farms in lower Northampton County, where soil and climatic conditions combine to make possible the earlier marketing of trucks crops than in other parts of the area, are very highly valued, and in some cases are held at as much as $400 an acre. Favorably located farms throughout the two counties are held at $100 per acre up. The prevailing price for farm land is fully $100 per acre. The cheapest lands are found in upper Accomac County, west of the railroad. Here the drainage is poor, roads are below the average, and there are no steamboat wharves. Land bearing a good stand of merchantable timber is worth $40 to $60 more per acre than similar land in a good state of cultivation. Farms with good woodlots bearing some marketable trees and large enough to provide pine straw and leaf mold for use on the land, are worth more than those lacking in these resources. Comparatively high land values prevail near Atlantic and Modest Town.

The Eastern Shore of Virginia Produce Exchange has been a large factor in stabilizing the truck industry of Accomac and Northampton Counties. With a wide organization, consisting of inspectors at all shipping points and agents in the larger city markets, it has been able to establish a brand of Irish and sweet potatoes, "Red Star Brand," which is known throughout the larger markets. Produce is generally sold f. o. b. shipping point and is seldom consigned. The Eastern Shore of Virginia Produce Exchange, entirely cooperative, now handles fully 75 per cent of the truck crops shipped from the area, and in 1916 did a business of nearly $7,000,000 and in 1917 of about $10,000,000. It may be truly said to be one of the most successful growers cooperative organizations in the country.

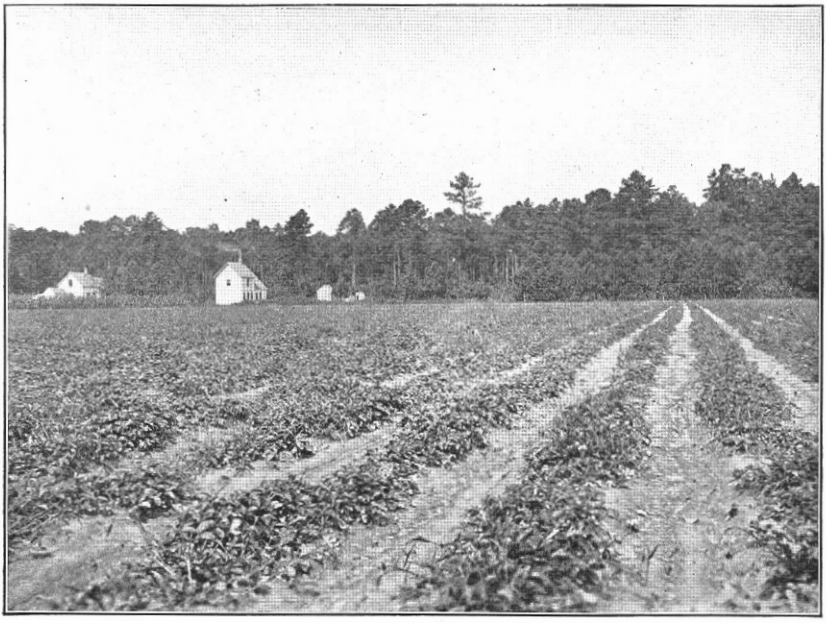
A substation of the Virginia Truck Experiment Station is maintained in the area. This was located at Tasley until the close of the 1917 season, when it was removed to a farm one-half mile south of Onley, where more typical soil is available. This experiment station, in cooperation with the one at Norfolk, is doing much valuable



S. 8538.

FIG. 1.—CORN AND COWPEAS AFTER IRISH POTATOES NEAR ONLEY, ACCOMAC COUNTY.

The fodder has been stripped. Note fodder stack in right background.



S. 8523.

FIG. 2.—STRAWBERRIES ON THE KEYPORT SANDY LOAM, NEAR ONLEY. ELKTON SANDY LOAM IN BACKGROUND.

Note typical [redacted] tenant house.

S. 8270.

FIG. 1.—HARVESTING A GOOD FIELD OF COBBLERS NEAR ONANCOCK, ACCOMAC COUNTY.

S. 8282

FIG. 2.—EARLY IRISH POTATOES ON SASSAFRAS SANDY LOAM, NEAR ONANCOCK.

work for the farmers. In 1916 the Tasley station was easily self-supporting, a notable accomplishment. Many of the farmers take an intelligent interest in this experimental work, and the facts and conclusions brought out as a result of fertilizer and seed tests, and disease investigations are often applied practically with excellent results. A number of the more successful farmers sometimes run series of fertilizer tests themselves.

SOILS.

Accomac and Northampton Counties lie wholly within the Coastal Plain province, a physiographic division extending along the Atlantic Ocean from Long Island to southern Florida, and thence along the Gulf of Mexico to the mouth of the Rio Grande.

The superficial geology of the area is comparatively simple. The two main topographic divisions previously described as the foreland and the upland country comprise, respectively, the Talbot and Wicomico plains, as correlated by the Maryland Geological Survey, geologic terms applied to the younger and older series of beds of unindurated materials from which all the soils of the area have been derived. These divisions are referred by the Maryland Survey to the Columbia group of Pleistocene deposits, and their elevation to the present altitude above sea level is comparatively recent in a geologic sense.

The chief soil forming materials of both the Wicomico and Talbot formations are sand and silt, the latter being made up of soil grains ranging in size between very fine sand and clay. The former is the dominant constituent of most of the soils of the area. Silt is more conspicuous in the soils of the "necks" bordering Chesapeake Bay and the Chesapeake forelands than elsewhere in the area, though it is also the main material of the loam soils throughout the drainage divide of the uplands. Small areas of soil containing a considerable quantity of quartz gravel are encountered in a few places within the forelands in northwestern Accomac County, and the low escarpments between the Talbot and Wicomico plains often bear a slight admixture of the same character.

The underlying or substratum material consists of sand, considerably coarser than the ingredients of the overlying mass, and occurs at a rather uniform depth, about 3 feet below the surface. This substratum of sand serves to improve the drainage of all of the soil types, but otherwise does not, as a rule, affect the character of the soil.

Most of the superficial material is derived from underlying and older Coastal Plain formations, but there is undoubtedly a consider-

able mingling with this, of sediments and fine gravels from the region of crystalline rocks to the north. A few large stones which are seen in the forelands of upper Accomac County bear this out.

The components of the soils of the area were originally deposited as marine sediments, and the textural variations of the several soil types are due primarily to the sorting power of waves and tides before the elevation above tide level, with slight local modifications which may be attributed to the more recent agency of winds. Erosion has played little or no part in the modification of the original material, weathering and drainage having been the most potent factors in altering its character.

The indiscriminate sorting of the materials during their deposition has resulted in the absence of any soil "pattern." No rule can be stated as to where and why any particular type of soil should be found, except in so far as drainage has affected the character of the soil. The more recent formations, however, as the Talbot formation, are finer in texture than the older Wicomico plain, and thus the Chesapeake forelands are quite uniformly made up of heavier textured soils than the uplands.

The various types are quite regular in profile, uniformity of texture, and structure. Generally the surface foot carries more coarse material and is less compact than the portion between 12 and 30 inches, while the section below 30 inches is coarser and more open than the underlying mass.

The materials composing the coastal islands and tidal marshes are now in process of formation and alteration. With one exception, they are too variable and subject to change to be classed as distinct soil types, and they are to be considered as being entirely separate in character and origin from the materials which make up the soils of the peninsula proper.

The soils of Accomac and Northampton Counties are grouped into 5 series, on the basis of differences in color, origin, drainage, and weathering. The series are divided into types, on the basis of texture. Thirteen distinct soil types have been mapped in addition to 4 miscellaneous types, with one phase of the latter.

Soils derived from the coastal plain deposits, with little or no modification in character of the original material except through drainage and aeration, have been included in the Sassafras, Keyport, Elkton, and Portsmouth series. The Norfolk series represents soils derived from coastal plain deposits, but partially reworked through the agency of wind. Tidal marsh, Coastal beach, and Dunesand consist of soils of marine origin in process of formation. Swamp consists of low bottom lands along the fresh water streams of the area.

The soils of the Sassafras series are distinguished by their brown color and mellow structure. The subsoils are reddish yellow to reddish brown, resting upon beds of sand or gravel at depths varying from 2½ feet to 5 feet. The open substratum gives excellent drainage. The Sassafras soils are confined to the northern part of the Atlantic Coastal Plain, where there is an admixture of Piedmont-Appalachian material with the coastal plain sediments. They constitute the most widely developed soils of the present survey. Four types are mapped, the Sassafras sandy loam, fine sandy loam, loamy sand, and loam.

The Keyport series includes soils of the northern part of the Atlantic Coastal Plain, similar in origin to the Sassafras soils, but developed to their present state under less thorough drainage conditions, resulting in an imperfect oxidation of the iron content. The surface soils are commonly grayish brown, and the subsoils are mottled gray, yellow, and reddish brown. The color of the subsoil, together with a more plastic structure, differentiates them from the soils of the Sassafras series. The substratum, at about 3 feet, consists of loose sandy material, frequently quite wet. Three types, the Keyport sandy loam, fine sandy loam, and loam, are mapped in Accomac and Northampton Counties.

