Soil Survey
of
Anne Arundel County, Maryland

By
S. W. PHILLIPS, in Charge, and S. O. PERKINS
United States Department of Agriculture
and
H. B. WINANT
Maryland Agricultural Experiment Station

Bureau of Chemistry and Soils
In cooperation with the Maryland Geological Survey and the
Maryland Agricultural Experiment Station
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SOIL SURVEY OF ANNE ARUNDEL COUNTY, MARYLAND

By S. W. PHILLIPS, in Charge, and S. O. PERKINS, United States Department of Agriculture, and H. B. WYANT, Maryland Agricultural Experiment Station

COUNTY SURVEYED

Anne Arundel County lies within that section of the State commonly spoken of as "Southern Maryland." Its northern limits extend to the southern edge of the city of Baltimore, and its western boundary is within 15 miles of the city of Washington. It is roughly triangular in shape and compromises an area of 419 square miles, or 268,160 acres. Patuxent River forms its western boundary, Patapsco River its northern, Chesapeake Bay its eastern, and Calvert County its southern. The eastern boundary is extremely irregular owing to the many bays, inlets, and creeks reaching back from the bay. The county is approximately 36 miles long but has a salt or brackish water frontage of about ten times that length.

One of the outstanding physiographic features of the county is the extremely broken and tortuous shore line of Chesapeake Bay and its estuaries. The central drainage divide or watershed varies considerably in elevation, flattening out into fairly wide marine terraces on the east and into the narrower Patuxent River terraces on the west. This divide is for the most part rolling, and the main interstream areas are fairly smooth, with slopes ranging from gradual to abrupt. As the main stream courses and the terraces are approached the slopes become steeper, and the country as a whole is more broken.

Beginning at the northern end of the county, the stream bottoms along Patapsco River, which are practically at tide level, are comparatively narrow, and a fairly well-defined escarpment separates the bottoms from the narrow terraces above. The slopes rising from the terraces are fairly smooth, becoming steeper toward the top of the wooded ridge which attains an average elevation of about 200 feet above sea level. This ridge runs in a southwesterly direction, practically parallel with the courses of Patapsco River and its tributary, Deep Run, and gradually pinches out most of the stream terraces. The height of the ridge increases gradually toward the southwest and attains an elevation of more than 300 feet above sea level east and northeast of Laurel, the highest part of the county. Southeast from this ridge is a more or less well-defined trough the general level of which is about 150 feet above sea level. The trough dips gradually toward the northeast, and near the bay it merges with the old marine terraces which lie from 20 to 60 feet above sea level. On the southern side the trough is delineated by a series of knobs and ridges which attain elevations ranging from more than 200 feet at the western end to about 100 feet at the eastern end. South of this series of knobs is another low area, extending from the vicinity...
of Conway, where the average elevation is between 120 and 140 feet, toward Millersville, Omar, and Severn Park where the ridge merges into the coastal terraces at an elevation ranging from 20 to 40 feet. South of this low area is another series of knobs and ridges that attain elevations of more than 200 feet at the western end but dip toward the east to elevations ranging from 120 to 140 feet. South of the second series of knobs is another low region or trough extending from west of Rutland, where the elevation averages between 140 and 160 feet, eastward toward Annapolis and dipping to within 20 feet of sea level. This trough widens as it extends eastward and includes the South River Basin. Its southern boundary runs south-eastward in the direction of Mayo where it merges with the marine terrace which is practically continuous from that place southward along the bay to the northern margin of Herring Bay. A remnant of the marine terrace occurs near Holland Point on the Calvert County line.

The section of the county south and west of this low area is characteristically rolling or hilly, attaining an elevation of more than 200 feet on the highest knobs and averaging about 160 feet above sea level. Many of the ridge tops are smooth or flat, particularly west of Davidsonville along the Marlboro highway, and west and southwest of Mount Zion. Along Patuxent River the general level of the terraces is about 60 feet above sea level, and the width ranges from one-fourth to more than 1 mile. An escarpment, which in many places is precipitous, marks the edge of the river bottom. The most deeply dissected parts of the county occur along Severn River, the upper part of the South River Basin, and in the southern part of the county in the vicinity of Herring Bay and Patuxent River. In these localities the upland consists of narrow hog-backed ridges and steep, abrupt, and in places precipitous, slopes. Erosion is active throughout the upland parts of the county, particularly in the central and southern parts.

The first settlement in Anne Arundel County is reported to have been made on Severn River by Puritans from Virginia. Subsequent settlements were made at Herring Bay, West River, South River, and on Middle and Broad Necks. The county was established in 1650, but its area has been subsequently decreased in the establishment of near-by counties, and its present boundaries were fixed in 1919, when a part of the county was annexed to the city of Baltimore. The early settlers were mainly from near-by States or other Maryland settlements and were of English descent. The present rural white population is largely descended from this original English stock, but the urban population is drawn from a much wider source. The population of Anne Arundel County, as reported by the 1930 census, is 55,167, of which 77.3 per cent is classed as rural. The average density of the rural population is about 75 persons to the square mile. The population figures include persons living within the Fort Leonard Wood Military Reservation. The most densely settled parts of the county are in the vicinity of Annapolis, along the main highways, and along the electric railway lines; and the most sparsely settled sections are the western and southwestern parts and the sand-hill belt. During recent years a great many

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1 Soil survey reports are dated as of the year in which the field work was completed. Later census figures are given whenever possible.
summer homes have been built along the water fronts on the bay and rivers, and these sections are thickly settled during the summer.

Annapolis, with a population of 12,531 according to the 1930 census, is the only city in the county. It is the county seat, the State capital, and the seat of the United States Naval Academy and St. John's College. Eastport and West Annapolis are residential villages adjacent to Annapolis; and Galesville, Glenburnie, Linthicum, Shipley, Pumphey, Wellhams, Odenton, Severna Park, and Jessups are the larger rural and suburban villages. There are numerous trading centers and settlements such as Mount Zion, Davidsonville, Jacobsville, Mayo, Parole, Crownsville, and small suburban developments along the lines of transportation and principal roads in the northern part of the county near Baltimore. The city of Baltimore is the principal market for the farm products and truck crops of the county although the city of Annapolis, the Naval Academy, Fort Leonard Wood, the suburban villages, and the numerous summer colonies offer a ready market for a large quantity of farm produce.

The general farm crops are used on the farm or locally, but practically all the tobacco crop is shipped to Baltimore for sale and local use or for reshipment to other parts of the United States and abroad. Most of the vegetables, fruits, and truck crops are disposed of in Baltimore or locally. Some vegetables, principally tomatoes, are used by commercial canning plants, although not so much now as formerly. Some cattle, sheep, and poultry are sold in Baltimore, and the dairy products are sold in Baltimore and Annapolis. Oysters, crabs, and other sea food are packed and shipped to inland parts of the country as well as disposed of locally.

Transportation facilities are afforded the northern and northwestern parts of the county by the main line of the Baltimore & Ohio Railroad, which runs along the northwestern border; by the main line of the Pennsylvania Railroad, which crosses the northwestern part of the county; and by the Washington, Baltimore & Annapolis Electric Railroad, which parallels the Pennsylvania Railroad. Two branch lines of the electric railroad connect Annapolis with Odenton and Shipley. The extreme southern part of the county is crossed by the Chesapeake Beach Railway operating from Washington to Chesapeake Beach, which is on the bay in Calvert County. Bus lines operate from Annapolis to Washington, via Priests Bridge, and via Mount Zion to Marlboro and Washington; to points in Calvert County; and to Baltimore. Automobile freight lines operate out of Baltimore south through Annapolis to Solomons Island. The main roads are hard surfaced, and the mileage of such roads is being extended. Radiating to the principal rural communities, the roads are maintained in excellent condition throughout the year, some of them being graveled. In the more sparsely settled and sandy sections of the county the roads are kept in fair condition during most of the year.

CLIMATE

The climate of Anne Arundel County, as indicated by the Weather Bureau records, is comparatively mild. The winters are open and have an average temperature of 35.4° F., with but 17.7 inches of snow. After March the spring opens up quickly, and there is little danger of frost after the middle of April. The summers are warm, with
plentiful and well-distributed rainfall to benefit growing crops. During most summers several very hot spells of several days’ duration occur, but they are tempered by fairly cool nights owing to the influence of Chesapeake Bay. The fall season is generally delightful, and there is little danger of frost before the latter part of October and rarely any snow before December. Farmers report a decidedly tempering effect caused by the proximity of large water areas. However, a northeaster during the fall or winter seems to be particularly penetrating near the bay where there is no forest to break its effect. The average frost-free season, extending from April 12 to October 27, is 198 days. This is particularly beneficial to truck growers, many of whom are enabled to grow two or three crops on their land each year. Frost has occurred as late as April 25 and as early as October 11. Winter crops of cabbage and spinach are grown by some farmers. Storms during August sometimes damage the tobacco and corn crops through the action of wind, hail, and too much moisture at that period of their growth.

Table 1 gives the more important climatic data as recorded by the United States Weather Bureau station at Annapolis.

