

SOIL SURVEY OF ANNE ARUNDEL COUNTY, MARYLAND.

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DESCRIPTION OF THE AREA.

Anne Arundel County is situated on the western shore of the Chesapeake Bay just south of the city of Baltimore. It is included within the meridians $76^{\circ} 20'$ and $76^{\circ} 45'$ west longitude and $38^{\circ} 45'$ and $39^{\circ} 15'$ north latitude. It is bounded on the north by Howard and Baltimore counties, on the south by Calvert County, and on the

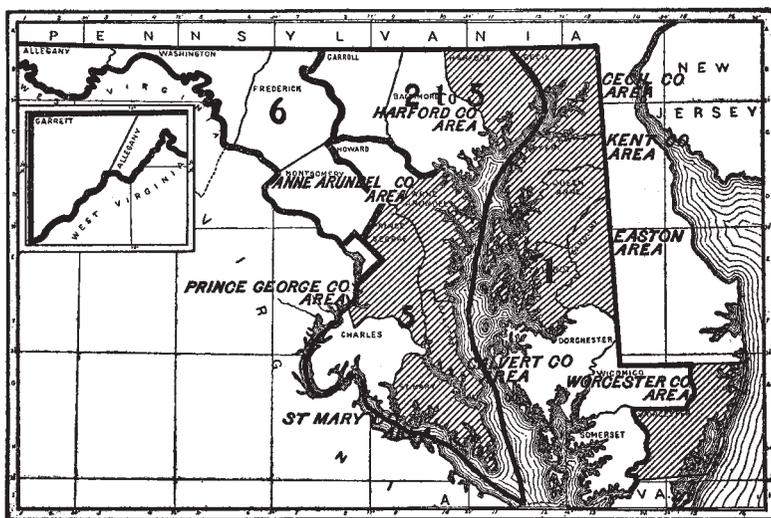


FIG. 9.—Sketch map showing location of the Anne Arundel County area, Maryland.

west by Prince George County, from which it is separated by the Patuxent River. The extreme length of the county from north to south is about 37 miles, and the greatest width is about 26 miles. It has a total area of 275,840 acres, or 431 square miles.

Anne Arundel County, named for Lady Anne Arundel, the wife of Cecil Calvert, was settled in 1650. The first settlement was started about 2 miles from the present site of the city of Annapolis, in 1649, by a band of Puritans from Virginia.

The population of the county is now about 40,000, the larger part of which consists of the agricultural class. There are said to be about 4,500 farms in the county, most of them being small and well

tilled. The assessed value of property in the county in 1907 was \$12,476,303. Annapolis, the largest town and the capital of the State, is the county seat. Here are located the United States Naval Academy and St. John's College. The other towns are not large, Annapolis being the only incorporated town. Brooklyn and South Baltimore are in reality suburbs of Baltimore. They have the only manufacturing industries of the county, except the ice and gas plants and car shops in Annapolis and the canneries that are scattered about in various parts of the area. Eastport, a suburb of Annapolis, Parole, also a suburb, Galesville, Glenburnie, Odenton, Naval Academy Junction, Friendship, and Germantown are small but slowly growing towns. At various stations along the electric lines some of the land is being sold in small lots to Baltimore and Washington people for building purposes. Churches and schools are numerous, well constructed, and conveniently placed. The educational system of the county is excellent.

The county is drained by many rivers and tide-water embayments, all emptying into Chesapeake Bay, and all of them navigable far back into the county. The principal rivers are the Patapsco River, which separates Anne Arundel from Baltimore City and County, the Magothy, the Severn, near the mouth of which the city of Annapolis is situated, the South River, the West River, and Rhodes River. These rivers, with their numerous creeks and estuaries, give this county a shore line of something over 290 miles of navigable tide water, and large quantities of truck and other farm produce are shipped by boat to the Baltimore markets.

The streams above tide water in this county are small, but are of some importance as drainage courses and furnish water for live stock. Some of them have sufficient fall and volume to afford water power for grist mills. Some years ago Anne Arundel County had a large number of such mills, but most of them are now dismantled.

Fish, oysters, and crabs are abundant in all the rivers and creeks, furnishing those who live near with an abundance of sea food at all times of the year, as well as providing employment to a large number of people. In 1908 over 200,000 bushels of oysters were taken from the waters of Anne Arundel County.

In the northern part of the county the railroad facilities are ample, the lines traverse the county in such a way as to give a choice of two routes to most of the farmers. In the southern part of the county, however, there is only one railroad south of Annapolis—the Chesapeake Beach Railroad, which crosses only a very small section in the southwestern corner. The Baltimore and Ohio Railroad forms part of the northwest boundary of the county, the Pennsylvania Railroad crosses the northwest section, and the Washington, Baltimore and Annapolis Electric Railway parallels the Pennsylvania line through

the county, at an average distance of about 1 mile. The Washington, Baltimore and Annapolis Electric Railway also has a line running from Annapolis to Annapolis Junction, crossing the Pennsylvania line at Odenton. The Baltimore and Annapolis Shortline runs from Baltimore to Annapolis through the northeast section of the county. These lines, in connection with the packet boats that ply on the rivers, furnish the northern part of the county with excellent means of transportation. On the other hand, about the only transportation available in the southern part is by water, and since the harbor facilities in this section of the county are not so good as in the northern and only a small proportion of the people have access to even this limited means, it is readily seen that adequate transportation facilities are lacking.