In the Elkton series are grouped those soils of the northern Coastal Plain region, having gray to light gray surface soils and heavily mottled, gray, whitish, yellow, and rusty-brown subsoils. Sandy material, usually saturated with water, occurs at depths of 2½ to 3 feet. The Elkton soils have been derived from material originally identical with that giving rise to the Sassafras soils but subjected to different processes of weathering. Occupying wet and depressed areas, the original mass has undergone intermittent wet and dry stages, resulting in unfavorable structural and chemical changes. Through lack of aeration, the finer soil particles have combined rather than granulated, forming a compact and often plastic soil mass. The Elkton soils differ from those of the Keyport series in being much more poorly drained. The iron content is in a much lower state of oxidation. The Keyport soils stand between the Sassafras and Elkton soils as a transitional, but entirely distinct series. The Elkton series is represented by three types in the present survey, the Elkton sandy loam, fine sandy loam, and loam.

The Norfolk soils are characterized by grayish surface soils and yellow, friable subsoils. They are among the most widely distributed soils of the Coastal Plain region. One type, the Norfolk fine sand, is mapped in the present survey.

The Portsmouth series includes dark-gray to black soils developed in depressed areas in the uplands under conditions of poor drainage.

The miscellaneous materials included in the survey are Coastal beach, Dunesand, Tidal marsh, and Swamp.

The following table gives the names and the actual and relative extent of the soils mapped in Accomac and Northampton Counties:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Tidal marsh	126,016	29.3	Norfolk fine sand	5,440	1.3
High phase	1,792		Swamp	5,248	1.2
Sassafras sandy loam	100,672	23.2	Portsmouth loam	4,096	0.9
Shelly phase	512		Dunesand	3,840	0.9
Sassafras fine sandy loam	62,144	14.2	Sassafras loamy sand	3,072	0.7
Elkton loam	29,120	6.7	Keyport loam	1,728	0.4
Keyport sandy loam	24,576	5.6	Portsmouth sandy loam	768	0.2
Elkton sandy loam	22,464	5.2	Sassafras loam	512	0.1
Elkton fine sandy loam	18,048	4.1	Total	436,480	.....
Keyport fine sandy loam	14,912	3.4			
Coastal beach	11,520	2.6			

SASSAFRAS SANDY LOAM.

The surface soil of the Sassafras sandy loam is a light-brown to brown, mellow sandy loam, from 9 to 15 inches deep. It is characterized by a fairly even distribution of the coarse, medium, and fine grades of sand, with a relatively large proportion of silt, which gives a decided coherency to the soil mass. The subsoil is a reddish-yellow or reddish-brown heavy loam, to a depth of from 30 to 36 inches, where it passes rather abruptly into a loamy sand of about the same color as the heavier layer above. The reddish-brown color of the subsoil is more pronounced in the more thoroughly drained portions.

As a rule, the Sassafras sandy loam is quite uniform as to texture and structure throughout the area. In certain localities and under certain conditions, however, minor variations from the typical are found. West of Hallwood and Bloxom are small gravelly areas. Throughout the drainage divide of the peninsula, narrow, ridgelike areas are of frequent occurrence, and in these the subsoil layer is often thinner, the sandy substratum sometimes appearing within 2 feet of the surface. The depth of the surface soil varies widely on these ridges, owing to slight local modifications by erosion. Many areas of the type have a subsurface layer slightly different in color and more compact than the surface soil. The color of this subsurface layer, where it occurs, is yellowish brown. The stratum is most noticeable in fields that have been in continuous cultivation for long periods, and is probably an artificial quality, induced by cultivation rather than a natural feature of the soil.

The Sassafras sandy loam, locally called "red clay land," is the most extensive soil type of Accomac and Northampton Counties.

Its occurrence is widespread over the area, except on the Talbot terraces, and, particularly on the sea side of the peninsula, it occupies continuous stretches of territory from the lower extremity of Northampton County northward to Temperanceville and beyond. It also is found in extensive tracts throughout the central part of the area, but here is more frequently interrupted by flat and depressed bodies occupied by other types of soil. The Chesapeake forelands contain very little of the Sassafras sandy loam, being occupied in the main by finer textured soils. The type is less widely developed in northern Accomac County than in other parts of the peninsula.

The Sassafras sandy loam has a nearly level to very gently undulating topography. The smaller areas, especially the narrow ridges of the type which are so common to the drainage divide of the area, incline to a slightly irregular surface, but these ridges are never more than a few feet higher than the surrounding territory. In the neighborhood of streams, particularly the upper reaches of tidal estuaries, the slopes are short and abrupt. Toward the seaward shore of the peninsula the descent is gradual, and in many places imperceptible.

Surface drainage is everywhere good, and on account of the coarse substratum excellent underdrainage obtains throughout the type, which feature, coupled with the good texture of the overlying material, makes the type a thoroughly aerated soil. The retentiveness of the subsoil prevents excessive drainage, and the soil is capable of maintaining a supply of moisture favorable to healthy plant development.

In its agricultural importance the Sassafras sandy loam outranks any other soil of the area. A large proportion of the best farms are located on this type, and it is considered the most reliable and productive, as well as the easiest handled and best-understood soil of the peninsula. Fully 80 per cent of the type is under cultivation. The remainder supports a healthy growth of pine. Oaks also thrive, and the characteristic undergrowth consists mainly of myrtle, an evergreen shrub which attains a height of 10 or 12 feet, and is rather dense in places. Were it not for the unusual value of the woodlot in Accomac and Northampton Counties, on account of the demand for pine timber and straw, considerably more of the type would be cultivated.

The most important crops are Irish and sweet potatoes, corn, and the various forage and cover crops. (See Pl. II, fig. 2, and Pl. III, figs. 1 and 2.) Hogs and poultry are kept on every farm. A variety of minor crops are successfully grown. The Sassafras sandy loam is adapted to a wider range of crops than any other type of the area. It is especially prized for sweet potatoes, producing tubers of pro-

nouncedly better color, keeping quality, and texture than the less thoroughly drained soils of the survey. Sweet potatoes are most extensively grown in Accomac County, where climatic conditions and the time of harvesting Irish potatoes render the production of "Irish potato corn" rather unsafe.[1] (Pl. IV, fig. 1.) A somewhat brighter colored, more desirable market type of Irish potato is produced than on most other soils. Crops grown on this type are in general less susceptible to climatic disturbances, such as frost, drought, and excessive rainfall than on other soil types of the area.

Irish potatoes yield 35 to 125 barrels (105 to 375 bushels) per acre, depending to a large degree upon the stage of maturity when dug.[2] The average yield of Irish potatoes is in the neighborhood of 60 barrels (180 bushels) per acre. Sweet potatoes on this type yield 50 to 150 barrels per acre, and under especially favorable conditions higher yields have been obtained. The normal yield of sweet potatoes is about 75 barrels per acre. Corn yields 30 to 65 bushels and hay from 1½ to 2½ tons. Occasional higher yields of clover and alfalfa are harvested. Very good yields of other farm crops, both truck and staple, are obtained.

The Sassafras sandy loam is easily tilled and does not clod when plowed wet or bake to any great extent when dry. It is fully as responsive to judicious manuring and fertilizing as any other soil found on the Eastern Shore of Virginia, and on this account it receives better treatment and the benefit of more soil-improving crops than most other types. The methods of handling the type are as described in the chapter on agriculture, and fertilizer is applied to the various crops about as previously outlined.

Land of the Sassafras sandy loam varies in selling price from a minimum of about $100 an acre to a maximum of fully $400 an acre, depending upon location with respect to shipping points and waterways and various improvements. The highest-priced lands of this type are found in lower Northampton County, where the location is always favorable and where a slightly milder climate makes possible the marketing of produce somewhat earlier than farther up the peninsula. The type will command an average price of over $150 an acre.

[1] A local term applied to corn which is planted between potato rows just before digging.

[2] It should be remembered that market prices exert a great influence upon the time of harvesting such crops as Irish and sweet potatoes. A small crop, harvested early, often brings larger net returns than a big yield, marketed when shipments are heavy. For example, one farmer having marketed Irish potatoes early in the 1917 season with a yield of 35 barrels per acre, reported the largest net return he had ever received. The year before, in which good prices were obtained, he had dug as high as 120 barrels per acre. Thus it is seen that were it not for the advantage of early marketing, the average yields would be considerably higher. Data on yields were secured from farmers of the area.

In the improvement of the Sassafras sandy loam many farmers are intelligently and systematically adopting such commendable practices as deep plowing, rotating crops, growing cover crops, and liming. No recommendations can be made which have not been practically and successfully tried out. The use of more definite rotations, however, which include leguminous crops, should be extended. The following two rotations are recommended for use in the area, the former being applicable to Northampton County, where few sweet potatoes are grown, and the latter being better for Accomac County. These rotations are not suggested as a continuous plan, but should be introduced every 5 or 6 years after 3 or 4 years of continuous planting to Irish potatoes or Irish and sweet potatoes, according to the common methods now practiced in the two counties.

For Northampton County, or wherever Irish potatoes are commonly grown for several successive years on the same land:

First year.—Irish potatoes, followed by corn in alternating rows in June. Sow crimson clover in the corn in August and let it stand through the winter.

Second year.—Harvest crimson clover early in May and plant corn immediately, in 4-foot rows. Sow a mixture of crimson and alsike clover in the corn early in August. Let it stand through the winter.