**Table 1—Normal monthly, seasonal, and annual temperature and precipitation at Annapolis**

<table>
<thead>
<tr>
<th>Month</th>
<th>Temperature Mean °F</th>
<th>Absolute maximum °F</th>
<th>Absolute minimum °F</th>
<th>Precipitation Mean Inches</th>
<th>Total amount for the driest year (1894) Inches</th>
<th>Total amount for the wettest year (1907) Inches</th>
<th>Snow, average depth Inches</th>
</tr>
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<tr>
<td>Winter</td>
<td>35.4</td>
<td>74</td>
<td>-6</td>
<td>10.49</td>
<td>9.30</td>
<td>12.48</td>
<td>17.7</td>
</tr>
<tr>
<td>March</td>
<td>43.4</td>
<td>83</td>
<td>11</td>
<td>3.97</td>
<td>1.00</td>
<td>3.45</td>
<td>4.0</td>
</tr>
<tr>
<td>April</td>
<td>53.5</td>
<td>90</td>
<td>24</td>
<td>3.69</td>
<td>3.60</td>
<td>4.12</td>
<td>3.0</td>
</tr>
<tr>
<td>May</td>
<td>64.2</td>
<td>95</td>
<td>35</td>
<td>4.18</td>
<td>6.00</td>
<td>8.02</td>
<td>0.0</td>
</tr>
<tr>
<td>June</td>
<td>73.5</td>
<td>99</td>
<td>46</td>
<td>4.24</td>
<td>1.80</td>
<td>7.85</td>
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<tr>
<td>July</td>
<td>77.7</td>
<td>105</td>
<td>53</td>
<td>4.63</td>
<td>3.00</td>
<td>5.99</td>
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</tr>
<tr>
<td>August</td>
<td>76.2</td>
<td>106</td>
<td>52</td>
<td>4.59</td>
<td>93</td>
<td>5.01</td>
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</tr>
<tr>
<td>Summer</td>
<td>75.8</td>
<td>100</td>
<td>46</td>
<td>13.46</td>
<td>5.73</td>
<td>17.96</td>
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<tr>
<td>September</td>
<td>66.7</td>
<td>98</td>
<td>40</td>
<td>3.92</td>
<td>1.53</td>
<td>10.95</td>
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</tr>
<tr>
<td>October</td>
<td>58.1</td>
<td>89</td>
<td>28</td>
<td>3.20</td>
<td>2.50</td>
<td>3.43</td>
<td>(1)</td>
</tr>
<tr>
<td>November</td>
<td>46.8</td>
<td>85</td>
<td>17</td>
<td>2.63</td>
<td>2.16</td>
<td>6.19</td>
<td>0.0</td>
</tr>
<tr>
<td>Fall</td>
<td>58.2</td>
<td>98</td>
<td>17</td>
<td>10.11</td>
<td>7.19</td>
<td>20.57</td>
<td>6.0</td>
</tr>
<tr>
<td>Year</td>
<td>55.8</td>
<td>106</td>
<td>-6</td>
<td>45.90</td>
<td>33.82</td>
<td>66.59</td>
<td>22.6</td>
</tr>
</tbody>
</table>

1 Trace

**AGRICULTURE**

In the early days of the country now included in Anne Arundel County the principal agricultural products were tobacco, corn, and wheat. These crops were in demand in England, the mother country, and were exchanged for such manufactured products as were needed,
as few or none were produced in the colony. Vegetables, fruits, and livestock were produced for home use. Much of the land was held in large tracts, and slaves and indentured servants were extensively employed. The smoother lands near the water fronts were settled first. Shipping and communication were principally by water, the roads being few and poorly developed. Disorganized by the emancipation of the slaves and the unsettled conditions subsequent to the Civil War, agriculture stagnated, and tobacco growing, which necessitated much hand labor, was particularly affected. The subsistence crops, principally grains, were substituted to some extent, but agricultural conditions were such that many people were forced to leave the farms, either going to the cities or to western agricultural States, and as a result much land was left idle. Between 1880 and 1900 fruits, small fruits, and vegetables began to be grown for market, and with the increased demands due to the growth of the cities of Baltimore and Washington these crops became increasingly profitable, particularly in the sandy northern part of the county near Baltimore. The canning industry was established, and this enabled the farmers to dispose of their surplus vegetables and fruits.

At the present time the agriculture of the county is of three kinds as follows: (1) Truck and small-fruit growing in the northern part; (2) general farming in the central part, in the more hilly sections, and on the terraces along Chesapeake Bay; and (3) tobacco growing, together with general farming and dairying, in the southern part. Truck crops, small fruits, tobacco, dairy products, and poultry products comprise the principal sources of cash income, and corn, wheat, soybeans, and hay are the subsistence crops produced in the county. The canning of vegetables, particularly tomatoes, once an extensive industry in this county, has greatly decreased in recent years. The explanation most often given for this decrease is that the markets are demanding fresh vegetables throughout the year and canned vegetables are not so popular as formerly. At present tomatoes are grown for canning only to a small extent in the northern part of the county and in the southern part near Upper Marlboro, Prince Georges County.

Corn occupies the largest acreage of any single crop. According to the United States census report, it was planted on 12,566 acres in 1929, and most of this acreage was harvested for grain, producing an average yield of 23.5 bushels an acre. Corn is used principally as feed for work animals and other livestock and for home use. Vegetables, including a wide variety of truck crops, such as beans, peppers, tomatoes, eggplant, cucumbers, cauliflower, spinach, sweetpotatoes, sweet corn, cabbage, peas, turnips, lettuce, and potatoes, occupy a large acreage. These crops are disposed of principally in Baltimore and comprise the more important money crops in the county. Tobacco was grown on 5,096 acres in 1929 and produced an average yield of 572.2 pounds an acre. This crop appears to be increasing in importance as evidenced by the number of new tobacco barns constructed during the year 1928. Wheat was produced in 1929 on 2,429 acres, averaging 12.3 bushels an acre. It is either sold or ground in the few local mills. Hay, which was cut on 4,764 acres in the same year, included 3,480 acres of tame grasses of which more than half consisted of timothy and clover, either alone or mixed, and 869 acres were in alfalfa. The hay crops are used almost entirely on the farms where grown.
The 1930 census reports 3,845 hogs in the county on April 1 of that year. Nearly every farmer raises a few hogs for home needs, and the surplus is sold alive or butchered and disposed of locally and in Baltimore in the form of sausage and fresh pork. In the same year, cattle numbered 4,903. These are mainly dairy cattle which are found principally in the small dairy herds in the central and south-central parts of the county. The milk is sold as whole milk, being collected daily at the farms or at the loading platforms by trucks which haul it to Annapolis and Baltimore. Dairy products constitute a very important and growing source of farm income, particularly in that part of the county south of Annapolis and including the Davidsonville and Mount Zion sections. Poultry raising is increasing in importance, particularly in the central and northern parts of the county. The sale of poultry products provides a small cash income for the farmers, and a number of people have gone into the business on a commercial scale, in conjunction with the production of fruit and truck crops.

A number of commercial orchards are in bearing in the county, principally in the northern half. Peaches, apples, and pears are the principal orchard fruits. Peach trees were formerly much more numerous than at present, but diseases and insect pests, which necessitate great expense for sprays and care, have combined to reduce the number of trees. Formerly chestnuts were a source of considerable revenue to many farmers but the almost complete disappearance of the trees has cut off this income entirely. Soybeans are grown by many farmers both for hay and for seed, but on most farms only about enough are threshed to assure seed for the following year. In the vicinity of the summer resorts and water-front summer colonies many farmers are specializing in truck crops and poultry products to supply the demands of the summer residents.

There is a very important relationship between the soil, particularly its texture and physical condition, and the crops grown. Tobacco is grown mainly on Sassafras fine sandy loam and Sassafras very fine sandy loam, usually on the smooth areas of the typical soil and to less extent on the better areas of the rolling phases. The farmer selects fields or patches which experience has taught him, or their general appearance indicates, are well suited to tobacco. Effort is made to select land that is as uniform as possible so that the crop will make a uniform growth. Norfolk loamy sand, Sassafras loamy sand, Sassafras fine sandy loam, and Collington fine sandy loam are recognized as the best soils for vegetables, truck crops, and melons. The imperfectly drained Keyport and the poorly drained Elkton soils are used almost entirely for corn, hay, and some wheat. The light sands are either used for truck crops or are not cultivated. Farmers find that alfalfa grows better on the Collington soils than on any other soil in the county.

The seed of tobacco and vegetables that require transplanting is sown during the winter in hotbeds or coldframes, in which the soil has been especially prepared and fertilized with manure and fertilizers high in nitrogen. Transplanting of tobacco and vegetables is done as much as possible on cloudy days or late in the afternoon so that wilting is not apt to injure the plants. In the trucking sections frequently more than one crop is grown on a certain piece of land. The general farm crops are handled in much the same way as is common through
this general region. Tobacco growing and dairying are engaged in by many farmers in the Davidsonville-Mount Zion section. Considerable care must be exercised in the cultivation of the Elkton soils, as plowing when too wet produces clods that greatly interfere with subsequent cultivation.

The rotation practiced differs somewhat in different parts of the county. In the central and southern parts corn and tobacco are followed by soybeans the next season, which, in turn, are followed by wheat and hay. The wheat is sown in order to obtain a good seeding of grass rather than as a money crop. In the general-farming sections corn is followed by wheat and grass on some farms. In the trucking sections winter cover crops of rye or wheat are sometimes sown to be plowed under in the spring for green manure. Most truckers are careful not to plant the same crops more than two years in succession on the same piece of land.

The 1925 census reports the expenditure of $289,716 for fertilizer (including lime) in 1924 and that 57.3 per cent of the farms used some commercial fertilizer. Many of the truckers and some of the tobacco growers and other farmers buy fertilizers through cooperative farm organizations. Probably the most widely used fertilizer is the 5–8–5 grade. One of the favorite formulas for plant beds is 10–5–2. For tobacco, mixtures analyzing 5–8–5 and 4–8–7 are used, but if an abundance of manure is available a 2–8–10 grade is used. Rates of application differ widely but average between 400 and 600 pounds an acre, and some farmers apply as much as 800 pounds. Superphosphate (acid phosphate) at the rate of about 300 pounds an acre is applied to wheat. Barnyard manure is usually applied to corn and grass land and little or no commercial fertilizer is used. For potatoes a 4–8–6 or 6–8–10 fertilizer is commonly applied. The use of lime is reported to be increasing. In the main trucking sections the farmers apply all the manure they can procure and in addition waste, which may be obtained without cost, from the garbage-disposal plant on Spit Neck. However, some farmers question the fertilizing value of the waste. Fertilizer mixtures and rates of application for truck crops differ widely, but many truck farmers use a 5–8–5 or higher grade; and the rate of application is reported to range from about 500 pounds to more than 1 ton to the acre a year.