The topography of the county varies from almost flat along the Chesapeake Bay to rough and quite rugged in the northwest part, where in one place there is an elevation of 306 feet above tide. The change from the lower to the higher levels is so gradual as to be hardly noticeable in crossing the county from east to west. In the southern part the difference between the lower and higher elevations is not so great, the highest point being Marriott Hill, which rises to a height of 240 feet. As far as topography is concerned, practically the whole county is tillable. Except along stream courses, all kinds of farm machinery could be readily used. Some of the slopes along the Patuxent River are quite steep, but not so steep as to prevent their use for fruit or pasture land. Very little of the low land is marshy, although much of it falls below the 20-foot contour line. Some of the ridges between streams are quite flat, usually giving rise to silty soils, but in all parts of the upland country the topography is sufficiently rolling to provide perfect surface drainage. Much of the land is of such a nature that no matter how flat the surface drainage would be ample on account of the loose, open character of the subsoil.

CLIMATE.

The climate of Anne Arundel County is modified to some extent by its proximity to Chesapeake Bay. The summers are not so hot and the winters not so cold as in some of the counties lying inland. There are no distinctly wet and dry seasons, but the table shows that the rainfall is greater in summer than in winter. The average annual rainfall is about 48 inches, which is usually well distributed throughout the growing months.

It will be noticed in the frost table that the last killing frost occurs as late as April 24 and as early in the fall as October 11, but the average date of the last and first killing frost is about April 18 and November 1, respectively. The ground is seldom frozen to any considerable depth, but there is frost enough to break down and mellow

the soil in fall-plowed fields. Freezing and thawing sometimes injure winter crops like wheat, but the damage from this source is not great.

In winter the prevailing wind in this part of Maryland is from the west or northwest; in summer it is usually from the south.

Damaging hailstorms sometimes occur, but their path is always narrow, and the resulting injury to crops is only local.

The following tables show the normal monthly and annual temperature and precipitation and the dates of the first and last killing frosts at the station named:

Normal monthly and annual temperature and precipitation at Annapolis.

Month.	Temperature.	Precipitation.	Month.	Temperature.	Precipitation.
	° F.	Inches.		° F.	Inches.
January.....	34.3	3.39	August.....	76.6	4.91
February.....	34.1	3.68	September.....	69.7	4.05
March.....	42.5	4.29	October.....	57.6	3.81
April.....	53.1	3.81	November.....	45.4	3.20
May.....	64.0	4.36	December.....	37.1	3.74
June.....	73.9	4.44	Year.....	55.6	48.89
July.....	78.4	5.21			

Dates of first and last killing frosts at Annapolis.

Year.	Last in spring.	First in fall.	Year.	Last in spring.	First in fall.
1903.....		Nov. 7	1907.....	Apr. 21	Nov. 14
1904.....	Apr. 21	Oct. 31	1908.....	Apr. 5	Nov. 2
1905.....	Apr. 19	Nov. 2	Average.....	Apr. 18	Nov. 1
1906.....	Apr. 24	Oct. 11			

AGRICULTURE.

GENERAL CONDITIONS.

Anne Arundel has always been an agricultural county, and, aside from the fisheries, agriculture with its dependent manufactories forms practically the only industry. Even those who obtain their living principally from the water are, to a certain extent, interested in agriculture.

The agriculture of the northeastern section of the county is largely specialized in the growing of truck crops for the Baltimore markets. The southern and western parts are devoted principally to general farming, although there are some extensive areas well suited to trucking, and the fact that the latter is not followed is mainly due to a lack of adequate shipping facilities.

The quality of the products grown in the trucking sections is most excellent, due in large measure to the sharp competition which always

exists in such industries in close proximity to cities like Baltimore and Washington. Many of the farmers living in the sandy sections of the county grow truck almost exclusively, except where fruit is still grown. The principal truck crops are English peas, snap beans, lima beans, asparagus, cucumbers, cantaloupes, watermelons, squash, especially the bush scalloped, eggplant, tomatoes, and sweet potatoes. In the same section small fruits, including strawberries, dewberries, blackberries, and raspberries are grown extensively. Some peaches are also grown in the sandy sections.

General farming is the prevailing type of agriculture in the southern portion of the county, corn, wheat, hay, oats, tobacco, and potatoes being the most important crops. Corn is planted in checks usually about $3\frac{1}{2}$ feet apart each way. Cultivation is done too generally with a one-horse plow that frequently runs too deep, breaking up the root system. Harrows and cultivators could be profitably used to a much greater extent with a saving of labor and better results.