Third year.—Turn under the clover sod in February for Irish potatoes. The land is now in shape for several years' continuous planting to potatoes and corn—a 2-crop, 1-year rotation. In the second year of the above rotation cowpeas or soy beans may be substituted for the corn crop for use either as a forage or green manure crop.

For Accomac County, or wherever Irish and sweet potatoes are grown in rotation:

First year.—Irish potatoes, followed by cowpeas, to be cut for hay. In the fall follow this with a mixture of red and alsike clover. (Mammoth Sapling is the best variety of red clover.) Let the clover stand through the winter.

Second year.—Harvest the clover crop in June. Then comes the alsike clover, giving a second crop. After the second harvest top dress the ground with a light application of stable manure. This forces a rapid growth of alsike in the late fall.

Third year.—Turn under the clover sod and plant Irish potatoes. The land is now ready for the usual rotation of Irish potatoes, corn, with or without cover crop, followed the next season by sweet potatoes. This special clover rotation should be introduced after each two or three cycles of the common Irish and sweet potato rotation. It may be varied as follows:

First year.—Irish potatoes, followed by cowpeas for hay. Rye for winter pasture is planted after the cowpeas, standing till spring.

Second year.—Turn under the rye and plant corn. Sow red and alsike clover in the corn in August. Let the clover stand through the winter.

Third year.—Harvest the clover as outlined above, top dressing with stable manure after the second harvest.

Fourth year.—Turn under the alsike aftergrowth for Irish potatoes.[1]

It is desirable to apply lime to the field at least once during the rotations above outlined. This should be done at the rate of 1,000 to 2,000 pounds per acre of quicklime, or 1 to 2 tons per acre of ground limestone. It will react most favorably when applied where clover is to be seeded, especially the quicklime. Only light sowings of lime should be made directly upon a potato crop.

On farms where considerable trouble is experienced with crab grass and wire grass, the rotation of crops as above suggested will aid greatly in their control.

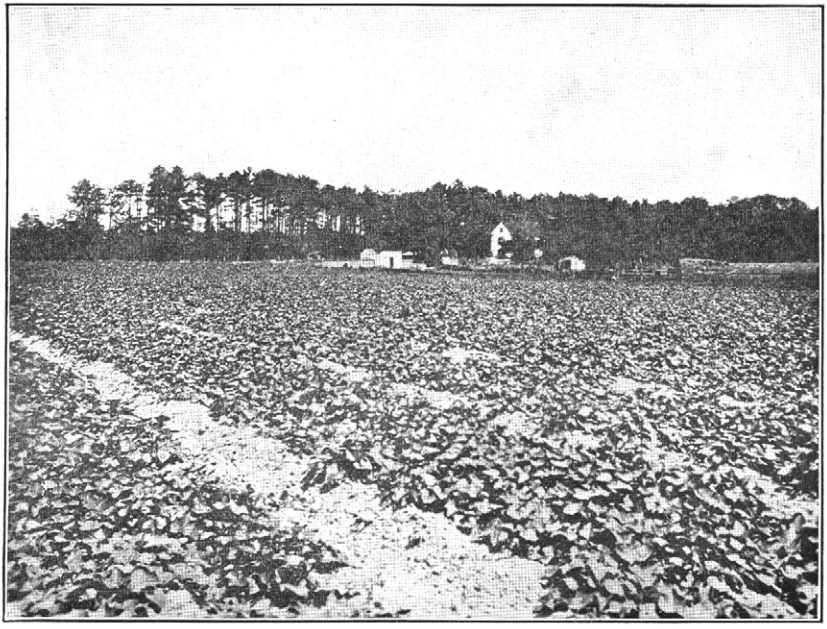
It has been demonstrated that alfalfa can be successfully grown on the Sassafras sandy loam where lime is used, and on shelly areas without lime. Four or five cuttings may be made in a season, and undoubtedly the extension of this crop would prove highly beneficial, both in increasing the hay production and in improving the land. In seeding to alfalfa for the first time the field should be inoculated. Late summer or early fall seeding is preferable. In maintaining the stand a light top-dressing of acid phosphate should be applied at least every two years.

More live stock should be kept, particularly hogs. The resultant increase in manure will be of much aid in maintaining fertility, and waste products of the farms may be profitably utilized in feeding.

More attention should be paid to fruit trees. In other localities, fruit growing on a commercial scale is successfully practiced on the Sassafras sandy loam, and although it is not suggested as a commercial proposition for Accomac and Northampton Counties, spraying and pruning would be profitable in managing the home orchards.

Sassafras sandy loam, shelly phase.—The shelly phase represents numerous small areas of Sassafras sandy loam, occurring along the seaward border of the peninsula, which contain a considerable quantity of shell fragments in both surface and subsoil. These are angular in shape, and their presence can only be attributed to bands of Indians hundreds of years ago, who congregated at these places and

[1] These rotations were recommended by Prof. T. C. Johnson of the Virginia Truck Experiment Station.



S. 8416

FIG. 1.—SWEET POTATOES ON THE SASSAFRAS SANDY LOAM, ACCOMAC COUNTY.

S. 8448.

FIG. 2.—SWEET POTATOES ON THE SASSAFRAS SANDY LOAM, ACCOMAC COUNTY.

S. 8429.

FIG. 1.—"IRISH-POTATO CORN," NORTHAMPTON COUNTY.

Typical better class farmstead in the background.

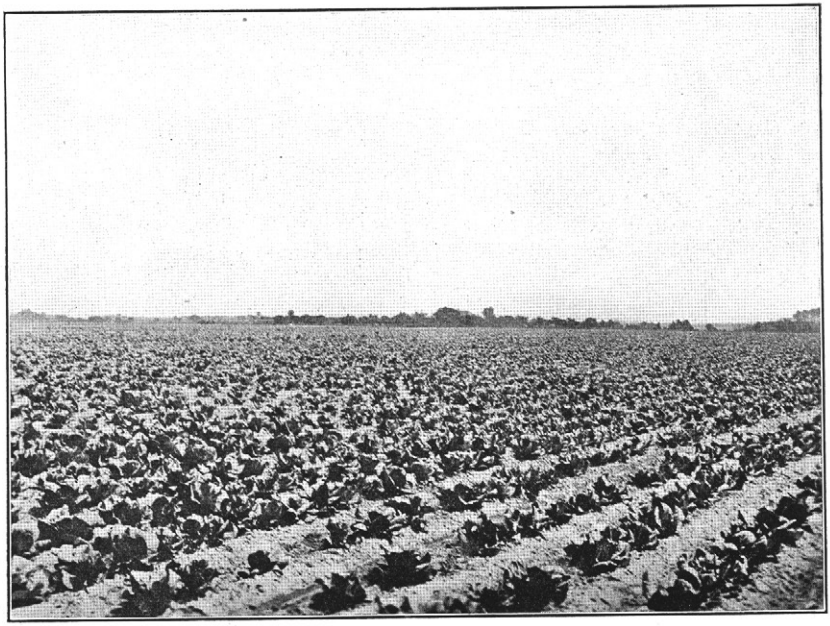


FIG. 2.—CABBAGE ON KEYPORT FINE SANDY LOAM, NORTHAMPTON COUNTY.

feasted on clams and oysters, leaving the shells on shore. They are present in sufficient quantity to impart a rather distinct character to the soil.

SASSAFRAS FINE SANDY LOAM.

The surface soil of the Sassafras fine sandy loam is a grayish-brown or brown fine sandy loam, with an average depth of 8 inches. Between 8 and 15 inches, a slightly more compact subsurface layer of a yellowish color is commonly encountered. This is underlain by a yellowish-brown or reddish-brown fine sandy clay loam, which at 30 to 36 inches passes into a loamy fine sand of about the same color. The subsoil layer is somewhat heavier than that of the Sassafras sandy loam, and in many places inclines to a slight degree of plasticity.

Slight variations from the typical characteristics of this soil are of frequent occurrence. West of Johnsontown and in Wilsonia and Oldtown Necks, where the surface configuration is rather irregular, the subsoil is appreciably lighter in texture, being a fairly heavy fine sandy loam. Near the village of Cape Charles, over a considerable proportion of an extensive tract of the type, the subsoil is nearly yellow in color and somewhat resembles the subsoil of the Norfolk fine sandy loam, an important type of soil in the southern parts of the Atlantic Coastal Plain region. This yellow subsoil characteristic is frequently noticeable where the Sassafras fine sandy loam is closely associated with areas of the Keyport fine sandy loam. The best drained areas of the type are pronouncedly reddish brown in color in the subsoil.

The Sassafras fine sandy loam is confined largely to the necks and water fronts of the Talbot terraces on the Chesapeake side of the peninsula. It is an extensive soil, however, especially in Northampton County, where it occupies about 90 per cent of the Chesapeake forelands, and occurs in large connected bodies. East of Birdsnest, Machipongo, and Nassawadox, and on Bell Neck, along the seaward side of the area, the type is developed quite extensively, occupying disconnected necks and "islands," which in this locality are separated by tidal marshes and small channels. In the vicinity of Atlantic and Horntown in northeastern Accomac County is a wide development of the soil, which here occurs chiefly on the upland or Wicomico plain. No other tracts of consequence are found within the upland division. Throughout the Chesapeake side of Accomac County the type is developed along the shores of tidal estuaries and streams within the foreland plain, often terminating at the head of tidewater.