Most of the farmhouses and outbuildings are ample for the needs of the farmer and his type of farming. The tobacco growers have barns sufficiently large for the storing and curing of their crop, most of them have some sort of pressing device for packing the tobacco in hogsheads, and many have transplanting machines. As the number of livestock is comparatively small, barn and stable space is not extensive on most farms. Most truckers have hotbeds or coldframes and small packing and sorting shelters. The majority of farmers on general farms have mowing machines, drills, and binders, or such machines are available in the neighborhood, and in nearly every community a threshing outfit is available. Many farmers own tractors and trucks. The work animals consist of medium-sized horses and mules, and the average number kept is about three animals to each farm.

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1 Percentages, respectively, of nitrogen, phosphoric acid, and potash.
On most farms the work is performed by the farmer and his family. The majority of the farm laborers are negroes, and vegetables and berries are picked largely by negro women and children. However, labor is rather scarce, owing to the higher wages offered in industries in Baltimore and by the summer residents.

The size of the farms range from a few acres in some of the trucking sections to estates of more than 1,000 acres, but the prevailing size is between 50 and 100 acres. The average size of farms in 1930 was 88.9 acres.

The 1930 census reports that 71.3 per cent of the farms are operated by owners, 26 per cent by tenants, and 2.7 per cent by managers. The tenants operate principally on the share-rent basis, the owner supplying one-half the seed and fertilizer. If the crop is to be turned under for soil improvement the owner supplies the seed and the fertilizer if any is applied, and the succeeding crops are divided equally.

Much of the land in Anne Arundel County, particularly that near the towns, water front, and along the main roads has a value entirely out of proportion to its agricultural value. The Sassafras soils, especially the better areas of fine sandy loam and very fine sandy loam, and Collington fine sandy loam are the most valuable agricultural soils; Sassafras and Norfolk loamy sands rank next in value, followed in order by Sassafras, Leonardtown, Keyport, and Elkton silt loams, with Norfolk loamy sand, mixed phase, and Norfolk and Sassafras sands next. The Tuxedo soils and the steep phases of the different soils are the least valuable.

The use of lime is recommended for the improvement of hay and pasture land by the Maryland Agricultural Experiment Station. The growing of alfalfa has, in general, been a failure particularly on the Sassafras soils. It is believed that the application of superphosphate would assist in the establishment of this crop which is so much desired by the dairymen of the county. In the corn, soybean, wheat, hay rotation, after the corn is harvested the use of a winter cover crop to be plowed under in the spring would build up the soil fertility, and the plowing under of crimson clover or rye might be of value for corn crops in the trucking sections.

Erosion is serious in the sloping fields. Such land should be plowed and cultivated with level or contour furrows and terracing should be resorted to in an effort to prevent the very serious loss of soil and plant food that is constantly depleting the farms of this region. Very steep slopes should never be cleared but should be maintained in permanent woodland, and gullied and badly eroded slopes should be reforested.

SOIL SERIES AND TYPES

The base map used in the soil survey of Anne Arundel County is drawn to the scale of 1 inch to the mile. The houses, schools, churches, roads, towns, railroads, streams, and other topographic features are shown, so that it is not difficult for the individual to determine the location of his farm on the map.

The soils of the county are grouped into series, based on color, structure, origin, and mode of formation. Thus we have the Sassafrass, Collington, and other series which have been recognized and
mapped throughout the coastal plain of Maryland. Within the series the soils are divided into types on the basis of the texture of the surface soil; that is, the percentage of sand, silt, and clay present in each soil.

The different soil types are represented by distinguishing colors on the map, and the various developments and the extent of each soil may be readily seen. The various phases of the soil types are shown by crosslines on the color of the typical soil.

In Anne Arundel County 8 soil series are represented by 17 soil types and 7 phases of the typical soils. In addition, two classes of miscellaneous material are mapped.

In the succeeding pages of this report the various soils are described; and the crops grown, the crop yields reported, the adaptability of the soils, and suggestions for their improvement are given. The distribution of the soils is shown on the accompanying soil map, and their acreage and proportionate extent are shown in Table 2.

Table 2.—Acreage and proportionate extent of the soils mapped in Anne Arundel County, Md.

<table>
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<tr>
<th>Type of soil</th>
<th>Acres</th>
<th>Per cent</th>
<th>Type of soil</th>
<th>Acres</th>
<th>Per cent</th>
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<td>Sassafras fine sandy loam</td>
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Sassafras Fine Sandy Loam

The surface soil of Sassafras fine sandy loam consists of a 5 or 6 inch grayish-brown or brown surface layer of fine sand or loamy fine sand, underlain by a mellow and friable subsurface layer consisting of light-brown or yellowish-brown fine sandy loam extending to a depth of 12 or 14 inches. The subsoil is firm but friable brown sandy clay loam or friable heavy sandy clay which breaks up into small aggregates that are dull brown on the outside but when crushed are brown. Below a depth of about 24 inches the subsoil is somewhat more compact and breaks up into slightly larger reddish-brown aggregates. The cracks in this layer contain some red material, and faint gray streaks occur at a depth ranging from about 36 to 40 inches below the surface. The underlying material, or substratum, consists of somewhat variegated friable sandy loam which passes gradually into stratified layers of fine sand, silt loam, fine sandy loam, and gravel. In wooded or undisturbed areas a very thin film of powdery gray material covers the surface soil directly beneath the cover of leaves and forest debris. Here, the surface layer is grayish brown, but within a depth of 4 or 5 inches it passes into the brown or yellowish-brown subsurface layer.
As mapped this soil includes some minor variations occurring chiefly in the texture of the surface soil which in some places is sandy loam and in others very fine sandy loam or loam. Locally a small quantity of gravel is scattered over the surface. Where this soil occurs in close association with Collington fine sandy loam there is a gradational soil between the two soils in which the soil might have been mapped with either type, and in such places the soil boundaries are arbitrarily drawn.

Sassafras fine sandy loam occurs extensively in the southwestern part of the county in the vicinity of Davidsonville, near Owensville, Mount Zion, and Friendship, and to a less extent in the central and northern parts near Riviera Beach, north of Glenburnie, near Gambrills and Conway, and in other places. It occupies smooth ridge tops and benches and comparatively level or gently undulating areas on the Chesapeake terrace lands. Although it occurs in smooth level areas the land is well drained, because the friable character of the subsoil and the light-textured substrata allow the ready downward movement of drainage waters.

Practically all of this soil is cleared and farmed. Its smooth surface relief renders it suitable for cultivated crops and allows the use of modern equipment. This is one of the most successfully farmed soils in the county and one of the best tobacco soils. Corn and hay occupy a larger acreage than other crops, and tobacco and wheat rank next. Dairying is a growing industry on this soil in the Davidsonville section, and trucking is engaged in to some extent in the central and northern parts of the county. Several apple orchards are located on land of this kind, and some small fruits and berries are grown.

Farmers report acre yields of corn ranging from 25 to more than 60 bushels, the average being about 35 bushels as compared with an average of 23.5 bushels for the county, reported by the 1930 census. The hay crop usually consists of timothy, with some alsike clover and redtop. Soybeans are grown for hay and to some extent for seed, and yield from 1 to 2 tons an acre, averaging about 1½ tons. Tobacco is the principal money crop, and yields ranging from 600 to 1,200 pounds an acre are reported, but the county agent estimates that the average acre yield on this soil is about 750 pounds. Farmers report that this soil produces tobacco of high quality and bright color. The wheat yields reported by farmers range from 10 to 25 bushels with an average of about 16 bushels an acre. Pasture grasses include the hay grasses, some wild grasses, and legumes, including considerable black medic and various sedge grasses and weeds. In the trucking region in the northern part of the county, a great variety of vegetables, cantaloupes, and berries are produced for the Baltimore and local markets.

Commercial fertilizer is applied to tobacco, truck crops, and usually to wheat, and the available manure is spread on corn and grass land. The fertilizers applied to tobacco vary somewhat in composition but the one most commonly applied is a 5-8-5 mixture applied at a rate ranging from 500 to 1,000 pounds an acre. Burnt lime has been used more or less for many years and its use is becoming common in an effort to produce more and better hay crops for the dairy herds.

Sassafras fine sandy loam, rolling phase.—The rolling phase of Sassafras fine sandy loam differs from the typical soil in that it occurs
in areas having a rolling or somewhat hilly relief. The texture of the surface soil is variable, owing to the effects of erosion. A cultivated or plowed field of the rolling phase presents a distinctly patchy and spotted appearance, caused by the contrasting patches of grayish-brown fine sandy loam, reddish-brown sandy clay loam and clay loam, and grayish-brown gravelly sand or loamy sand. The subsoil is similar to that of typical Sassafras fine sandy loam. The surface relief and variable texture of the surface soil render the rolling phase somewhat less desirable and more difficult to farm than the smoother areas of the typical soil, but both are used for much the same crops. In plowing, planting, and cultivating the rolling phase it is advisable to plow with the contour across the slope to facilitate the work and prevent erosion. In general, more hand labor is required in handling this soil than the smoother areas.

The rolling phase is much more extensive than the typical soil. It occurs on the sloping hillsides and narrow ridges in the same localities and associated with the smoother areas of Sassafras fine sandy loam. Most of the land has been cleared at one time or another, but much of it is now used for pasture or has been allowed to revert to woodland. At the present time probably about 65 per cent of it is farmed or is in pasture.

General farming, tobacco growing, some sheep raising, and considerable dairying comprise the principal agricultural activities on this soil. The crops grown are the same as those grown on the typical soil, with corn and hay occupying the largest acreages and tobacco, the chief money crop, receiving the most attention. Crop yields average somewhat lower than on the smoother typical soil, and the color and texture of tobacco are not so uniform owing to the variability of the soil. Farm practices and methods of fertilization are similar to those in use on Sassafras fine sandy loam. Terracing and contour plowing, together with the use of cover crops and grass, are suggested for the control of erosion.