Very little commercial fertilizer or manure of any kind is used for corn. More attention should be given to the manurial requirements of the crop, particularly with a view of supplying the soil with organic matter which can be done in a profitable way by turning under crops like crimson clover and cowpeas. Barnyard manure is a very effective manure for this crop and as much as possible should be produced on the farms. Commercial fertilizers are also used for corn by successful farmers in various parts of the State on soils very similar to those of Anne Arundel County.

The matter of seed selection is a very important one and should be practiced more generally and with more care. No particular varieties are grown, but each farmer saves seed from his crop, selecting of course the best ears. This is usually done after the corn is harvested and stored. The better plan is to select the seed in the field, where the good qualities of the stalk as well as the ear can be taken into consideration. New and well-selected varieties are seldom introduced, although there are in this part of the State some farmers who are making a specialty of seed-corn production.

The best soils in this area for corn are the sandy loams, silty loams, and well-drained bottom lands. Too many farmers grow corn on deep sandy soils of low water-holding power. The yellow or white Dent varieties are best suited to the climate and other conditions of this county. It is not necessary or best to obtain seed corn from a distance. It should be produced in the neighborhood, or better on the same farm where the crop is to be grown.

Tobacco is the oldest crop, with the possible exception of corn, that is grown in the county. The total amount produced has varied greatly at different periods, the largest yield in the history of its production having been made in 1860. The product grown here is

practically all exported to Europe. The seed is sown in February on new ground, preferably a moist sandy loam, well protected from winds and covered with cloth. A few days before setting the plants they are left uncovered in order to make them more hardy.

The plants are set as soon as the weather permits in hills spaced about 4 feet each way. After the crop is well started, cultivation should be shallow, as deep plowing interferes with the root system, checking the growth. The land should be kept as nearly level as possible and not ridged during cultivation.

Topping should be more widely practiced to insure a larger and better leaf. The best growers are all of the opinion that severe topping is advisable. When ripe, the plants are cut off near the ground and hung on sticks in the barn to cure. Flue curing has not proved very successful from the standpoint of profitableness. When the leaves are cured, they are stripped from the stalk, made into hands of uniform grade, and packed into hogsheds to be sold.

The crop is heavily manured and large amounts of commercial fertilizers are used. Potash has proved very beneficial to the crop and is generally applied in liberal amounts. A leaf of better quality is secured where the sulphate rather than the muriate of potash is used. Cover crops of crimson clover or cowpeas should be grown to increase the content of organic matter.

Much trouble has been experienced in getting good stands of the hay crops generally grown. Timothy does not seem to do well here on any of the soils. Redtop and some other grasses have been tried but with slight success. Orchard grass probably does best in this locality. Red clover does fairly well and is quite largely grown. Alfalfa has been tried in all parts of the area, but it has not been a success, except in the vicinity of Annapolis on the Collington sandy loam. Better results with alfalfa would likely be had by thorough preliminary preparation of the soil following a clean cultivated crop, liberal applications of burnt lime, and soil inoculations.^a The soils generally are in need of lime and it is believed that an acreage application of at least 2,000 pounds of burnt lime would prove a decided advantage as a preliminary treatment for all the hay crops.

Wheat and oats would prove more profitable crops if grown in systematic rotations, especially with legumes such as cowpeas and crimson clover. Wheat usually does very well after tomatoes. Various crops can be made to fit in excellent rotations, including wheat and oats, an essential factor being the production of those crops that supply organic matter.

Irish potatoes are grown to some extent on nearly every farm. Where they are grown on a commercial scale good yields are produced. The soil is always highly manured and well cultivated.

^a See Farmers' Bulletin No. 339.

Commercial manures are used scantily in a few cases where stable manure can not be had. Irish potatoes do best on rich sandy loams well supplied with organic matter and well drained. If the soil is heavy the tubers are soggy; if light and sandy the crop is liable to suffer for want of moisture. The soils of the southern part of the county are well adapted to this crop and the industry should be more extensively developed. A good yield of Irish potatoes in this county is 200 to 250 bushels per acre.

Crop rotation is a subject which should receive more attention. It is practiced to a certain extent, but too generally as a matter of convenience. The following is practically the only crop-rotation system in vogue: Corn is planted on sod land and wheat, if grown, is sown on the corn land in the fall without plowing. Grass is sown with the wheat, and clover is put on the same field in the early spring. The field is left in grass and clover for two years, when it is again plowed and planted to corn. Clover and grass are often sown on the corn land alone, as some farmers believe it does better without a nurse crop. This is a good rotation and will improve the land if carefully and continuously practiced.

A crop-rotation system should include at least one leguminous crop, and more than one where practicable. There should also be a cultivated crop, such as corn, tobacco, or tomatoes, which should be followed by one of the small grains. A good rotation for a large proportion of the soils of the county, especially land in poor condition, is corn followed by crimson clover the first year, cowpeas followed by winter oats the second year, and clover the third year.