Generally the topography of the Sassafras fine sandy loam is nearly level. The surface contour is gently undulating, however, in a number of places, notably on the eastern sides of Hungers and Nassawadox Creeks and in northeastern Accomac County. The influence of wind action is sometimes apparent in the areas of uneven relief. The shore of Chesapeake Bay in Northampton County and the tidal estuaries of the area as far north as Hunting Creek are marked by bluffs from 5 to 30 feet high. As the bay is approached the height of the bluffs diminishes, clearly showing the gradual slope of the forelands toward Chesapeake Bay.

Very good surface drainage prevails over the Sassafras fine sandy loam. On the whole, however, drainage is slightly less thorough than that of the sandy loam member of this series. Wherever the relief is sufficient to insure good drainage the subsoil is quite friable, admitting of good aeration and circulation of moisture. On the other hand, the subsoil of a few level bodies, and also some areas of the type which lie but a few feet above tide level, is heavy enough to retard the movement of soil water and artificial drainage is sometimes necessary. The drainage of a few low-lying tracts is impaired to some extent by tides. The porous substratum assists materially in improving the underdrainage of this soil, as in the case of the Sassafras sandy loam.

Next to the sandy loam the Sassafras fine sandy loam is the most important soil type of the area, and is highly prized for the production of all the more important crops. Owing to its situation along the navigable waters, it was the first soil to be developed in colonial days, and before the advent of railroad transportation a greater proportion of the type was cultivated than of any other. At present about 80 per cent of the type is in a good state of cultivation, the remainder supporting a forest growth similar to the Sassafras sandy loam. Some gum is found in wooded areas of least thorough drainage.

Irish and sweet potatoes, corn, forage and cover crops, strawberries, and cabbage are the main crops produced on farms of the Sassafras fine sandy loam. Raising live stock constitutes a minor industry on all farms. Tomatoes are grown in a small way to supply canneries within the area. Watermelons and cantaloupes are raised to supply local demands, and many truck and garden crops are grown in a small way to meet local and home needs.

Yields of the various truck crops are about as good as obtained on the Sassafras sandy loam. Strawberries yield 1,800 to 3,000 quarts per acre. Good yields of early cabbage are often obtained, but this crop has proved to be a rather speculative venture, as a rule.

In the production of crops the Sassafras fine sandy loam is handled in a similar manner to the Sassafras sandy loam. Some trouble

is experienced with baking of the soil in dry weather, and there is a slight tendency to run together when wet. Care has to be exercised in plowing and cultivating, on account of these characteristics. Fertilization is done in the same manner and at the same rate as on the Sassafras sandy loam.

The Sassafras fine sandy loam ranges in value from $75 to more than $300 an acre, depending upon location with respect to shipping points and navigable waterways and improvements. Lands of the type are held at an average price of $125 or more an acre. For the production of crops the type is valued about as highly as the Sassafras sandy loam. On the whole, however, the location of farms is not as favorable as in the case of the latter type, and for this reason a slightly lower average price is commanded.

Methods of improving the Sassafras sandy loam are equally applicable to the Sassafras fine sandy loam. Alfalfa will do well on the better drained portions of the type with the use of lime and, usually, inoculation. On account of the long periods of continuous cultivation which many areas of the type have received, the use of restorative rotations is fully as important as with the Sassafras sandy loam. The lighter areas of the type are in especial need of organic matter, which is cheapest to obtain by turning under leguminous crops.

The more poorly drained areas are so situated that effective drainage systems could be installed with inconsiderable outlay. The value of the land warrants the installation of tile drainage systems wherever artificial drainage is necessary. Subsoiling will be of benefit in some areas where the subsoil is rather impervious. Liming will aid in correcting the acidity and improving the physical condition of this type.

SASSAFRAS LOAMY SAND.

The surface soil of the Sassafras loamy sand to a depth of about 12 to 15 inches is a grayish-brown, sometimes brown, loamy sand. The subsoil is a yellowish-brown or reddish-brown slightly more coherent loamy sand, which often contains a thin layer of a light sandy loam. Below 36 inches a substratum of sand is often found, which contains very little fine material. Within the type as mapped are included a few small areas of Sassafras loamy fine sand, whose extent did not warrant mapping as a distinct type. Such areas are similar to the type in all respects except texture. The more important of these are located 1 mile northwest of Franktown, and 1 mile west of Johnsontown, respectively.

The most extensive tracts of the Sassafras loamy sand are found near Horntown and Wattsville, where in the aggregate it occupies 3 or 4 square miles. Other areas of the type are small and widely separated through the survey.

The surface configuration is prevailingly gently undulating, though some of the type is comparatively level. Drainage is excellent and in places inclined to be excessive, owing to the open substratum.

The Sassafras loamy sand is relatively unimportant in the agriculture of the area. Considerably more than half of the type is in cultivation, however, the remainder being forested with second growth pine and oak.

The same crops are produced on this soil as on the Sassafras sandy loam, and farm practice in general is similar. Planting is done one to two weeks earlier, and Irish and sweet potatoes are marketed earlier than on the surrounding types. This sometimes gives an advantage in price. The yields of Irish and sweet potatoes and corn are considerably lower than on the Sassafras sandy loam. Irish potatoes yield 25 to 75 barrels per acre, sweet potatoes 40 to 80 barrels, and corn 20 to 35 bushels.

Heavier applications of fertilizer are necessary than on the more retentive soils, a ton to the acre being often applied for Irish potatoes. The formulas are the same as used on other soils of the area.

Lands of the Sassafras loamy sand are generally sold in connection with other types of soil. They are held at $50 to $125 an acre, depending upon location and improvements.

In maintaining the fertility of this soil liberal applications of stable manure are essential. The turning under of green manure crops is very important, and in the use of the rotations suggested for the Sassafras sandy loam, which will be applicable to this type, the cycle should be shorter. More difficulty will be experienced in obtaining a stand of clover than on heavier soils, but once a crop is successfully grown future crops will be easier to obtain, provided too long a time has not elapsed. Of the various legumes, probably cowpeas are best adapted to this soil. The use of lime should be extended and more hogs should be raised.

SASSAFRAS LOAM.

The surface soil of the Sassafras loam is a grayish-yellow to brown, mellow loam to silty loam, about 12 inches deep. The subsoil is a yellowish-brown, friable clay loam, which at about 3 feet is underlain by a substratum of yellowish-brown loamy fine sand. Within the type are included small patches having the texture of a very fine sandy loam.

The only areas of this soil mapped on the Eastern Shore of Virginia occur in northeastern Accomac County, near Horntown and Silva. The topography is level and drainage is good. Owing to its small area it is unimportant in the agriculture of the peninsula. It

is a very good soil, however, and most of it is in cultivation. Forested areas support a growth of oak and some pine.

Though potatoes are grown on this soil, it is used more for general farm crops than for trucking, and the main crops are corn, grass, and wheat, of which good yields are attained. The locality in which this type occurs is practically the only one in the two counties where general farming is practiced to any extent. More live stock is kept than is generally the case in other parts of the survey.

Lands of the Sassafras loam are sold in conjunction with other types as a rule and have a somewhat lower price than surrounding soils better adapted to truck crops.

The type can be improved by liming and the addition of organic matter through the use of stable manure and leguminous crops. Heavier equipment than the average is necessary to till this soil properly.

ELKTON SANDY LOAM.

The surface soil of the Elkton sandy loam to an average depth of 8 inches is a gray sandy loam, frequently quite heavy. When dry it often has an ashy gray or whitish appearance. Between 8 and 12 to 15 inches there is commonly encountered a subsurface layer of a light gray, heavy sandy loam, sometimes mottled with rusty brown and yellow stains. The subsoil consists of a heavy, mottled gray, yellow, and rusty red or brownish sandy clay loam, in places sticky and plastic. Below 30 inches lies a substratum of gray or yellowish-gray sticky sand which is generally saturated with water.

Considerable variation in the degree to which the subsoil is mottled is everywhere apparent. Sometimes it is so intensely mottled as practically to exclude the characteristic gray color, and in other places almost no mottling appears, the color being bluish gray or drab. Within the larger areas of the type are included patches of the Portsmouth sandy loam and Elkton loam which are too small to be shown on the map. In the vicinity of Poulson and Mears quartz gravel is an important constituent of both soil and subsoil. Near Melfa several small areas of the Elkton loamy sand are included with the type. Such areas have a surface soil of gray loamy sand to about 12 inches and a subsoil of light yellowish-gray loamy sand. They are markedly inferior to the Elkton sandy loam in productiveness.

This type of soil occurs in medium to large bodies scattered throughout the survey. It is found mainly on the drainage divide of the peninsula and on the inner borders of the Talbot or foreland plains. In lower Northampton County a fringe of the type occurs along the seaward border, only a few feet above tide level, and here

it is subjected to continual seepage from the higher lands farther back.

The topography of the Elkton sandy loam is flat. It frequently occupies saucerlike depressions in the uplands which are partly or wholly surrounded by higher better-drained soils. The low areas about the heads of streams and the flat lands lying between natural drainage ways of the peninsula, are often of this type of soil.