**Sassafras fine sandy loam, steep phase.**—Sassafras fine sandy loam, steep phase, occupies steep precipitous slopes and broken country that is not suitable for agriculture. About 95 per cent of the land is woodland, and a very small acreage is cleared and used for pasture. This soil occurs principally in the southern and southwestern parts of the county, where it occupies some of the steep bluffs overlooking the Patuxent River bottoms, some of the steeper slopes near Owensville, and the steep hillsides along Herring Bay and near Benfield. The soil varies considerably in texture, as it is affected by the various-textured materials exposed through gullying and erosion, but it averages fine sandy loam. The land supports a valuable stand of mixed timber, and several sawmills are engaged in getting out building material, posts, and firewood. Forestry is the best use to which this steep soil can be put.

**Sassafras Loamy Sand**

Sassafras loamy sand has a brown or light-brown surface soil and a light-brown or yellowish-brown loamy sand subsoil which extends to a depth ranging from 3 to 8 feet. Beneath this are layers of gravelly loam, gravelly sand, and light-brown or yellow sand. The soil as mapped includes small patches of Sassafras sand and Sassafras
fine sandy loam, deep phase, and in the north-central part of the county, where the Norfolk soils are developed, it includes some Norfolk loamy sand where the two soils grade into each other.

The surface relief of Sassafras loamy sand is fairly level or gently rolling. The soil is developed most extensively on the benches or terraces along Patuxent River, and near Jacobsville, Lake Shore, Mount Carmel, Harmans, southwest of Severn, and near Omar. Other areas occur in the northern and northwestern parts. About 50 per cent of the land is farmed. Most of it has been cleared at some time but about one-half has reverted to pine woods. In the southern part of the county tobacco and general farm crops are grown but in the northern part truck crops, cantaloupes, and berries are the principal crops. The soil is well drained and in dry seasons tends to be somewhat droughty although not so much so as the more sandy soils. Tobacco of very high quality is grown on this soil, although the yield is reported by farmers to be lower than on the sandy loams and loams, averaging about 650 pounds an acre.

Sassafras loamy sand is an early soil and is highly esteemed by truck growers. It requires heavy applications of fertilizer and manure. Tobacco growers usually use the same kind of fertilizer, a 5–8–5 mixture, as is used by growers on Sassafras fine sandy loam. Some truckers mix their own fertilizer, and the quantities applied and the mixtures vary widely, ranging from 4 to 6 per cent nitrogen, 8 to 10 per cent phosphoric acid, and 4 to 8 per cent potash. A large quantity of garbage tankage is applied to truck crops. Several crops each season are produced by the more progressive truck farmers. The soil is well adapted to truck crops but requires constant application of plant foods to maintain its productivity.

**Sassafras Sand**

Sassafras sand has a light-brown or grayish-brown surface soil which becomes brown or light brown below a depth of 5 or 6 inches. In color it resembles Sassafras loamy sand but lacks the fine material that gives a certain amount of body or cohesiveness to the loamy sand. As mapped it includes small patches of fine sand, coarse sand, and loamy sand.

The soil occurs, associated with Sassafras loamy sand, along Patuxent River south of Priest Bridge and west and southwest of Davidsonville. Other areas are on Marley Neck, on Hog Neck, and at Rock Point. The surface relief is smooth or undulating. Drainage is perfect and in most places excessive, which renders the soil droughty.

Very little of this soil is farmed except areas adjacent to some of the better soils of the county, where it is included in fields of truck crops or tobacco. About 40 per cent of the land is cleared, and the remainder is in second-growth pine (*Pinus virginiana*) and cedar. The soil is locally used for building sand.

**Sassafras Very Fine Sandy Loam**

Sassafras very fine sandy loam closely resembles Sassafras fine sandy loam in general appearance, but differs in that the surface soil is very fine sandy loam. When plowed it turns up in clods in contrast to the comparatively loose character of the fine sandy loam. The subsoil is heavier in texture than the surface soil.
The most extensive occurrence of this soil is in the southwestern part of the county, in the vicinities of Davidsonville, Harwood, Mount Zion, Greenock, Darnall, and near Cumberstone. Less extensive areas are near Patapsco, along Cabin Branch in the northern part of the county, and near Governor Bridge. Practically all the land is cleared.

The soil typically occupies smooth or gently rolling wooded ridge tops and interstream divides, and the relief renders it well suited to cultivated crops. Drainage is excellent, owing to the friable character of the soil and subsoil and to the porous substratum.

In places this soil includes small areas of shallow very fine sandy loam and very fine-textured loam. Its characteristic tendency to clod, similar to a silt loam, has led many farmers to class it as a heavy soil, and some refer to it as a "clay" soil, but analyses clearly prove the contrary.

Sassafras very fine sandy loam occurs in close association with Sassafras fine sandy loam, and the same general type of farming is carried on although there is a tendency to use the very fine sandy loam soil for corn, grain, and hay, and to use the lighter soil for tobacco. However, tobacco is the principal money crop on the very fine sandy loam. Dairying is an important industry, particularly near Davidsonville and northwest of Mount Zion. Some truck crops and tomatoes are produced on this soil in the southwestern part of the county and disposed of in Upper Marlboro. The farming methods, fertilization, and crop yields are about the same as those reported for Sassafras fine sandy loam, but the very fine sandy loam usually produces heavier cuttings of hay and supports a better pasture sod than do the lighter soils, and it seems to be a better wheat soil. Several orchards are located on this soil.

Sassafras very fine sandy loam, rolling phase—Soil of this phase occupies rolling ridges and slopes adjacent to or in the vicinity of areas of Sassafras very fine sandy loam. Its rolling surface relief renders this soil somewhat less well suited to cultivated crops than the smoother typical soil, but the type of agriculture carried on is practically the same. About 65 per cent of the land is cleared, and it is estimated that one-half of the cleared area is cultivated, the remainder being used for pasture for dairy cows and sheep. Tobacco is the chief cash crop, as it is on the other soils of the county.

Soil of the rolling phase includes considerable areas from which the surface soil has been practically eroded, and the subsoil is now being cultivated. This condition renders the soil somewhat variable, and as mapped it includes areas of loam, fine sandy loam, and silt loam, in addition to some gravelly patches. A plowed field has a very spotted appearance, and the crops, especially tobacco, have a somewhat variable growth, although farmers usually select as uniform a piece of land as possible for tobacco. Farming methods are similar to those on other soils of the county, but soil of the rolling phase is not farmed with the same ease as typical Sassafras very fine sandy loam and crop yields are not quite so large.

SASSAFRAS SILT LOAM

The surface soil of Sassafras silt loam is brown or grayish-brown silt loam underlain by a yellowish-brown subsurface layer which continues to a depth ranging from 12 to 15 inches. Below this depth
the subsoil is brown or rich-brown friable, heavy, and slightly compact but brittle silt loam or silty clay loam. In places, at a depth ranging from 30 to 40 inches below the surface, some gray streaks occur along the crevices or cracks between the small lumps or soil aggregates. Below this heavy layer the lower subsoil layer consists of brown silt loam or very fine sandy loam, which, at a depth ranging from 4 to 6 feet, grades into stratified brown and yellowish-brown silt, fine sand, very fine sand, and some clay or sandy clay.

This soil occurs principally in the vicinity of St. Margarets, near Pumphrey, and west of Dodon. Smaller areas are south of Sappington, west of Conway, west of Millersville, and west of Bristol. It occurs principally on flat wide ridge tops and benches but includes some rolling or somewhat hilly areas. Although not extensive this is locally considered a good soil, and about 90 per cent of the land has been cleared of its hardwood growth and is farmed principally to general-farm crops. It is considered an excellent corn and wheat soil, and some truck crops are grown. Acre yields ranging from 35 to 60 bushels of corn and from 15 to 25 bushels of wheat are reported. This is an excellent hay soil and yields range from 1½ to 1¾ tons an acre of timothy or a mixture of timothy, redtop, and alsike clover

Superphosphate is used, principally on wheat, at the rate of about 400 pounds an acre, but some farmers use a mixed fertilizer. Barnyard manure is applied to corn and grass lands. This soil should prove well suited to alfalfa if limed liberally and treated with superphosphate.

**Sassafras Gravelly Sand**

Sassafras gravelly sand has a surface layer of light-brown or grayish brown sand from 3 to 5 inches thick, below which is reddish-yellow or yellowish-brown gravelly sand or loamy sand. Below a depth of 10 or 12 inches the material is reddish-yellow gravel and sand which grades into paler-yellow beds of sand and gravel below a depth ranging from 2 to 4 feet.

This soil occurs principally on the terraces or beach lands above the Patuxent River bottoms between Bayard and Governor Bridge, above Priest Bridge, and along Little Patuxent River below Woodwardville. Smaller areas are on Marley Neck, and near Jessups. The surface relief is flat or rolling.

Practically all the land has been cleared and at one time farmed, but at present most of it is lying out or is used for pasture, and pines are beginning to reforest some areas. The principal value of this soil at present is as a source of road and building materials, numerous pits having been opened for this purpose. A small acreage is devoted to truck crops.

**Sassafras Gravelly Loam**

Sassafras gravelly loam is a rather variable soil. It occupies slopes, and the relief is rolling or somewhat hilly. Typically the surface soil consists of a brown or grayish-brown loam or fine sandy loam surface layer and a yellowish-brown loam subsurface layer. The subsoil is reddish-brown or yellowish-brown heavy loam, clay loam, or light sandy clay. In places small gravel are scattered over the surface soil and through the subsoil, and small pockets of gravelly sand and gravelly sandy loam occur locally.
The soil occurs in the northern part of the county near Pumphrey, Shipley, and South Baltimore, near Fort Leonard Wood Junction, along Little Patuxent River below Woodwardville, and in small areas widely scattered over the western part of the county.