The farming methods practiced in this county on the whole are very good. There are, however, a number of subjects belonging more properly to the scientific side of agriculture, to which the farmers of Anne Arundel County should give more attention. Some of these are seed selection, plant breeding to some extent, the treatment of insect pests and fungous diseases, and the fertilizer requirements of the soil. Any one of these if neglected will sometimes make all the difference between success and failure in the growing of crops. A crop of weeds instead of a crop of hay is often the result of not knowing the various grass seeds. The general failure of crops is sometimes due to insects or diseases which might be easily controlled. The application of commercial fertilizers unsuited to the soil is, of course, a great loss.

Modern farm machinery should be more generally used. The present prevalent method of cultivating crops with one-horse plows should give way to improved implements like the riding cultivators, by which such work can be done better, easier, and cheaper. A machine will often save the price of a hired man, and at this time,

when farm labor is scarce and wages high, this becomes an important subject.

Fruit has been grown in this county since the first settlers arrived. The planting of peach and apple trees was one of the first things to occupy their attention. Until a comparatively few years ago satisfactory yields of fruit were obtained, though the orchards received no attention except at fruit-gathering time. This condition has been radically changed by the multiplication of insects and diseases peculiar to fruit trees. It is now impossible to grow fruit without giving careful attention to cultivation, pruning, and spraying. Very few farmers, however, have given any attention to the control of such pests, and the result is that the fruit industry has declined.

In the last ten years a few have recognized that some kinds of fruit can be grown to advantage on the soils of Anne Arundel County, and have set orchards of apples, pears, principally of the Kieffer variety, and some peaches. Such orchards are regularly pruned and sprayed and where the land will permit the orchards are cultivated. Some of the orchards, however, are on rather stony land where cultivation is difficult. Kieffer pears do especially well in the county, and for a limited amount of this variety there is a fairly good demand in the markets. The southern part of the county is especially adapted to the growing of pears, peaches, and some of the early varieties of apples.

Lately the advisability of setting out peach orchards has been considered somewhat questionable on account of the prevalence of the yellows, a disease which can not be controlled by spraying. The only known method of keeping the disease in check is by uprooting and burning all infected trees, but this to be effective must be under state control. Other diseases and most of the insect pests may be readily controlled at moderate expense by thoroughly spraying the trees with Bordeaux mixture and other fungicides and insecticides.

The use of stable manure is of such great importance in this area that it can not be passed over without special mention. No figures are obtainable as to the total amount of manure used in the county every year, but some idea of the great quantity employed may be had when we consider that an annual average application of one-half to 1 carload and sometimes more is used to the acre by the great majority of truckers. The cost of stable manure alone amounts to as much as \$3,000 or \$4,000 or even \$5,000 a year for individual truckers. One man this year (1909) bought 35 schooner loads at \$130 a load. Much of the manure is shipped by boat to the farmers who live near tide water. It is being shipped continually from Baltimore and Washington and unloaded in vast piles or ricks along the tracks or

wharves or hauled from the city direct to the farms, where it is worked over and given careful attention until needed. Manure costs from \$60 to \$75 a carload, including freight, which is about \$1 a ton, total cost.

The acreage application of manure seems to be increasing gradually with the best farmers. In late years barnyard manure is being supplemented with commercial fertilizers. High-grade mixtures are used in many cases at the rate of 500 to 700 pounds per acre.

The total amount of manure shipped into the county every year is so great that the reduction of this amount by only a small percentage would mean a saving annually of many thousands of dollars to the county. One way of accomplishing this is to grow and plow under more green crops. This is now practiced by some farmers with satisfactory results. They grow cowpeas or crimson clover between the rows and plow them under while green. This is an excellent practice and while it will not take the place of manure altogether, it will reduce the amount required to produce a good crop. In the trucking sections of the county this is about the only practicable method of increasing the organic matter content of the soil, aside from stable manure.

In the general farming sections of the county more manure should be made on the farm by keeping more live stock and carefully preserving all waste products. Too often the manure is thrown out under the drip of the barn, where a great part of its value is soon lost. It should be placed in a shallow basin-shaped depression into which the water can not drain and the stock allowed to trample over it. The water falling on it as rain will be about sufficient to keep it in a good moist condition. If some provision is not made to prevent the deterioration of the manure, the best plan is to haul it direct from the stable to the fields while still fresh.

At one time stock raising was of considerable importance in Anne Arundel County. Twenty-five or thirty years ago nearly every farmer in the county, except possibly some in the sandy parts where trucking was carried on, kept more or less live stock, including cattle, sheep, hogs, and horses, and every year there was a surplus for sale. Some farmers at that time had as many as 1,000 head of sheep. Changes in economic conditions later caused a rapid decline of the live-stock industry. Now it is unusual to see sheep in the area, and only enough hogs, cattle, and horses are kept to supply the needs of the farm. There are a few dairies in the county, which seem to be profitable, as the market for dairy products is never oversupplied. At the present time the conditions in the county, especially in the southern part, would seem to favor the production of live stock for market. The southern part is in many respects a typical stock-raising section; the soil is well adapted to

the various grasses and other forage crops and the pastures are well supplied with water.