Drainage is poor, the water table generally standing very near the surface.

Most of the type is forested with a second growth, consisting mainly of sweet and black gum, white oak, and pine, and a thicker undergrowth of huckleberry, myrtle, and other shrubs. About 30 per cent is under cultivation, and the soil is fairly important in its relation to the agriculture of the area.

Irish and sweet potatoes, corn, hay, strawberries, and onions are the principal crops grown on the Elkton sandy loam. The truck crops occupy a somewhat less important place than on the better drained soils of the area. Otherwise, the type of farming is similar to that on the better drained soils of Accomac and Northampton Counties and the methods of cultivation are about the same. Corn is grown independently on this type, more than on the Sassafras and Keyport soils. A number of minor crops are planted in a small way.

Owing to the generally poor drainage conditions the Elkton sandy loam is not an entirely dependable soil. Crops have a tendency to drown out in periods of excessive rainfall, and are affected by long dry spells. Therefore crop yields are lower on the average than on the Sassafras and Keyport soils. In favorable seasons, however, they equal the yields on the better drained soils, at least where good artificial drainage systems have been provided. Irish potatoes yield 25 to 125 barrels per acre. Yields from the early diggings are smaller than on the Sassafras soils, better results being obtained when the crop is left until full maturity. Sweet potatoes yield 30 to over 100 barrels per acre, corn 20 to 60 bushels, strawberries, 2,000 to over 3,000 quarts, and onions 100 to 250 baskets per acre. Hay gives fairly good yields, especially red clover. Winter cover crops are sometimes heaved out by frost.

In the cultivation of the Elkton sandy loam plowing is done later in the spring than on the well-drained types. The soil is handled in a similar manner, however, as regards tillage and fertilization.

The Elkton sandy loam is held at $50 to $150 an acre when in cultivation, depending upon location, drainage, and improvements. When sold in connection with better-drained soils considerably higher prices are obtained.

In improving and maintaining the fertility of the Elkton sandy loam the first step should be the establishment of adequate drainage. Tiling is justified in many cases, and although little tile drainage has yet been installed, it will ultimately be an important factor in the improvement of many farms of Accomac and Northampton Counties. By deepening and extending natural drainage ways, and by constructing open ditches, much of the type could be brought into good condition without a prohibitive outlay. In most cases, however, lateral tile should be laid. Until good drainage has been established measures for building up the fertility of this type will be largely wasted. Under fair to good conditions of drainage, the Elkton sandy loam will be benefited by the plowing under of pine straw, wood-mold, coarse stable manure, etc., which will loosen the soil and improve the aeration. Rotations which include the leguminous crops should be adopted, and the use of lime should be extended. The turning under of green cover crops once in about two years will result advantageously. By using proper care, this type can be made a generally productive and reliable soil.

ELKTON FINE SANDY LOAM.

In color and profile the Elkton fine sandy loam is quite similar to the Elkton sandy loam. The surface soil to a depth of from 12 to 18 inches consists of a gray, fine sandy loam, often light gray in lower portions. The subsoil is a gray, yellow, and rusty brown, mottled, rather plastic fine sandy clay and is underlain at 30 inches by the usual sandy substratum, light gray to whitish in color, sticky, and saturated with water.

This type is widely developed within the Chesapeake forelands, especially in Accomac County. It is also found in the flat strip of forelands extending along the seaward side of the area, from Machipongo northward to Wachapreague. The only upland areas of the type occur near Horntown and New Church, in close association with the Sassafras and Keyport fine sandy loams.

The Elkton fine sandy loam occupies flat areas of low elevation, as a rule, and in places semiswampy, with few natural channels for the removal of any excess of ground water. The drainage is somewhat poorer than that of the Elkton sandy loam. The type in many places lies adjacent to bodies of Tidal marsh, and often the construction of low dikes with drainage gates is unnecessary to keep out excessively high tides.

Considerable areas of the type are under cultivation, but about 75 per cent of its total area is uncleared, the forest growth being similar to that of the Elkton sandy loam. The crops grown, the yields, and the methods employed are like those on the latter type,

and fertilization of the various crops is like that of other soils of the area.

The Elkton fine sandy loam sells at from $40 to $100 an acre, and sometimes higher when sold in connection with lands of the Sassafras and Keyport fine sandy loam. As a rule the type is relatively unfavorable in its situation with respect to markets.

In general, the methods suggested for the improvement of the Elkton sandy loam are equally applicable to this type. Under good drainage conditions a fair degree of productiveness can be maintained. Under present conditions the more poorly drained portions of the type would be rather expensive to reclaim.

ELKTON LOAM.

To an average depth of 10 inches the material of the Elkton loam is a gray or brownish gray loam, fairly heavy, but containing sufficient sand, as a rule, to give it a distinctly gritty feel. The subsoil is of a mottled gray, yellow, and rusty brown color, and varies from the texture of a heavy loam to that of a plastic silty clay loam. At depths of 30 to 36 inches occurs a gray or yellowish-gray, sticky, loamy sand, saturated with water.

This type is characterized by many local textural variations which are impossible to distinguish on the map. The surface soil may vary in texture from a heavy sandy or fine sandy loam to a light silt loam within a small area. These departures from the typical, however, are of little or no consequence in their relation to the agriculture of the soil. Near Poulson small areas of the Elkton loam bear a considerable content of small, rounded quartz gravel thoughout the 3-foot section. Near Poplar Cove Wharf, on Onancock Creek, and 2½ miles south of Eastville are typical areas of Elkton silt loam, which are included with the loam because of their small aggregate extent, as well as their similarity in all respects except texture. The type also includes small areas of the Portsmouth loam, too patchy to be shown on the map.

The Elkton loam, like the other types of that series, is called locally "pipe-clay land." It is common to nearly all parts of the survey. It is not extensively developed in Northampton County, but in Accomac occupies large bodies both on the Talbot terrace and throughout the drainage divide of the uplands. The largest areas of the type occur within the Chesapeake forelands, from Pungoteague northward to the Maryland line. Broad tracts are found in upper Accomac County, as the peninsula broadens out near the northern boundary. It is closely associated with the Elkton sandy loam, its mode of occurrence is the same, and often the boundary between the two types is difficult to distinguish.

The topography is flat and often depressed. Like the Elkton sandy loam, saucerlike depressions are common to the type over the upland drainage divide. Timbered areas are apt to be very hummocky, apparently having been left in that condition by decaying upturned roots of fallen trees. Some of the larger, more poorly drained tracts are characterized by small "beech ridges," a few inches higher than the surrounding soil. These are somewhat lighter in texture and slightly better drained than the body of the type. They are never more than an acre in extent.

Drainage is characteristically very poor. On the upland or Wicomico plain, the type as a whole is somewhat better drained than within the Talbot division, the sandy substratum exerting a greater influence on the underdrainage than on areas of low elevation above tide. The larger bodies of the type are semiswampy and are incapable of development except by extensive ditching and tiling. Some of the more extensive tracts are locally called swamps, as Dahl Swamp, near Cashville. On the Chesapeake side of Accomac County, tidal marshes are often bordered by the type, the two merging together very gradually in places. Diking is done in some places to keep out tides.

In extent the Elkton loam is one of the more important soils of the Eastern Shore of Virginia. Only about 25 per cent is under cultivation, however, the rest being forested with gum, soft maple, pine, and white oak. Much of the merchantable timber has been removed, and a thick undergrowth is found in many places. Near the salt marshes trees are often stunted and of little value.

Much the same crops are grown on the Elkton loam as upon the other types of the Elkton series. A few farms in upper Accomac County are mainly devoted to the staple crops—corn, grass, and wheat. On the better drained farms yields correspond to those obtained on the Elkton sandy loam. Cultivation and fertilization is carried on under methods previously described.

Farm lands of the Elkton loam sell at from $30 to $150 an acre, the price depending upon drainage, improvements, and location in respect to shipping points. Some portions of the type near tide level have a lower value, while higher prices are sometimes obtained for land sold in connection with other better-drained soils.

In its crop adaptation the Elkton loam is quite like the Elkton sandy loam. With the exception of the heavier vegetables, however, it is not as well adapted to truck crops as the sandier soils, being better suited to grass, corn, and small grains, and in other localities being mainly devoted to the staple farm crops. In view of the high development of the existing type of farming in Accomac and Northampton Counties, the soil is probably best used for the ordinary

crops grown there, and recommendations for the improvement of the Elkton sandy loam will also apply to the Elkton loam. Adequate drainage is essential for the highest development of the type. Coarse manures and pine straw, when plowed under, will aid in opening up the soil, and the liberal use of lime will improve its physical condition, as well as correct the acidity.

KEYPORT SANDY LOAM.

The surface soil of the Keyport sandy loam is a grayish-brown sandy loam with an average depth of 8 inches. This is underlain by a subsurface layer of a pale or grayish yellow, faintly mottled, heavy sandy loam, extending to a depth of 15 inches. The subsoil is a yellow, reddish-brown, and gray mottled sandy clay loam, and passes at 30 to 36 inches into a grayish-yellow loamy sand. The Keyport sandy loam differs from the Sassafras sandy loam in that it is less well drained, and has a mottled subsoil. It differs from the Elkton sandy loam in being considerably better drained and in having a more highly oxidized subsoil, resulting in a basic subsoil color of yellow, while that of the typical Elkton subsoil is gray.