The hilly relief renders the soil rather undesirable for farming and only about 10 per cent of it is used, mainly in connection with the associated soils, for general crops and orchards. About 60 per cent of the land has been cleared and is for the most part lying idle or is used to some extent for pasture. Materials suitable for building and road construction are obtained from areas in which gravel pockets have been uncovered. The best uses to which this soil can be put at present are pasture and forestry.

**Collington Fine Sandy Loam**

The surface soil of Collington fine sandy loam consists of a brown or dark-brown fine sandy loam or loamy fine sand surface layer, extending to a depth of 5 or 7 inches, underlain by a subsurface layer of brown or reddish-brown fine sandy loam, with a slightly green tinge, which is friable but slightly sticky and has a tendency to adhere to plows and tillage tools rather than to scour freely. The subsoil, beginning at a depth between 12 and 20 inches, is somewhat compact friable but sticky, although not plastic, reddish-brown or greenish-brown sandy clay or sandy clay loam. Below a depth of 30 inches the soil material is somewhat less compact, more friable, and lighter textured, and the green color is more prominent. In places in the subsoil and substratum are streaks, layers, and bands of red iron oxides which are soft and friable but which become hard and brittle on exposure to the air. The substratum consists principally of beds of green fine sand with some silt and clay. In wooded areas there is a very thin layer or film of gray powdery material just beneath the accumulation of leaves and decaying forest litter, the surface layer is grayish-brown or brown to a depth of 4 or 5 inches, and the subsurface layer is lighter brown, grading into the typical brown or reddish-brown subsoil. When cultivated these layers are mixed and, with the addition of organic matter, produce the characteristic rich-brown surface soil. This soil as mapped includes areas of very fine sandy loam and small areas in which the surface layer is more sandy than typical.

Collington fine sandy loam occurs in very gently rolling and smooth or undulating areas which occupy broad ridges or interstream divides and benches. It occurs principally in a broad belt extending across the central part of the county, bounded on the west by an approximate north and south line from near Millersville to below Governor Bridge, on the north from Millersville through Severna Park to Gibson Island, and on the south by a line from Governor Bridge through Davidsonville to Galesville. The land within these bounds consists almost entirely of the various Collington soils. There are a few outlying areas, such as those near Pindell and Mount Carmel.

Natural drainage is excellent, except at the heads of small drainage ways where a few imperfectly drained patches occur.

Nearly all the land is cleared and is being farmed. Originally it supported a mixed hardwood and pine forest, the pine predominating on the more sandy spots. Much of this soil is included in summer colonies or real-estate projects near the many rivers and bays, consequently a considerable acreage has been withdrawn from agricultural
use. Some farmers object somewhat to the Collington soils on account of the stickiness of the subsoil which is exposed in places and makes plowing somewhat difficult, and also because the land does not dry so quickly as does Sassafras fine sandy loam.

Tobacco is the principal crop in the southern part of the Collington belt, particularly south of South River; along the Marlboro road and the Defense Highway and in the vicinity of the summer colonies and resorts more truck crops are grown; and over the remainder of the soil general farming is prevalent, with corn and hay crops predominating. A number of fields of alfalfa have been sown, in fact the most successful alfalfa fields in the county at present are on this type of soil. A number of dairies are established on Collington fine sandy loam, several florists have gardens and nurseries on this soil, and several orchards are located on it.

It is claimed by many tobacco growers that the tobacco grown on the Collington soils is superior in quality to that grown on the Sassafras soils, but that the yields are somewhat lower on the Collington soils, averaging about 700 pounds an acre. Corn yields range from 35 to 75 bushels, wheat from 15 to 20 bushels, timothy or mixed hay from 1 1/2 to 2 tons, and alfalfa from 2 to 4 tons from 3 or 4 cuttings. The soil supports an excellent pasture sod which includes tame grasses and such legumes as black medic and Lespedeza. Potatoes, melons, cantaloupes, strawberries, raspberries, and other truck crops are grown almost entirely for local markets during the summer season, and much of these crops is disposed of to the summer colonists and tourists through roadside markets. Some apples and peaches are grown.

Fertilizer is applied to tobacco, wheat, and truck crops, and to less extent to other crops. For tobacco 5-8-5 and 4-8-7 mixtures are commonly used, except on farms having an abundance of manure, when a fertilizer analyzing around 2-8-10 is applied. The average application is about 500 pounds an acre. Lime is in general use, and from 200 to 400 pounds an acre of superphosphate is applied to wheat and usually to alfalfa. The apparent suitability of this soil to alfalfa is of much importance to the dairymen.

Collington fine sandy loam, rolling phase.—The rolling phase of Collington fine sandy loam differs from the typical soil in that it is rolling or somewhat hilly. Drainage is excellent or excessive, and erosion is active. The surface soil lacks uniformity, as it is thin in places or has been eroded to such an extent that the subsurface soil or, in spots, even the subsoil has been exposed, which renders the land more difficult to plow and cultivate. Plowed fields of the rolling phase have a more distinct red tinge than do those of the typical soil.

The rolling phase of Collington fine sandy loam occurs in the general region of the Collington soils but is particularly extensive on both sides of Severn River, north of St. Margarets, and west and north of South River.

About 80 per cent of the land has been cleared, but less than half of the cleared land is being farmed at present. A smaller percentage of the rolling phase of Collington fine sandy loam is farmed than of the rolling phase of Sassafras fine sandy loam. It is used principally for the production of general crops. The forest growth consists of mixed hardwood with some pine. The exposure of the subsoil in spots renders the fields somewhat undesirable for tobacco and in fact some-
what undesirable for all types of farming owing to the difficulty of preparing and cultivating the land. This soil is excellent pasture land. Crop yields are lower, as a rule, than on the typical soil.

Collington fine sandy loam, steep phase.—The steep phase of Collington fine sandy loam, as the name indicates, occupies steep and broken areas. It occurs along the upper part of South River and its tributaries and along Severn River and some of its tributaries. The soil is variable in texture, depending on the steepness of the slope, and in many places it consists of but slightly weathered substrata materials. Some areas are redder than typical.

Practically all this steep land is in forest consisting principally of hardwoods. The soil has practically no agricultural value under present conditions and should be retained in permanent forest or wood lots, as it is too steep and broken to be used economically for farming.

**Collington loamy fine sand**

Collington loamy fine sand has a grayish-brown or light-brown loamy fine sand surface soil overlying a light-brown subsurface layer of loamy fine sand. In some areas at a depth of 30 or more inches below the surface fine sandy loam occurs. Such areas are gradational between the fine sandy loam and loamy fine sand.

This soil is not extensive, its principal occurrences being in the vicinity of Priest Bridge and on the south side of Magothy River from Mill Creek to the mouth of Little Magothy River. The relief is flat or gently rolling, and drainage is excellent. Most of the land has been cleared but at present little of it is farmed except in association with Collington fine sandy loam. General farm crops and truck crops are grown.

Much of this soil is included in summer colonies and real-estate developments and is not used for agriculture. It retains moisture better than do the sand soils and is probably better suited to vegetables than the Norfolk soils.

**Collington silt loam**

The surface soil of Collington silt loam consists of a brown silt loam surface layer and a lighter-brown or yellowish-brown subsurface layer. Below a depth of 10 or 12 inches the subsoil is brown silty clay loam with a slightly red cast. The material is heavy but friable, although it is somewhat sticky, a characteristic of the Collington soils. Below a depth ranging from 3 to 5 feet stratified sand, silt, and clay are present. In flat areas slight gray streaks are developed along cracks in the subsoil at a depth ranging from 26 to 30 inches.

This is not an extensive or agriculturally important soil. It occurs south and southeast of South River post office, and near Iglehart, and isolated areas are northeast of Davidsonville and east of Arnold.

The land is smooth or gently rolling, and drainage of most areas is good. The soil occurs on smooth ridge tops and shoulders, and is practically all cleared and farmed to general farm crops. It is somewhat harder to handle than Collington fine sandy loam and is not held in so high esteem by farmers. Farming methods are about the same as on the fine sandy loam, but crop yields are slightly lower. This is an excellent grass and corn soil, and if limed and treated with superphosphate it should produce good alfalfa.
Collington silt loam, rolling phase.—The rolling phase of Collington silt loam usually occurs on steep slopes and eroded areas below areas of the typical soil. It is somewhat variable in texture and color and is subject to erosion where cleared. Practically all the land is in forest or pasture, and these appear to be the best uses for it.

NORFOLK LOAMY SAND

The surface soil of Norfolk loamy sand consists of a surface layer of gray or pale-yellow loamy sand and a subsurface layer of pale-yellow sand or loamy sand. Below a depth of 10 or 12 inches the subsoil is yellow loamy sand. Below a depth of 4 feet the substratum consists of yellow or pale-yellow sand which may contain more or less indurated layers of reddish-brown iron crust. In places a fairly compact layer consisting of yellow sandy loam or friable sandy clay occurs in the subsoil at a depth of about 28 or 30 inches. The surface soil varies somewhat in texture, being coarser in the western part of the county than farther east. The fine texture and more loamy character of this soil enables it to retain moisture and plant food better than the more open and porous Norfolk sand, therefore the loamy sand is preferred by farmers. The surface relief is level or gently rolling, and the land is uniformly well drained.

The principal areas of Norfolk loamy sand occur on Marley Neck, near Wellhams, northeast of Glenburnie, east and south of Harmans, and west of Severn. Other areas are scattered throughout the northern part of the county.

About 75 per cent of the land has been cleared of its pine forest and more than one-half the cleared area is being farmed, but a considerable acreage is included in real-estate projects. The most important crops are vegetables, strawberries, watermelons, and cantaloupes, with some corn and hay for home use. Vegetables and strawberries of very excellent quality are grown, and several orchards are located on this soil.

Heavy applications of barnyard manure, garbage tankage, and fertilizer are made for the truck crops. The fertilizer mixtures used vary considerably depending on the amount of manure or tankage available. Many farmers use a 5-8-5 mixture, and others use fertilizers higher in phosphoric acid and potash, applied at a rate ranging from 500 to 2,000 pounds an acre. On many farms two or three crops are produced annually on the same field. Winter cover crops of rye and wheat are commonly sown in the fall to be plowed under the next spring.