In many respects the agriculture of Anne Arundel County reached a high state of development about the close of the last century. Since then there has been a decline in some lines of endeavor. According to the Twelfth Census the total acreage in farms, the number of acres in improved farms, and the percentage of farms worked by the owners were less in 1900 than in 1890. The average size of farms had decreased from 146 acres in 1880 to 124 acres in 1890 and to 109½ acres in 1900. In this respect there has been an improvement, a small farm being usually better worked than a large one. The value of land and improvements, of implements and machinery, and of live stock was less in 1900 than in 1890 and, with the exception of implements and machinery, was even less than in 1880. The value of all farm products in 1900 was \$1,882,241, being greater than at any time since 1879. This probably is due to the marked development of the trucking industry. The expenditure for fertilizers has steadily increased from \$110,518 in 1879 to \$183,970 in 1900, which also doubtless follows as a result of the increase in market gardening and trucking. The production of the cereals has decreased since 1880, except in the case of corn, which has slightly increased since 1890. While the yield of Irish potatoes has decreased since 1890, that of sweet potatoes was much greater in 1900 than ever before. This is because the sweet potato is grown as a trucking crop.

VEGETABLES, MELONS, AND SMALL FRUITS.

With the exception of asparagus and a few other crops of less importance, garden peas and snap beans are the first garden products to reach the market. Anne Arundel, if not the largest producer, is one of the most important counties of the country in the production of garden peas. A large part of the crop is canned within the area.

Peas are planted as early as the soil and weather conditions will permit; beans are planted a little later. The low-growing dwarf or bunch varieties are grown mostly for the reason that they do not require supports.

Heavy applications of well-rotted barnyard manure are applied to these crops, and especially to beans. Some growers believe that both crops do best on soil which has been heavily manured the previous year and none applied at the time of planting. The rows are usually planted in pairs and every alternate row is made wide, about 3 feet, to facilitate picking. Cultivation should be shallow.

These crops unless properly cared for are liable to considerable damage from the attacks of insect pests and diseases, among which anthracnose, powdery mildew, blight, and rust are prominent. By

the use of insecticides and spraying Bordeaux and by persistent seed selection, injury from this source can be reduced to a minimum.

The growing of cantaloupes is one of the leading special industries of the county. A desire to get the melons to market early has led the growers to adopt various methods of hastening growth. The seed is planted in March in tin cans containing a mixture of manure, sod, and occasionally stream alluvium, all thoroughly rotted by winter composting. The cans are placed in glass-covered cold frames and early in May the plants are set in the field without disturbing the roots. In this way there is little or no check to the growth of the plants and the maturity of the melons is advanced considerably. By this method cantaloupes can be marketed two weeks earlier than where the seed is planted in the field. The method, however, is expensive and only a few acres for extra early market are handled in this way. The Knight is the principal variety grown. Other sorts, such as Jenny Lind, Hackensack, Anne Arundel, and Delmonico, are planted to some extent. The Rocky Ford does not seem to be particularly well suited to the conditions here.

In seasons of protracted drought following wet weather the melon crop sometimes suffers severely from leaf blight, and many acres were practically destroyed by this disease during the season of 1909. Leaf spot and anthracnose are other diseases to be contended with in the growing of cantaloupes. As in the case of garden peas and beans these enemies can be controlled by spraying with Bordeaux or some other of the standard fungicides.

The cantaloupe industry is quite profitable in favorable seasons. From 500 to 700 baskets per acre are ordinarily secured and yields of 1,000 baskets have often been produced. The melons sell for 25 to 45 cents a basket. The early transplanted melons bring a higher price. The crop is not an expensive one to grow, requiring very little hand work and being easily gathered.

The growing of tomatoes is one of the most important and extensive industries in the area. The crop is grown in all parts of the county upon a number of different soils and with varying results. Best results are had upon the sandy loams and loams of the Sassafras and Elkton series. Having a high sand content and good drainage the soil warms up early, inducing rapid development and consequently early crops. Canneries have been conveniently established in various sections of the county for handling the surplus crop. The output of some of these canneries is very large, this being an important industry. In the southern part of the area a considerable part of this crop is shipped by boat to Baltimore, the surplus of course going to the canneries.

Liberal applications of stable manure are made to the tomato fields before setting the plants, and most farmers apply various

amounts, usually 200 to 500 pounds per acre, of a high-grade commercial fertilizer after the plants are in the field. Tomatoes do very well following some highly manured cultivated crop. They also do well after clover. To obtain the best results the soil should be well supplied with organic matter. The amount of commercial fertilizer required for good results can be materially reduced by growing the legumes, particularly clover, and by liberal use of barnyard manure. Where the condition of the soil is not the best it is a good plan to apply a large quantity of stable manure followed with about 500 pounds of fertilizer containing a high percentage of nitrogen and potash.

In the trucking sections, where an early crop is the object, the plants are supported by stakes and sometimes pruned, a practice which will often cause the fruit to ripen several days earlier than where the vines lie on the ground. In general field culture, however, the plants are not supported, especially where the fruit is grown for canning.