Over most of the area the type is uniform in all of its characteristics. A few variations warrant mention, however. One-half mile southwest of Weirwood an area mapped as this type is more nearly the Keyport loamy sand. The color is similar to the sandy loam, but the soil and subsoil contain much less fine material, being of a distinct loamy sand texture. This would be mapped as a separate type but for its small extent. It is not as productive as the typical Keyport sandy loam. Along the seaward border of Northampton County are a number of narrow strips of the type which are influenced by seepage water. These are not in cultivation, and in contrast to the soil as a whole, would be difficult to drain. A few areas mapped within the Chesapeake forelands of upper Accomac County are not entirely typical, the color of the subsoil being a yellowish gray, and the texture of the subsoil varying from a sandy loam to a brittle sandy clay. Such areas are located northwest of Bloxom, and near Hallwood and Poulson. In these localities some of the type is gravelly. A small gravelly area is found also near Shields.

The Keyport sandy loam is widespread in its occurrence throughout the uplands, to which it is largely confined. It has its greatest development over the upland drainage divide, and is most frequently found in the portion of the area between Exmore and Parksley, especially in the vicinity of Tasley and Onley.

The Keyport sandy loam does not occupy large areas, as a rule. Its mode of occurrence—as an intermediary stage between the Sassafras and Elkton soils—limits its extent to comparatively narrow,

irregular tracts in many places. The topography is level, as a rule. Often the soil occupies small, saucerlike depressions, which are similar to those common to the Elkton sandy loam. Sometimes the type occupies low ridges within the Elkton types. It also occurs in depressions and flat lands around the heads of small streams.

The surface drainage is poor, though much better than that of any of the Elkton types. The Keyport sandy loam is nearly always so situated that artificial drainage can be provided very simply. The soil would be much more poorly drained but for the sandy substratum. Good results with crops are often obtained without artificial drainage. The color and structure of the subsoil shows that the type is much better aerated, and in a more favorable condition for plant development than are the Elkton soils.

The Keyport sandy loam is one of the leading agricultural soils of the area. Over half of it is under cultivation, and considerable of the type is annually being cleared and planted to crops. Probably a greater proportion of this soil is now being improved and brought into cultivable condition than of any other soil on the peninsula. Forested portions support a growth of pine, oak, some gum, and an undergrowth of myrtle, huckleberry, and other shrubs.

The crops grown on the Keyport sandy loam are the same as are produced on the Sassafras sandy loam, the adaptations of the two types being quite similar. Yields in many cases equal those obtained on the Sassafras sandy loam, but are not quite as high through a period of years, owing to losses in times of very wet weather. The soil is handled in the same way as the Sassafras sandy loam, with respect to cultivation and fertilization.

Land of the Keyport sandy loam, when sold mainly in connection with the Sassafras sandy loam, as is often the case, brings practically as good prices as the latter type. When sold separately it brings from $75 to fully $200 an acre, depending upon the same conditions which influence the value of other types.

In general the suggestions for the improvement of the Sassafras sandy loam will apply to this type. The best results, however, can only be obtained where adequate provision for drainage has been made. In view of the high value of the type it would seem that tile drainage is much to be preferred over the open ditch method. Several farms largely composed of the Keyport sandy loam now have tile drainage systems in use, and the results are good enough to warrant the installation of tile over a considerable part of the type throughout the area. All the leguminous crops commonly grown in the two counties, except alfalfa, are to be recommended for this soil. It is possible that on well-drained areas alfalfa will grow fairly well, but the crop is not suggested for most of the type.

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

Mechanical analyses of Keyport sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
211631	Soil	1.0	18.8	18.4	25.2	5.2	24.0	7.2
211632	Subsoil	.4	14.9	16.0	21.1	4.3	29.2	14.1
211633	Lower subsoil	1.3	16.2	14.8	18.0	4.6	27.3	17.7

KEYPORT FINE SANDY LOAM.

The surface soil of the Keyport fine sandy loam is a grayish-brown fine sandy loam, 8 inches deep. This is underlain by a yellow compact, heavy fine sandy loam, which at about 14 inches passes into a subsoil of yellow color, mottled with gray and rusty reddish brown, of a slightly plastic fine sandy clay texture. At from 30 to 36 inches, is found a substratum of grayish yellow loamy fine sand.

This type of soil is almost entirely confined to the forelands, or Talbot division, and bears the same relation to the finer textured Sassafras and Elkton soils that the Keyport sandy loam bears to the Sassafras and Elkton types. A few upland areas are found in upper Accomac County in close association with the fine-textured Sassafras and Elkton soils in that locality. Its main development is in the necks of the Chesapeake side of the peninsula, and the largest tract of the type occurs in Savage Neck.

The Keyport fine sandy loam is comparatively flat in surface configuration, though in places it occupies low ridges which are but slightly elevated above surrounding Elkton types. In its typical position it borders the inside of areas of the Sassafras fine sandy loam along the estuaries and streams of the forelands, merging gradually into the flat, poorly drained lands farther back, usually the Elkton fine sandy loam and loam.

Drainage is imperfect, and wherever the type is in cultivation open ditches are in common use. The type is much better drained than the Elkton soils, but on account of its closer texture is slightly less well drained than the Keyport sandy loam. Considerable trouble is experienced at times with crops drowning out.

The Keyport fine sandy loam, though not of great relative extent, is considered a valuable soil and considerably over half of it is in cultivation. The remainder supports a forest growth similar to that of the Keyport sandy loam.

The crops are similar to those grown on the Sassafras fine sandy loam. Cabbage is quite important in Northampton County. (See

Pl. IV, fig. 2.) Strawberries and onions also are largely planted, especially near Onancock and Cashville. In favorable seasons the yields of all crops closely approach those obtained on the Sassafras fine sandy loam. The type is well handled by methods similar to those in use on the better soils of the area.

The Keyport fine sandy loam is held at $50 to $200 an acre, depending upon location with respect to shipping points and improvements.

With adequate provision for draining the type it can be improved and its fertility maintained by the use of measures suggested for the Sassafras sandy loam. Some tile drainage systems are now in successful operation. With few exceptions areas of this type are favorably situated for the easy installation of such systems, and their use is strongly recommended.

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

Mechanical analyses of Keyport fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
211624	Soil	0.4	2.6	5.4	52.0	4.2	28.3	7.4
211625	Subsurface	.3	2.0	4.3	44.3	5.1	32.7	11.4
211626	Subsoil	.2	1.8	2.9	37.6	4.6	28.1	25.2
211627	Lower subsoil	.8	3.0	5.0	68.0	2.9	7.6	12.6

KEYPORT LOAM.

The surface soil of the Keyport loam consists of a grayish-yellow loam, 12 to 14 inches deep. The subsoil is a mottled yellow, rusty reddish brown, and gray heavy silt loam, and is underlain at about 32 inches by a yellowish gray, sticky loamy sand to fine sand. Near Horntown small areas having a very fine sandy loam texture are included with the type. They are similar to the loam in other respects.

The Keyport loam is an inextensive type. The largest areas lie west of Horntown and south of Hopkins, the remainder of the type occurring in small, widely scattered bodies in various parts of the survey. The topography is generally level and drainage is rather poor. About half the type is cultivated, the crops being the same as grown on associated soils. General farming is practiced to some extent near Horntown.

Good yields of truck and staple crops are obtained under the usual methods of cultivation and fertilization. Land values range from $35 to over $100 an acre.

Recommendations given for the improvement of the other Keyport types are applicable to the Keyport loam.

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

Mechanical analyses of Keyport loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
211609	Soil	0.4	3.0	4.4	36.2	4.2	37.1	14.5
211610	Subsoil	.6	2.7	4.0	35.2	4.7	35.6	17.2
211611	Lower subsoil	1.0	8.0	6.6	52.7	2.8	15.9	13.0

NORFOLK FINE SAND.

The surface soil of the Norfolk fine sand is a gray or grayish-brown fine sand, about six inches deep, underlain by yellow fine sand to a depth of 36 inches or more. This description represents the Norfolk fine sand as it is developed on the mainland, the larger areas lying to the north of Assawoman and near Drummond Ponds. The topography is undulating to rolling and the drainage is excessive.

Included with this type and developed on Chincoteague, Parramore, Assateague, Hog, and Smith Islands are areas of fine sand which vary slightly in color from the typical Norfolk fine sand. In places the surface soil is a gray loose fine sand underlain by yellow-brown incoherent fine sand to a depth of 36 inches or more. In the lower situations on these islands the surface soil is gray to dark gray fine sand having a depth of about 10 inches and containing enough organic matter to give a slightly loamy texture.

The subsoil is a gray to brownish-gray fine sand usually saturated with water. The agricultural differences between this phase and the typical soil were not of sufficient importance to warrant establishing a new type.

The topography of the fine sand on the islands consists principally of low, long, narrow ridges, which are separated by narrow strips of Tidal marsh. Comparatively little of the type is under cultivation. Near Assawoman and on Chincoteague Island small areas of the Norfolk fine sand are devoted to the production of corn, Irish potatoes, sweet potatoes, and vegetables, all of which are produced principally for local consumption. Their yields are generally low and the land would probably not be cultivated if there were good agricultural soils available. Some fertilizer is used, together with pine straw and glade mud, or mucky soil material collected from the marshy swales near by.