This is naturally an early, well-drained soil, and its general location near Baltimore makes early trucking the logical type of farming to which it is best suited.

Norfolk loamy sand, mixed phase.—Norfolk loamy sand, mixed phase, resembles the Norfolk soils very closely and occurs in close association with them, but differs sharply from those soils in that fragments of reddish-brown sandstone, consisting of sand cemented into hard rock by various materials (largely iron oxides), are scattered over the surface and through the subsoil; and in the deeper-yellow or yellowish-brown color of the subsoil.

The surface soil of this mixed material consists of gray or pale-yellow sand or loamy sand to a depth ranging from 4 to 7 inches with some sandstone fragments strewn here and there, and a subsurface
layer, extending to a depth of 12 or 15 inches, of yellow or yellowish-brown loamy sand containing some rock fragments. The subsoil is yellow loamy sand containing streaks of brown and pale yellow. The brown streaks are finer textured than the remainder of the subsoil and are apparently the beginning of the iron segregations which, on coming near the surface or being exposed to the atmosphere, become hardened into the thin platy iron fragments so common on and through this soil. Below a depth of about 40 inches the underlying material is somewhat variable and includes pale-yellow and gray sand with numerous streaks, veins, and strata of brown loamy sand or brown silt loam. In places the surface soil is like the Norfolk soils and the subsoil is similar in color to the Sassafras or Collington subsoils. In places soil of this phase includes small elevations or knobs in which the subsoil to a depth ranging from 18 to 30 inches is sandy loam or sandy clay. Some Norfolk sand areas, too small to be shown separately on the map, are also included.

Norfolk loamy sand, mixed phase, occurs near Robinson, Benfield, Sappington, and Solley, on Hog Neck, in the Fort Leonard Wood Reservation, and in scattered areas west and south of the reservation.

The relief is typically more rolling than that of the Norfolk soils and includes numerous low ridges and knobs some of which are literally knobs of iron sandstone rock. Drainage is excellent throughout.

About 35 per cent of the land is being farmed, although fully twice that much has been cleared of its pine forest. Much of the land is lying out and has grown up in broom sedge and weeds or has been allowed to revert to woodland. As with the associated soils much of the land is included in real-estate projects and subdivisions, particularly along the electric lines and water fronts.

This soil is used principally for truck crops, berries, and fruit. Its principal occurrence is in the trucking belt, associated with the Norfolk and Sassafras soils, and in places it is farmed in fields including these soils. Farming methods, the crops grown, and crop yields are practically identical with those of Norfolk loamy sand. This soil requires heavy applications of commercial fertilizer and manure for the best yields. In places the rock fragments are so numerous that the land is left idle, but over most of it the larger fragments have been picked off the fields so as not to interfere with farming operations. Sand pits are numerous, particularly along the main roads and the railroads. The sand is used for building purposes, roads, and the manufacture of cement blocks.

NORFOLK SAND

Norfolk sand consists of a layer of gray loose sand from 4 to 6 inches thick, passing into pale-yellow or yellow sand, and this, in turn, into yellow sand below a depth of about 10 inches. Little or no change in color or texture takes place to a depth ranging from 3 to 8 feet. In places the substratum below a depth of 4 or 5 feet is somewhat paler yellow than above that depth. In the vicinity of areas of Norfolk loamy sand, mixed phase, Norfolk sand may contain a few fragments of hard sandy iron rock. In places small areas of Norfolk loamy sand are included and here the soil contains a small quantity of gravel.

This soil occurs in the north-central part of the county in the vicinity of Pasadena, on Hog Neck, Marley Neck, around Glenburnie,
Severn, and Odenton. The relief is smooth or rolling, and the land is completely drained.

More than 70 per cent of the land has been cleared but much of it is now lying out or used for the slight amount of pasturage it affords. There are numerous evidences of former fields which have been abandoned. A large acreage is included in real-estate developments along the water fronts. About 30 per cent of the land is farmed at present and is devoted to truck crops almost exclusively, with some corn grown on the smoother and slightly more loamy areas. Crops require heavy fertilization and applications of manure. Yields are slightly lower than on Norfolk loamy sand, and farming methods and fertilizer practices are about the same on the two soils. Near Glenburnie, Norfolk sand is utilized in the manufacture of building blocks.

This soil is early and easily worked, but it is low in natural fertility and is droughty. The best use of the areas near Baltimore or other markets is for truck crops, and areas located too far from markets for profitable trucking should be reforested.

**KEYPORT SILT LOAM**

The surface soil of Keyport silt loam consists of a surface layer of grayish-brown or light-brown silt loam from 4 to 6 inches thick, underlain by a subsurface layer of yellowish-brown or brownish-yellow silt loam which is slightly compact, and which has, in places, faint films of gray along cracks and crevices. Below a depth of about 12 inches the subsoil is very compact yellow or yellowish-brown silt loam or silty clay loam, with some gray and rust-brown coloring along cracks in the material. This layer becomes very heavy at a depth of about 2 feet, and the gray color becomes very much more noticeable at a depth ranging from 30 to 40 inches. The substratum below a depth of about 5 feet is somewhat variable. In places, such as east of Skidmore, heavy compact brittle yellow and gray clay extends to a depth ranging from 6 to 8 feet, at which depth it passes into compact sandy clay consisting of horizontal bands or streaks of brown or reddish-brown compact very fine sandy loam, containing some iron oxides, fine sand, and layers of friable greensand material. In other places the substratum is a compact somewhat indurated or hardened clay loam, distinctly gritty and carrying a small amount of small gravel. It passes into dark-gray fine sandy loam with splotches of rust brown, and below this into greensand marl. In places the compact hardpanlike layer in the subsoil is not very well developed, especially where the relief is somewhat undulating, and near the water fronts.

This soil occurs extensively east of Sudley, in the vicinities of Galesville, Mayo, St. Margarets, and Skidmore, and is less extensive at Fairhaven, Nutwell, along the water fronts near Deale and Shady Side, west of Pumphrey, and along Cabin Branch. It occurs on the marine terraces along the eastern part of the county adjacent to the bay, at elevations ranging from 10 to 40 feet above sea level. Its surface relief is level, gently rolling, or undulating, and drainage is only fairly well developed. Ditches or shallow furrows are used to improve the surface drainage.

About 95 per cent of the land has been cleared of its hardwood forest growth, and about 45 per cent of the cleared land is farmed, the remainder being included in water-front home sites and real-estate subdivisions. The farmed land is devoted to such general crops as
corn, wheat, and hay. Farmers report acre yields ranging from 35 to 50 bushels of corn, from 15 to 20 bushels of wheat, and from 1½ to 2 tons of hay, although yields of wheat as high as 28 bushels are reported in exceptional seasons. Several flocks of sheep and herds of cattle, principally dairy cattle, are grazed on this land. Alfalfa growing has been attempted but with little success.

Practically all farmers on this soil apply superphosphate for wheat at a rate ranging from 200 to 400 pounds an acre or a mixed fertilizer analyzing about 2-12-4. The barnyard manure is saved and applied principally to the corn and hay land, and some lime is being used. The pastures include tame seeded grasses, a variety of wild grasses, and some legumes, such as alsike clover and black medic. Lespedeza has been seeded on this land but with only moderate success.

Numerous tests with Soiltex, as well as the type of vegetation on the land, indicate that this soil needs lime. It is well suited to grass and grain provided it is limed and superphosphate or complete fertilizer is applied. The wider use of soybeans in the rotation is also suggested for soil improvement.

**ELKTON SILT LOAM**

Elkton silt loam is locally known as “white land” or “white oak land.” The surface soil consists of a dark-gray or gray silt loam surface layer containing some rust-brown streaks, underlain at a depth ranging from 6 to 12 inches by a subsurface layer of light-gray or almost white silt loam. The subsoil is dark-gray silty clay loam mottled with some lighter gray and rust brown. Tubes, seams, or cracks of light-gray silt loam or very fine sandy loam are numerous throughout the subsoil. Below a depth of about 35 inches the material is dark-gray clay loam with light-gray and rust-brown streaks along cracks and crevices, and it grades into heavy but friable gray very fine sandy loam or loam. Below a depth ranging from 4 to 5 feet is light-gray, gray, rust-brown, and green compact but friable very fine sandy loam containing some streaks or seams of blue clay. In places the soil includes patches with some yellow in the subsurface layer, which represent a gradation toward Keyport silt loam.

The surface relief is very flat, and drainage is poor. Surface ditches must be constructed before the land can be adequately drained for agriculture. The soil occurs on the marine terraces of the eastern and southeastern parts of the county, principally at North Beach Park, in a large practically continuous area extending from Deal's to Shady Side, and northwest of Skidmore. About 75 per cent of the land has been cleared of its forest growth, which consisted largely of gum, white oak, holly, and black oak.

The soil is used for grain, hay, and pasture land. Wheat yields 20 or 22 bushels an acre in favorable seasons, but returns are very low after a cold wet spring. The same is true of corn, which yields from 25 to 30 bushels an acre. A number of sheep and a few cattle are pastured on this soil. The land is farmed largely by negroes, but some of it is farmed in small tracts by oystermen who make farming a side line to oystering. Crops are very susceptible to wet and dry seasons on this soil which is said to “freeze” twice a year, in winter and during the dry spells of summer. Very little commercial fertilizer is used, but excellent yields are obtained when lime is applied and barnyard manure is available in adequate quan-
tities. Farming methods on this soil are somewhat antiquated, and the region in which Elkton silt loam is dominant has a rather dilapidated and patchy appearance.

This soil is apparently best suited to small grains, grass, and corn. The land needs drainage and perhaps open ditches would be the most satisfactory means of draining it. It needs lime and should have liberal applications of superphosphate for small grains.