The most careful growers select the best and most perfect fruits for seed. In this way they are able to produce not only a fine tomato but one of such color and size as the market demands. This is a commendable practice, and should be adopted by all growers, not only with tomatoes but other crops, like cantaloupes.

The plants are grown in cold frames under glass, some growers transplanting them once before setting. This should always be done where practicable, because it gives the larger, sturdier plants essential for the best results. Tomatoes are not greatly troubled by disease or insect enemies. Occasionally some damage is done by the tomato worm.

Cucumbers are quite largely grown in the trucking sections of this county. The soil best adapted to their requirements is much the same as that suited to the cantaloupe; that is, a well-drained sandy loam overlying a sandy clay subsoil. Cultivation also is about the same for the two crops, as are also the means necessary to combat troublesome insects and diseases. Considerable loss comes from the dying out of vines following the ripening of fruit. If no cucumbers are allowed to ripen, the vines continue to produce fruit for a much longer time.

Watermelon culture is deserving of special mention on account of the large number grown in the area and the fine flavor and quality of the product. Watermelons are grown in all parts of the county, but mainly in the trucking section between Baltimore and Annapolis. They do best on sands or deep, well-drained sandy loams. For an extra early crop the fields should have a southern exposure. A few aiming to supply the early market grow the plants under glass and

transplant to the fields. Under prevailing methods of culture liberal application of barnyard or stable manure are made either in the hill or continuously in the row. The manure should be well mixed with the soil before planting. It is generally considered that the crop can not be grown profitably with the use of commercial fertilizers alone, some even claiming that the mineral fertilizers should not be used at all. Most planters, however, use some fertilizer, though depending mainly upon barnyard and stable manure. Many farmers have ceased to grow melons on account of not being able to secure manure. Cowpeas are sometimes grown between the rows and worked into the soil during cultivation, in this way maintaining the organic-matter content of these soils and lessening the need of barnyard manure. Watermelons require only a moderate amount of cultivation and care, and always find a ready market. Large numbers are hauled by wagon to Baltimore and Annapolis, and many are shipped by water to various parts of the county. The most popular variety is the Kolb Gem; Kleckstock, Peerless, and Rattlesnake are also grown.

Sweet potato culture is an important industry in the county. The crop is grown in all parts of the area, but most extensively in the trucking region south of Baltimore. The light sandy soils are best adapted to their production, although heavy yields are produced on the sandy loams and loams. They are apt to be discolored if grown on heavy red soil, like the Susquehanna clay loam. Sets are grown from tubers placed in a hotbed in the early spring. From 5,000 to 8,000 plants are required for each acre. Well-rotted barnyard manure is applied in large quantities to this crop, and a liberal application of commercial fertilizer high in nitrogen and potash is also given.

Sweet potatoes are commonly sold directly from the field, but for later market and seed some are stored in cellars or piled in the field and covered with straw and then with earth. Three hundred bushels per acre is considered a fair crop. The most popular varieties are Red Nose, Early Carolina, and Red Nansemond.

Next to the trucking industry in importance is the growing of small fruits, of which strawberries are by far the most important. More strawberries are grown in Anne Arundel than in any other county in the State. Although much hand work is required in cultivating and harvesting the crop, it is usually quite profitable. The larger yields are secured on the loams and silt loams, though the sands and deep sandy loams produce the earliest berries.

Large quantities of barnyard and stable manure, with varying amounts of commercial fertilizers, are used in strawberry culture. Fertilizers high in potash seem to give the best results. Either the

sulphate or muriate of potash give good results when used in conjunction with manure, as do also wood ashes. Applications of 200 pounds per acre of nitrate of soda are very effective in increasing the yield, though the shipping quality of the berries is seemingly impaired where this substance is used too freely. This, however, is not a serious matter here, owing to the nearness of markets.

Plants are set in April or May and given clean cultivation during the summer. Unfortunately the rush of other crops sometimes results in the neglect of the strawberry field. Young plants should not be allowed to bear fruit the first summer, but the blossoms are not always removed as they should be, owing to the work involved. Some trouble is experienced here by the plants rotting shortly after they are set out. This probably could be prevented by pruning back the roots one-third, setting shallow, and spreading the roots well when setting. The matted-row method of growing is the prevailing one here. The rows are about 4 feet apart, and the plants are placed from 18 to 24 inches apart.

A common mistake is made in allowing the plants to stand too long. If the fields are left more than two years, insects are likely to cause much trouble. Two years usually constitute the profitable life of a strawberry field. If left longer, the field should be closely mowed immediately after the berries are off and then burned over. It is a good practice to plow a furrow between the rows and fill with manure. By narrowing the beds down to 8 or 10 inches and leaving only an edge of the old row a field may be practically renewed. Mulching is not generally practiced, although it would aid in keeping the fruit clean, especially on the heavier soils.