The Norfolk fine sand ranges in price from $5 to $20 an acre except for small lots near the towns, where the prices are somewhat higher.

This land would be greatly benefited by the addition of organic matter through the turning under of leguminous cover crops, rye, or coarse manures. Rye will probably make the best growth of the cover crops. After organic matter has been incorporated in this soil, fair results can be obtained with Irish potatoes, sweet potatoes, watermelons, cantaloupes, and truck crops.

PORTSMOUTH SANDY LOAM.

The surface soil of the Portsmouth sandy loam is a dark-gray to black sandy loam about 12 to 15 inches deep. The subsoil is a gray sandy clay loam or sandy clay mottled with yellow and rusty stains in the lower portions, and is underlain at 30 inches by a gray sticky sand saturated with water.

This type is developed in comparatively small areas distributed widely within the upland drainage divide of both counties. The largest tracts lie near Mappsville, Temperanceville, and Birdsnest, and 1½ miles northwest of Painter. The soil is developed in level areas and saucerlike depressions, and drainage is poor.

The Portsmouth sandy loam is not an important soil type in Accomac and Northampton Counties. Considerably less than half of the type is drained and cultivated. The forested areas support a growth like the associated Elkton soils.

The type is handled in the same manner and used for the same crops as the Elkton sandy loam. Land values are somewhat lower than on that type.

Little can be done with the Portsmouth sandy loam without first draining it. In other localities thoroughly drained areas of the type have proved very productive, producing excellent crops of corn, and being well suited to strawberries and onions. By the construction of main ditches with laterals of tile much of the type can be brought into a good state of cultivation. Rather heavy applications of lime are necessary to put the soil in the most productive condition.

PORTSMOUTH LOAM.

The surface soil of the Portsmouth loam consists of a black, spongy loam, about 15 inches deep. It is very high in organic matter and frequently approaches the characteristics of Muck. The subsoil is gray in color, mottled with yellow in the deeper portions, and varies from a heavy loam to a plastic silty clay loam. At 30 inches occurs a substratum of gray loamy sand, wet and sticky.

The largest areas of the Portsmouth loam are found between Hallwood and Sanford. Other important tracts are situated north of Melfa and southwest of Keller, while developments of lesser extent occur in a number of scattered localities, often closely associated with the Portsmouth sandy loam. The type does not occur below Nassawadox.

The Portsmouth loam has the same topography as the sandy loam and is the result of the same processes, having been developed under swampy conditions, which favor the rapid accumulation of decaying vegetable matter. The soil is almost entirely lacking in natural drainage, and during certain seasons of the year is partially covered with water.

Only a very small part of the type, along the borders of a few areas, has been brought under cultivation, and in its present condition the Portsmouth loam is of little significance in the agriculture of the area. The body of the type is forested with pine, black and sweet gum, and oak, with a heavy undergrowth. Irish potatoes, corn, strawberries, and onions are the main crops, and good results are obtained on the better-drained portions.

The Portsmouth loam, in its present state, can not be farmed without extensive ditching or tiling, or both. When drained, however, it can be made a productive soil, and apparently there is much of the type that can be reclaimed with profit. Where this soil has been developed in other localities it has proved a strong soil, producing good crops of corn, strawberries, onions, and cabbage, and giving fair results with Irish potatoes. The liberal use of lime would be of great benefit. Fall-sown crops are apt to heave during alternate freezes and thaws of winter.

TIDAL MARSH.

The areas of marshy land lying near sea level, and subject to tidal inundation, are classed as Tidal marsh.

The soil material is a brown or gray, rather slimy sandy loam to loam or clay loam, and the upper portion is pretty thoroughly interspersed with the roots of coarse grasses and decomposing vegetable matter. The subsoil below an average depth of 12 inches is mottled gray or drab in color, and is usually heavier than the surface and contains less organic matter. The whole remains saturated the year around.

Tidal marsh occupies extensive flat areas along the Chesapeake side of Accomac County and between the mainland and the coastal islands on the seaward side of the peninsula. It also occurs in small strips bordering the Tidal estuaries which penetrate the mainland, especially those of the Atlantic drainage. The Chesapeake

side of Northampton County is conspicuous for the absence of Tidal marsh, except around the heads of a few estuaries.

Bodies of this material are 2 to 4 feet above normal tide level at low water. They are irregular in outline, and are dissected and penetrated by innumerable winding tidal channels.

Tidal marsh has no agricultural value. It supports a rank growth of coarse grasses and in places shrubs, locally called salt-water bushes. Some portions are used as pasture, but it is not highly valued for this purpose. It can be reclaimed only by diking to keep out the tides.

Tidal marsh, high phase.—Tidal marsh, high phase, represents an intermediate stage between the low-lying Elkton soils and the typical salt marshes, and has some of the characteristics of both. The soil material resembles the Elkton fine sandy loam or loam, except that in places it contains considerable decaying vegetable matter in the surface few inches. It is found in localities where the mainland slopes imperceptibly to the Tidal marsh level, and also in small areas of slight elevation within the salt marshes themselves. Tidal marsh, high phase, somewhat resembles the soils of the Bladen series which are found farther south in the Coastal Plain region, and which are developed under similar conditions.

This phase is mapped only on the Chesapeake side of Accomac County. A large area occurs on the south side of Nandua Creek, near its mouth. Other developments are found in various localities along the inner borders and within the areas of Tidal marsh above Onancock Creek. They support a rather scant stand of stunted pines, while the grasses and shrubs are similar to those of the typical salt marshes. A few small areas are diked and cultivated, and from these fair crops are obtained.

Tidal marsh, high phase, is more easily reclaimed than the typical salt marsh. Diking is necessary, however, for it is sometimes flooded in times of unusually high tides. It is used locally for pasturage purposes for cattle and ponies.

COASTAL BEACH.

Material of shore line formation of recent age, which is still being deposited and shifted through the agencies of waves and winds, is classified as Coastal beach. It consists of a loose, gray or whitish sand or fine sand, with an almost total lack of finer material which would impart coherency to the mass. Shell fragments are found in varying quantities, being most numerous in level strips near the surf.

Coastal beach occupies a prominent part of all the islands bordering the Atlantic coast. It also occurs in narrow, discontinuous strips

along the bay shore of Northampton County. Along the coast, within reach of the surf, the topography is level to gently sloping and the elevation is low. About 100 yards back from the shore the type rises in low, irregular dunes which are often shifted by strong winds. It descends rather abruptly and in ragged outline to the marshes and bays on the west of the narrower islands, while on the broader islands it is terminated by disconnected marshes and areas of Norfolk fine sand.

Coastal beach is entirely uncultivated in this area. It supports a thin growth of stunted pines and shrubs in many places, and where drenched by salt spray the only vegetation consists of scattering salt-resisting shrubs and grasses. It has no agricultural value.

DUNESAND.

The Dunesand consists of a loose, incoherent, gray, whitish, or slightly brownish sand or fine sand having a depth of several feet.

The principal occurrence of the Dunesand in Accomac and Northampton Counties is on Parramore and Hog Islands. Considerable areas are also developed along Chesapeake Bay in Northampton County. This sand has been thrown up by the action of the wind into ridges and dunes, some of which rise 30 to 40 feet above the general elevation of the surrounding country. These dunes are frequently unstable and drift from place to place. In some places, however, the surface is bound by vegetation.

These dunes are naturally very droughty and are not used for agriculture. The principal difference between the Coastal beach and the Dunesand is in topography.

SWAMP.

Low-lying, wet alluvial bottom land lying along the fresh-water streams and formed of soil with no definite texture and subjected to standing water and swampy conditions throughout the year is classed as Swamp. The surface few inches usually consists of a dark, spongy mass, high in organic matter and filled with decaying roots, grasses, and cat-tails. The subsoil is in most places a gray sandy to clayey material.

Swamp occurs in narrow strips along the more important streams of the area, grading into Tidal marsh as base level is reached. The largest areas are 2 miles west of Melfa, three-fourths mile north of Bloxom, and along the upper reaches of Bullbegger and Pitts Creeks in the extreme northwestern corner of Accomac County.

None of the type is cultivated. It is grown up with gum, pine, bay, and a dense undergrowth of alders. Much of it could be re-

claimed by deepening and straightening the stream channels and tiling or ditching, but under present conditions the results would not be commensurate with the expense of reclamation.

SUMMARY.

The Eastern Shore area is situated in extreme eastern Virginia. With the exception of its northern boundary bordering the line of Maryland, it is surrounded by the waters of Chesapeake Bay and the Atlantic Ocean. The total area of the survey, comprising Accomac and Northampton Counties, is 682 square miles.

Three physiographic divisions are developed—the mainland, the coastal islands, and marshes. The topography is prevailingly level, but varies from the low, flat foreland country to the often gently undulating upland plain, whose elevation does not exceed 50 feet. Both sides of the peninsula are much indented by tidal estuaries or creeks. Drainage of the upland country is generally fairly good. The forelands of Northampton County are very well drained, as well as almost the entire seaward side of the area. A chain of low, sandy coastal islands borders the Atlantic Ocean at a distance of 1½ to 8 miles from the mainland. The intervening territory is made up of large bodies of salt marsh, interrupted by bays and channels. Salt marshes are also of considerable extent on the Chesapeake side of Accomac County.