**TUXEDO SOILS, UNDIFFERENTIATED**

Tuxedo soils, undifferentiated, is a designation used for material that is so variable as to render impossible its satisfactory separation into soil types. Tuxedo sandy loam has a gray surface soil, and a pale-yellow subsurface soil, consisting of loamy sand or sandy loam, underlain by a subsoil of red, gray, yellow, and white sandy clay or clay. The clay subsoil of these undifferentiated Tuxedo soil areas ranges from hard and compact or indurated to rather plastic. Gravelly patches are numerous, and eroded patches, in which the subsurface soil and subsoil are exposed, give the soil material a very spotted appearance. In such places it is in reality almost unaltered substratum material. The texture ranges from gravelly sandy loam to clay. Small patches of Norfolk and Sassafras soils, too small to be separately mapped, are included.

The undifferentiated Tuxedo soils occur mainly in rolling or hilly country and are very commonly developed along the sides of small stream valleys where erosion and slumping have exposed the underlying materials. They are mapped on Bodkin Neck, Marley Neck, about the head of Severn Run near Severn, near Sappington, Woodwardville, on the Fort Leonard Wood Reservation, and north and west of the reservation. The material is extensive in the northwestern part of the county. Formerly this class of soil material was mapped as Susquehanna soils, but it lacks the plastic, tough clay subsoil characteristic of those soils.

Drainage is mainly by run-off, as the compact and heavy subsoil impedes downward movement of water through the soil. About one-half of the land has been cleared of its mixed pine and hardwood growth. Very little of the cleared land, however, is farmed, but is devoted principally to pasture and orchards, although some truck crops and corn are grown where this material is included in fields with the Norfolk soils. Its great variability renders the soil of low agricultural value, but where farmed it is handled like the associated soils.

For the most part this land is best suited to orchards, pasture, and forestry. All the steeper areas should be permanently maintained in woodland.

A few areas of these undifferentiated soils are flat and are similar in general appearance to the soils of the steeper areas. The principal areas of this flat land are on Marley Neck near Solley and on Bodkin Neck. They are farmed principally to corn, hay, truck crops, and orchards.

**LEONARDTOWN SILT LOAM**

The surface soil of Leonardtown silt loam is grayish-brown silt loam, grading at a depth of 5 or 6 inches into lighter-brown or yellowish-brown heavy but friable silt loam or silty clay loam. At a depth of
about 15 inches the subsoil is compact yellowish-brown or brown silty clay loam which grades at a depth of about 20 inches into dull-brown silty clay loam with considerable gray coherent material in both the horizontal and perpendicular cracks, seams, and crevices. This layer has a distinct platy or laminated structure and is very compact and difficult to penetrate with a soil auger. The gray material is most prominent between depths of 26 and 30 inches. Below a depth ranging from 30 to 40 inches the subsoil is brown with some gray and rust brown along cracks. Here the material is compact but much less so than in the layer just above, and it is fairly friable. Below a depth of about 4 feet the subsoil is fairly heavy but friable brown, yellowish-brown, and heavy gray silt loam or silty clay loam. The substratum in most places consists of material like that underlying the Sassafras soils, but in places it is similar to the substratum of the Tuxedo soils, undifferentiated. North of Shipley and in other places near areas of Sassafras gravelly loam the compact layer consists of an indurated gravelly sandy loam or sandy clay layer just below the layer in which the gray material is most pronounced.

This soil is mapped principally near Linthicum and Shipley, west and north of Waugh Chapel, and near and east of Fort Leonard Wood Junction. It includes areas near Leon and Greenock, in which the hardpan layer is not well developed. The area near Fort Leonard Wood Junction is really loam in texture but is included with the silt loam owing to its small extent.

This soil is inextensive, and it is of only local agricultural importance. It occurs on flat ridge tops or plateaus. Drainage is imperfectly developed because of the hardpan layer, and recourse must be had to open ditches or shallow furrows and the fields plowed in small lands from 50 to 100 feet in width.

Practically all the soil has been cleared. Much of it is included in building lots and town and real-estate developments suburban to Baltimore. About one-half of it is farmed. Corn, wheat, and hay are the principal crops, although several truck farms and orchards are established on this soil. Corn yields from 20 to 35 bushels an acre in favorable seasons, but an unduly wet year cuts down the yields. Wheat yields from 12 to 18 bushels an acre and hay about 1½ tons. Although not particularly well suited to truck crops, the location of the soil with respect to markets is favorable, and a wide variety of truck crops is grown. Several fields of alfalfa are on this soil and yields of more than 2 tons an acre are reported where the land has been limed and fertilized. Fertilizers are necessary for wheat, but this crop is not so extensively grown as formerly owing to its tendency to winterkill. For truck crops heavy acre applications of complete fertilizers are applied, totaling about 1 ton a year, all the available manure is used, some garbage tankage is applied, and lime is considered essential. Strawberries, pears, apples, and raspberries are grown to some extent for the Baltimore and local markets.

**PORTSMOUTH LOAM**

Portsmouth loam has a dark-gray or black loam surface soil extending to a depth ranging from 8 to 15 inches, and a gray or mixed gray, yellow, and rust-brown loam or sandy loam subsoil. This soil occurs at or near the heads of streams and drainage ways or along the inner margins of some of the large stream bottoms or second bottoms, and
it is somewhat variable in texture and appearance. In places east of Governor Bridge it consists of black mucky clay loam from 24 to 30 inches thick underlain by blue sticky clay, and in other places it is dark-gray loam or fine sandy loam. Some areas include small patches of mucky loam and even a few patches of muck.

About half the land has been cleared of its hardwood growth, and about one-third of the cleared land is being farmed to corn, soybeans, and hay, all of which grow very luxuriantly and produce high yields. Reports of farmers indicate an average acre yield of about 40 bushels of corn, and between 2 and 3 tons of hay. In favorable years corn is reported to have yielded more than 75 bushels an acre. No fertilizers are used. It is difficult to plow and prepare this land for crops, and seed bed preparation is apt to be somewhat late. Crops suffer during wet seasons.

This soil is of small total extent. The most extensive areas are east and south of Governor-Bridge, and southeast of Severn. The land is poorly drained and thorough drainage is necessary before it can be successfully farmed. Where drained it is a very good corn and hay soil and, if more extensive, would be an important truck-crop soil.

**MEADOW**

Land subject to overflow by fresh-water streams is classed as meadow. It includes a wide variety of soil material and is subject to change in texture and composition with each overflow. The texture range is from sand to silt clay loam, and the color ranges from gray to reddish brown. In places where the adjacent uplands are Sassafras soils, meadow consists of transported Sassafras soil material carried down and dropped by the stream waters, and where Collington or Norfolk soils are predominant the stream bottoms resemble to some extent the adjacent upland soils. Meadow includes small marshy or swampy areas as well as some fairly well drained areas. Along Patuxent River above the tidal marsh areas and along Little Patuxent River the material for the most part is brown or reddish brown, and, were it not for the mixed soil condition that exists, the soil here would be mapped in the Congaree series, which comprises soils derived from upland piedmont soils such as are found along the upper part of this drainage system.

Near the Howard County line, meadow includes some brown fairly well drained bottoms of tributaries of Little Patuxent River. Such material was mapped in the Ochlockonee series in Howard County, but it is of very small extent in Anne Arundel County. In the sandhill region of the county, meadow includes some small areas of muck and of Portsmouth soils. Around the heads of streams and in small depressions at the heads of drainage ways, meadow includes small areas with gray or grayish-brown surface soils, yellow or pale-yellow subsurface soils, and subsoils consisting of more or less compact but friable pale-yellow, gray, and rust-brown sandy loam. Practically all these areas are farmed in connection with the adjoining soils. Near Old Landen Point in the northeastern part of the county, meadow includes a small poorly drained area in which a well-defined chocolate-colored hardpan layer has developed at a depth of about 20 inches. If of larger extent this area would have been separately mapped as Leon fine sand.
Meadow is for the most part uncleared and supports a hardwood forest with a few scattered pines in the better-drained high spots or light-textured patches. Where cleared it is devoted mainly to pasture although at times corn and hay are grown, but as crops have been lost by unexpected overflows very little of the land is farmed at present except in fields with other soils.

Forestry is the best present use for most of this soil. Drainage and control of the flood waters, particularly of Patuxent River, would open up some valuable corn and hay land but only at great expense.

**TIDAL MARSH**

Near the head of tidewater along the numerous rivers and creeks and at bends, bays, or shallow spots near the shore, salt-marsh grasses and various aquatic plants have gained a foothold and have completely filled all but a small channel with a luxuriant plant growth. Such areas receive constant additions of soil material from the tributary streams, and the channels are gradually becoming choked with a mass of peaty fibrous material, the partly decayed remains of the succeeding generations of plants, together with some mineral matter. These areas may at periods of medium or low tides become fairly dry or merely soggy, but at high tides are completely inundated. They are included in the classification, tidal marsh.

The most extensive areas are along the lower part of the Patuxent River bottoms and along Lyons Creek near the Calvert County line; at the heads of South, Severn, and Magothry Rivers; in isolated patches along the numerous bays, inlets, and old channels which extend inland from Chesapeake Bay; and along Patapsco River at the northern edge of the county.

Tidal marsh has little or no agricultural value except for the small amount of grazing for cattle and the small amount of marsh hay which is cut and used principally for bedding.

**SOILS AND THEIR INTERPRETATION**

Anne Arundel County, Md., is located in the coastal-plain physiographic region a short distance from the piedmont fall line which crosses Howard County a few miles northwest of the Anne Arundel County line. This region was originally forested so that conditions were unfavorable for the accumulation of a large amount of organic matter in the soils, and as a result all the upland soils are light colored and are classed in the group known as the brown or gray-brown forest soils. Leaching has gone forward under a humid temperate climate so that the soluble plant food, the carbonates, and alkalies have been removed and there is no zone of accumulation of these materials within the solum. Oxidation has gone on under conditions of excellent drainage, for the most part, so that the mature soils of the uplands have brown or yellowish-brown subsols, or B horizons.