Several varieties are grown, among these the Bubach, Haverland, and Warfield (having imperfect blossoms), and the Sharpless and Clyde (with perfect blossoms) are favorite sorts.

The culture of dewberries is carried on in a limited way, and the industry is becoming more popular. Dewberries grow well on thin sandy soils and do not require heavy fertilizing, although liberal applications of stable manure and wood ashes are beneficial. They are propagated from tips like blackberries and raspberries and are set in rows about 5 feet apart with 3 or 4 feet between plants. These are tied to a stake driven into the ground near the plant. After fruiting the canes are removed to facilitate the growth of the young canes for the succeeding crop. The Lucretia is the most widely grown variety. Other good varieties are Manatee and Austins Improved.

Blackberries and raspberries are not grown extensively. They would be a profitable crop on some of the soils of this area. The blackberry for best results requires a rather heavy loamy soil, well

supplied with organic matter. In this county wild blackberries are abundant, and perhaps for this reason their cultivation has not been taken up more generally. Some tested varieties are Snyder, Ancient Briton, Early Cluster, and Taylors Prolific.

SOILS.

Although its northern boundary follows approximately the eastern border of the Piedmont Plateau, Anne Arundel County lies wholly within the Coastal Plain portion of the State. In point of origin its soils differ widely from those of the Piedmont in that they are derived from a variety of materials deposited in water during the submergence of this Coastal Plain region in past geologic time, whereas those of the Piedmont represent the products left in place upon the decay of granite, gneiss, gabbro, and other igneous or metamorphic rocks. These sediments were laid down under widely divergent conditions. The finer particles, as silt and clay, which had been washed down from land areas were carried out into deep water, while the coarser grades of sand and gravel were deposited nearer shore. Ages lapsed in the progress of this sedimentation—there were variations in climate and probably in the source of the transported particles, and the relative position of the sea floor was interrupted by subsidence and uplift. Notwithstanding that a large proportion of these deposits was washed in from the uplands of the Piedmont, considerable amounts were probably brought down from glaciated regions to the north. The occurrence of bowlders throughout this general Coastal Plain belt is evidence of transportation of materials from the north, probably by way of the Susquehanna Valley, through the agency of floating ice.

Subsequently, upon the recession of the ocean, this diversity of sediments—soil-forming materials—was exposed. These, through the action of the weather, running water, and vegetable and plant life, have been still further altered. In some cases the deposits that were alike at the time of emergence have been sufficiently changed to give rise to different types of soil with very different agricultural values, as, for example, the Sassafras silt loam and the Elkton silt loam, which are both derived from silty deposits, very nearly or exactly the same when first exposed to the agencies of weathering, though now differing greatly. Several formations, which at the time of the uplift of the region above water were buried beneath later deposits of quite different character, have been brought to the surface through the action of erosion, as is illustrated in the gravelly soils exposed in many places along slopes. An example of this is seen in the case of the Sassafras gravelly loam, a slope soil that lies adjacent to heavier noneroded types of the same series, occupying

more nearly level uplands. These uplands in many places are underlain by the same gravelly deposits that have been exposed along the slopes.

In general there is a fairly definite relationship between soils and topography, the lighter types occurring most abundantly on the slopes and the heavier ones being more generally confined to the level uplands. There are, however, some large areas of gently rolling to nearly level sandy soils that have not been very materially changed since the recession of the water. In the broad, flat, plateaulike areas there has been little surface wash. The effect of erosion as related to the removal of the finer constituents has been minimized, and therefore changes in the original material have been mostly changes in the structural and chemical characteristics rather than in texture.

Much of the former level sea floor, or old stream terraces, has been badly dissected by erosion, particularly through the development of the drainage system. Deep valleys have been cut through the uplifted deposits, and in the vicinity of these the surface configuration has been so altered that it is difficult to conceive the existence here of a former level or nearly level plain.

In the classification of the soils of the area those types that are similar in their most prominent characteristics as color, structure, mineralogical composition, drainage condition, productiveness, and topography have been grouped into series. Differentiation in the series is determined by the relative content of gravel, sands, silt, and clay. Exclusive of the recently formed bottom land, there are in Anne Arundel County five distinct series of soil, including eighteen types.

The most abundant and widely distributed group of soils has been included in the *Sassafras* series, the members of which occur upon the low foreland terraces as well as upon the plateaulike uplands. The surface configuration and usual coarse texture of the substratum have favored good surface and underdrainage, a condition which has had much to do with the development of the characteristic uniformly reddish-yellow to reddish-brown color and the friable structure of the subsoil portion of the several types. The individual particles seem to have suffered less attrition than in case of the members of several other series, particularly the *Norfolk*, as is evidenced in the usual higher content of minerals other than quartz. These soils of the *Sassafras* series are the most productive soils of the region.

In those imperfectly drained areas that have been subjected to intermittent wet and dry stages the same material that gave rise to the silt loam member of the *Sassafras* series has undergone an unfavorable structural change and has assumed an ashy gray to

nearly white appearance. This soil is very poorly aerated, is dense instead of friable, as in case of the Sassafras silt loam, and is very much inclined to run together and compact following rains and freezes. The type has been given the name Elkton silt loam. It is confined largely to the flat forelands of the southern portion of the county. Its productiveness is much below that of the Sassafras silt loam.