The area is one of the earliest settled regions of the United States, and has been continuously occupied by civilized inhabitants since 1619. It had a population in 1910 of 53,322, of which 42 per cent were colored. Cape Charles and Onancock are the most important towns. The agricultural population is evenly distributed.

Transportation facilities are admirable. Roads are excellent in summer. Farms are supplied with many modern conveniences.

The climate is good. The growing season averages fully 6 months, and the mean annual temperature is over 57° F. There is a well distributed rainfall of about 40 inches. The climate is slightly milder in the southern parts of the area than in the northern extremities.

The agriculture of Accomac and Northampton Counties consists almost entirely of truck farming, the general farming in the main being restricted to that necessary to the support of the trucking industry. The main truck crops are Irish and sweet potatoes. Strawberries, onions, and cabbage are grown quite extensively. Corn and hay are the most important of the staple crops. There are many minor crops, mostly specialties. Cover crops are generally grown for improving the land. Hogs are kept on every farm.

Intensive methods of cultivation are used. Farm equipment is modern, rotations are in general use, and large quantities of commercial fertilizer and manure are used. For Irish potatoes, 1,500 pounds per acre of a fertilizer analyzing 7–6–5 is normally used. For sweet potatoes, 800 to 1,000 pounds of a 3–6–6 or 3–8–4 mixture is applied in normal times.

Farms are small, averaging about 63 acres, approximately half of which is improved land. There were 4,275 farms in the area in 1910, over half of which were operated by tenants. Farm lands bring from $40 to upwards of $300 an acre, according to the kind of soil, the state of improvements, and the location with respect to shipping points.

Truck crops are largely handled through a cooperative growers' organization, the Eastern Shore of Virginia Produce Exchange. An experimental farm allied with the Virginia Truck Experiment Station is maintained near Onley.

Forest products and fisheries are important industries of the area closely linked with agriculture.

The Eastern Shore area lies within the Coastal Plain province, and the soil materials were originally deposited in coastal waters. They are among the most productive soils of the Atlantic Coastal Plain, and are included within the Sassafras, Keyport, Elkton, Portsmouth, and Norfolk series. The better drained, retentive types are the equal of any trucking soils in the country, as evidenced by the fact that over 2 per cent of the Irish potato, and about 5 per cent of the sweet-potato production of the United States comes from the counties of Accomac and Northampton. Most of the soils of the area are easily managed, hold improvements well, and are readily responsive to judicious treatment.

The Sassafras sandy loam is the most extensive and important soil type of the area, occurring throughout the uplands. Fully 80 per cent is under cultivation. It is an excellent truck soil, being especially prized for growing Irish and sweet potatoes. It commands an average price of fully $150 an acre. High yields of all crops are obtained. The type is easily handled.

The Sassafras fine sandy loam is second in value and importance only to the sandy loam. It is highly regarded, and is used and handled in the same manner as the Sassafras sandy loam. Fully 80 per cent is cultivated, and yields and land values are high. The type is largely confined to the forelands, where it occupies large areas, especially in Northampton County.

The Sassafras loamy sand is a light loamy sand well suited to the truck crops grown in the area. Most of it is cultivated, but the type is of small extent. It is not as productive or valuable as the

Sassafras sandy loam. It requires the addition of considerable organic matter.

The Sassafras loam is inextensive, but most of it is cultivated. In contrast to other soils of the area, this type is mainly used for corn, wheat, and grass, to which it is best adapted. It is not as highly valued as the trucking soils.

The Elkton sandy loam is a poorly drained soil developed mainly in flat or depressed areas on the drainage divide of the area. Less than half of it is cultivated. Where well drained by artificial means, the type can be made a productive truck soil.

The Elkton fine sandy loam occupies flat, poorly drained areas within the forelands. About 25 per cent of it is farmed, and it can be well managed only after adequate drainage has been provided. Some of the large, more poorly drained portions would be expensive to reclaim.

The Elkton loam occurs both on the upland drainage divide and on the forelands, and with the exception of the Portsmouth types is the most poorly drained soil of the area. When drained, however, it can be brought into a good state of cultivation, and although not as well adapted to truck crops as the lighter soils, it can be profitably used in growing Irish potatoes, corn, strawberries, onions, and the heavier vegetables. All of the Elkton types need lime and are benefited by turning under coarse manures and pine straw.

The Keyport sandy loam occurs on the uplands in irregular tracts, and is intermediate in drainage between the Sassafras and Elkton soils. It is a valuable soil and is well adapted to the truck crops, giving best results, however, only when improved by artificial drainage, which can usually be economically provided. Tiling is to be recommended for this type. Over half of the soil is cultivated.

The Keyport fine sandy loam is developed within the forelands, and bears the same relative position there, as the sandy loam occupies on the uplands. Over half of the type is in cultivation, and it is highly regarded. Like the Keyport sandy loam, most of the type could be tile drained with profit.

The Keyport loam is an inextensive soil, developed in small widely scattered tracts. It is farmed in the same manner as associated soils and can be improved in a manner similar to other Keyport types.

The Norfolk fine sand is an unimportant type developed through the influence of wind action and undulating in topography. Little of the type is cultivated. It needs large amounts of organic matter.

The Portsmouth sandy loam and loam are black soils containing a high percentage of organic matter. They are very poorly drained and are for the most part undeveloped. When drained and limed, they have proven to be productive soils in other localities.

Tidal marsh consists of the extensive salt marshes on both sides of the peninsula, and bordering the estuaries which penetrate the mainland. It is valued only for pasture and can be reclaimed only by diking. A high phase, similar to the Bladen soils occurring farther south, is more susceptible of reclamation.

Coastal beach includes sandy material of recent shore line formation. It is found on all the coastal islands. It has no agricultural value.

Dunesand is composed of shifting, incoherent sand built up into dunes by wind action. It is nonagricultural.

Swamp constitutes the low, wet bottom lands along streams. It is not farmed at the present time.

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[PUBLIC RESOLUTION—No. 9.]

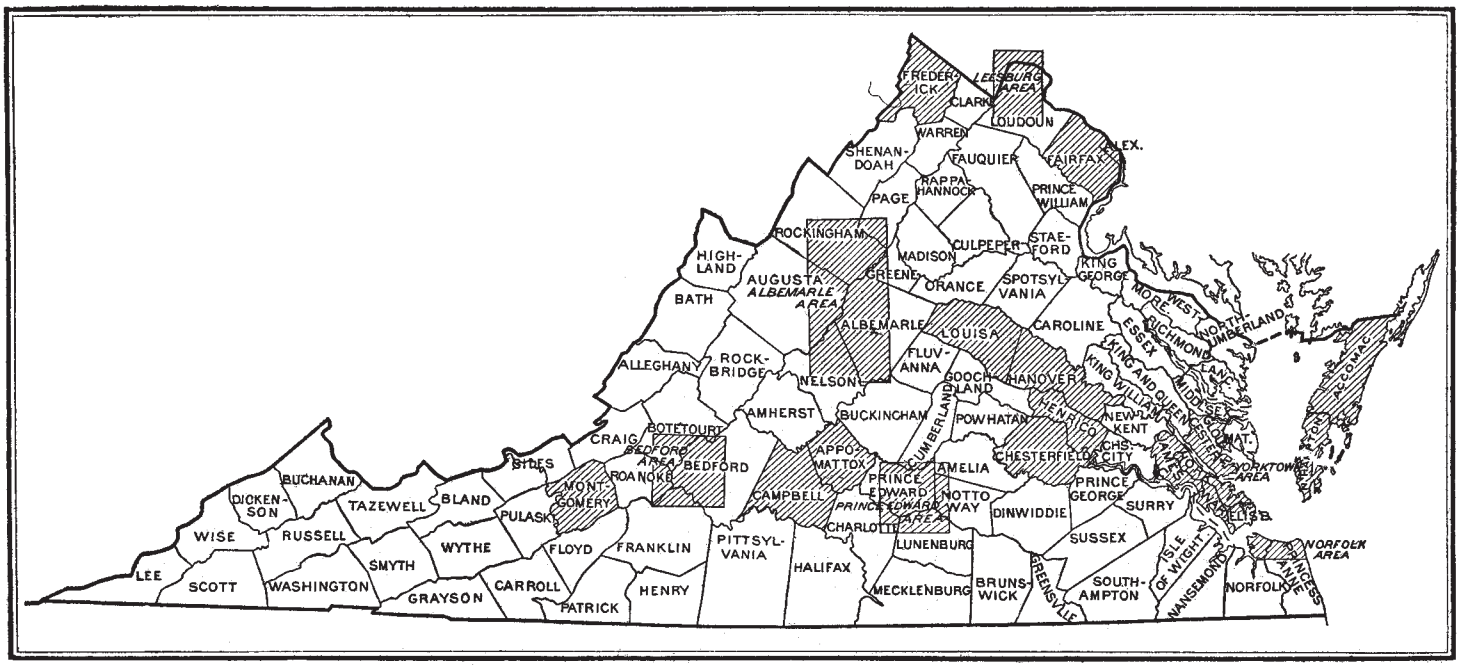
JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

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.

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