Many of the streams have cut large, deep, and narrow channels through the unconsolidated sands and clays of the original parent material of the region. Bordering the narrow strips of flat first-bottom land are high or abrupt steep and broken hillsides, and much of the county is decidedly rolling or hilly. On the steeper slopes and to less extent throughout the hilly parts of the county, erosion has been active except where checked by forest growth or where the
land has been kept in grass most of the time. Much of the erosion is sheet erosion; that is, a small part of the surface soil is removed by each heavy rain. This has resulted in destroying the normal soil profile development in many places and is responsible for the rolling and steep phases of soil shown on the map.

The soils of Anne Arundel County are derived through the forces of weathering such as oxidation, eluviation, and illuviation, from beds of unconsolidated clays, sandy clays, sands, and sandy material containing gravel. Extensive areas of greensand or glauconitic material have given rise to the Collington soils.

The soils of this county may be grouped in two broad classes based on the degree of development of the soil profile. The first group includes the Sassafras and Collington soils. These soils have a normally developed profile and occur on the smooth uplands under excellent drainage conditions. Under these conditions of relief and drainage the development of the soils has been influenced by the climatic and soil-forming agencies of the region acting uninterruptedly over a long period.

The normal soil profile of this region is well illustrated by that of Sassafras very fine sandy loam, which is characterized by a layer of leaf mold or partly decayed forest litter ranging from a mere film to 4 inches in thickness. Beneath this organic surface layer in most places is a very thin film of pale grayish-brown or gray material underlain by a light-brown or grayish-brown very fine sandy loam layer about 5 inches thick. Below this is friable light-brown or yellowish-brown very fine sandy loam which becomes slightly compact at a depth of 12 or 14 inches. These layers comprise the upper, or A, horizon. Beneath the A horizon is a layer of brown friable but somewhat compact sandy clay or heavy sandy loam, which has a fairly definite structure and breaks up into angular particles ranging from about one-fourth to three-eighths inch on the longer axis. The outsides of the particles are duller brown than the material inside. Worm casts and root holes are filled with grayish-brown fine or very fine sandy loam, and the same kind of material as well as some thin films of reddish-brown iron oxide may occur along the crevices. This material is noticeably porous, the pores being about one-fiftieth inch across, and the particles become slightly larger with depth. This layer extends to a depth of about 36 or 38 inches below the surface and constitutes the heavy B horizon, or layer of concentration. It is the seat of deposition of material carried from above by the downward percolating soil water, consequently it contains a higher percentage of fine soil material than the layers above. It constitutes a reservoir of soil moisture for the soil as a whole, and in most places it contains a higher percentage of potash than the surface soil. It is the lowest horizon in which weathering is complete or approximately complete. Beneath this horizon the material is friable sandy loam, variegated or streaked red, reddish yellow, yellow, and grayish yellow. Beginning at a depth ranging from 5 to 7 feet below the surface the material is laminated or stratified and includes fine sand, very fine sand, silt loam, and clay. This constitutes the C horizon and includes the upper or partly altered material and the comparatively unchanged stratified substrata. Pockets or seams of small gravel are common in exposures of the underlying material of the Sassafras soils, and some
gravel may be found strewn over the surface in the rolling and eroded areas.

The Collington soils have the same general profile characteristics as the Sassafras soils but are developed from different materials, including considerable greensand, or glauconite, which, being high in content of iron, imparts a deeper-red color to both the A and B horizons, and the whole profile has a green or olive tinge owing to the presence of the glauconitic material. Stickiness, which is probably due to some colloidal condition in the soil, is also a characteristic of the Collington soils and tends to prevent clean scouring of the plow. The substratum is characterized by numerous layers of segregated iron oxide material which on exposure becomes hardened, and platy fragments of this material split off when the substratum is exposed by erosion.

The rolling and steep phases of these soils do not, as a rule, have normally developed profiles, owing to the rapid erosion of the surface soil, or A horizon, and many fields consist largely of B horizon material. The phases represent altered or mutilated soils.

All the other soils of the county may be included in the second group. They have been restricted in their development by drainage, surface relief, or other agencies.

The Norfolk soils, consisting of deep sands, have a very thick A horizon, in places extending to a depth of 5 or 6 feet. The material is very pale yellow or gray at the top and becomes pale yellow or yellow below a depth ranging from 2 to 5 inches. Some gray splotches occur here and there throughout the lower part of the layer. In most places at a depth of 4 or more feet the B horizon is thinly developed and is yellow or brownish-yellow sandy clay from 4 to 8 inches thick, passing down into variegated red, gray, and yellowish-brown sandy clay, containing lenses of clay, sand, and gravel. This material in most places is rather compact and hard but in few places it is plastic, except in lenses or in thin layers or strata. In having a substratum heavier than the A and B horizons it differs from the normal soil profile of the region. Some thin more or less horizontal streaks or seams of brown material which, on exposure, hardens into platy dark-brown hardpan or ironstone, may occur in the B and C horizons. This material is usually fine textured and is doubletless deposited iron oxides. These "iron rock" fragments, ranging from platy to fairly thick heavy layers or chunks, are present in considerable quantities over and through the surface and subsurface layers. The surface relief is rolling and "knobby" as contrasted to the smoother flatter relief of the typical Norfolk soils.

The material classed as Tuxedo soils, undifferentiated, represents a soil condition rather than a true soil; that is, it includes several kinds of soils and soil materials so mixed that separation is impractical. It probably has developed from the geologic, or C horizon, material consisting of variegated clays, silty clays, and sandy clays. Most of this class of material has developed in rolling or hilly sections of the county, where erosion is continually removing the surface soil, thus preventing the development of a definite soil profile.

The Leonardtown soils rather closely resemble the Sassafras soils through the A horizon and much of the B horizon, but are pale brown or brownish yellow in the B horizon. The lower part of the B horizon is very compact and indurated, contains considerable gray material,
and is very difficult to penetrate with a soil auger. Analyses show that this part of the horizon is higher in silica and lower in iron and alumina than the lower part of the B horizon of the Sassafras soils and apparently the compactness is due to the higher silica content. The C horizon ranges from gravelly sand to red or mottled clay. The Leonardtown soils occur in smooth areas, and the hardpan or compact lower B horizon is believed to indicate that they were developed under imperfect drainage conditions and in very flat positions. The normal A horizon and upper layer of the B horizon, however, indicate that the soils were not developed under a waterlogged condition, although with the development of the hardpan the internal movement of water was naturally impeded and the color and structure of the profile changed.

The Elkton soils, occupying flat areas at low elevations and having poor drainage, indicate that their profile development has been retarded or influenced by excessive moisture. In areas where surface drainage is imperfect and the soil has been subjected for considerable periods of time to the influence of excessive moisture and imperfect internal drainage during parts of the year, and to conditions of deficient moisture during periods of dry weather; that is, to alternating wet and dry conditions, the surface soil is gray or nearly white. In a few forested areas there is an accumulation of vegetable matter on the surface. The subsoil, or horizon B, consists of heavier material mottled gray, yellow, and brown. This horizon varies in thickness and in structure, but in most places at a depth ranging from 28 to 34 inches it is underlain by material which is lighter in color and much more friable. The mottled color of the entire profile is evidence of incomplete oxidation.

Occupying a position between the Sassafras and Elkton soils is an intermediate grade of material as regards color, drainage, and structure. These conditions give rise to soils that have been grouped in the Keyport series. The soil profile is somewhat similar to that of the Sassafras soils to the bottom of horizon A which comprises the surface and the subsurface layers. Horizon B, or the true subsoil, shows evidence of incomplete oxidation in its mottled gray, yellow, and brown color. It is heavier in texture, is tough, and in many respects resembles the subsoil of the Elkton soils. The mottled condition of the lower part of the subsoil is not owing entirely to imperfect drainage, but in part to the fact that oxidation has not yet extended below a depth ranging from 12 to 18 inches. Below the typical subsoil is the light-textured and loose material of horizon C, or the parent material. In a few places glauconitic material underlies the Keyport soils at a depth ranging from 4 to 7 feet below the surface.

The Portsmouth soils have developed under continuous moist, water-logged conditions so that the accumulation of organic material has been possible, and the surface layer is dark gray or black. Beneath this and extending to a depth of several feet the material is gray. These soils have a very youthful profile and are but a step removed from tidal marsh, or a continuously wet condition.

The bottom lands are subject to frequent overflow and are variable in texture. The overflowed lands along the small streams consist of materials brought down from the near-by uplands. Along Patuxent and Patapsco Rivers, however, the bottom lands are in
part composed of local materials but appear to be dominated by the brown Congaree soil materials carried down by these streams and their tributaries from the piedmont plateau.

**SUMMARY**

Anne Arundel County is in southern Maryland. It includes level or rolling uplands and interstream areas but is very hilly adjacent to the main streams. Drainage is excellent over most of the uplands.

The county has a temperate climate. The winters are comparatively mild, being tempered by the near-by water areas. Rainfall is well distributed throughout the frost-free season of nearly 200 days.

Baltimore is the principal market for agricultural products, and Washington also draws on the resources of this county.

Railroad transportation facilities are good in the northern and northwestern parts of the county; over the rest of the county transportation is by automobile. The main roads are excellent and secondary roads are fair.

The Sassafras and Collington soils are the most important agricultural soils in the county, and the Norfolk and Keyport soils are of considerable importance, particularly the former in the trucking sections. Sassafras fine sandy loam, Sassafras very fine sandy loam, and Collington fine sandy loam are the principal tobacco soils. Sassafras loamy sand and Norfolk loamy sand are the most important truck-crop soils. The best alfalfa is grown on Collington fine sandy loam.

Tobacco and truck crops, including melons, strawberries, and potatoes, in addition to a wide variety of vegetables, are the most important cash crops produced in the county, and the agriculture of the county is for the most part centered on these crops. Dairying and poultry raising are becoming increasingly important.

Most of the water-front lands have been withdrawn from agricultural use and are utilized for summer homes and real-estate developments.
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Washington, D.C. 20250-9410;

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