In the northern part of the county there is an extensive area of light-gray to pale-yellow loose sand which averages at least 3 feet in depth. Unlike the Sassafras sand, this soil—the Norfolk sand—has a relatively very low content of minerals other than quartz. The appearance indicates that the deposits giving rise to this type have been subjected to much more severe attrition through the action of waves and tides than had those that give rise to the corresponding member of the Sassafras series, causing more complete destruction and removal of the less resistant minerals. The type is less productive than the Sassafras sand; it is less loamy and somewhat more droughty.

Crossing the county about its center there is an extensive belt of soils derived from greensand which traverses the State in a southwesterly direction from the Delaware line near Warwick, Md. Geologically this belt is known as the Aquia formation of Eocene age. The formation is characterized by its high content of the mineral glauconite (greensand), which is a complex silicate containing potassium and phosphoric acid. The reddish-brown soils having greenish-yellow or olive-colored subsoils derived from this formation have been included in the Collington series. These soils rank high in agricultural value.

From the variegated, sticky, plastic clay formation, which outcrops in many places in the northern part of the county, are derived the soils of the Susquehanna series. These are characterized by the mottled scarlet, white, and drab color and extremely plastic structure of the subsoil. The soil portion of the sand member of the series was laid down as a mantle over the clay under very different conditions than those existing at the time the latter was deposited. The Susquehanna soils as developed in this area are of very low agricultural value, especially where the plastic clay comes near the surface.

A considerable total area of recently formed alluvial soil has been mapped under the name of Meadow. The undifferentiated materials of this classification have been deposited from running water, having been derived from the various soils occurring in the drainage basins. Deposition is still in progress, additional material being laid down at each overflow.

Tidal marsh includes reworked materials that have been deposited in protected situations along the coast line of Chesapeake Bay. These flat deposits are subject to daily inundation by tide.

The following table gives the names and areas of the several soil types shown on the accompanying map:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Sassafras fine sandy loam.....	42,880	15.5	Sassafras sandy loam.....	4,032	1.5
Collington sandy loam.....	41,600	15.1	Sassafras loamy sand.....	4,032	1.5
Sassafras sand.....	40,320	14.6	Sassafras loam.....	1,728	.6
Sassafras silt loam.....	31,040	11.2	Susquehanna sand.....	1,600	.6
Norfolk sand.....	25,024	9.1	Collington sand.....	1,216	.4
Meadow.....	19,648	7.1	Susquehanna clay loam.....	896	.3
Susquehanna sandy loam.....	16,064	5.9	Tidal marsh.....	640	.3
Sassafras fine sand.....	15,936	5.8	Collington gravelly sandy loam.....	320	.1
Sassafras gravelly loam.....	11,968	4.3			
Elkton silt loam.....	10,176	3.7			
Susquehanna gravelly loam ...	6,720	2.4	Total.....	275,840	.....

COLLINGTON SANDY LOAM.

The Collington sandy loam is found in a very well defined area extending from near West River along the shore to beyond the Severn and west as far as the Patuxent River. Near the outer edges of this body it is found only in the ravines and along the streams. It is therefore evidently a lowland type.

To a depth varying from 6 to 20 inches the soil consists of a brown to reddish-brown medium to coarse sand often containing considerable proportions of particles of a dark-green color, which are partially disintegrated fragments of glauconite from which the type is derived. The subsoil to a depth of 36 inches is a greenish-yellow or olive-colored sandy loam to sandy clay also containing considerable green glauconitic sand. From 6 to 15 feet below the surface numerous iron concretions occur in all sorts of fantastic shapes. A few feet below this there is usually a compact bed of greensand marl. The thickness of these beds varies from a few inches to several feet. Below this may be found a thick layer of sand or gravel resting upon another bed of green marl. This order is continuous in some places to great depths.

The surface of this type varies from almost flat to gently rolling and does not rise to an elevation greater than 170 feet.

The original forest growth has largely been removed, except on some of the rougher portions. Pine is usually the predominating growth in mixed forests, and there are extensive pine forests on some of the more sandy portions of this type.

The Collington sandy loam is considered one of the best soils in the area for general farming and truck growing. It may be used for the production of almost any crop. In places where the sand of the top soil is of considerable depth, excellent truck crops are produced. Where the clay comes nearer the surface, general farming crops are

more commonly grown and good yields are secured. This soil seems to be especially well adapted to the growing of alfalfa, and some very fine fields of this crop may be seen in the vicinity of Annapolis. Wheat, corn, oats, rye, tobacco, Irish potatoes, and nursery stock are grown with success. The soil seems to be especially well adapted to fruit growing. Small fruits, particularly strawberries, produce abundant and profitable yields on the more level sandy parts of the type.

Where the topography is rough and broken, this type is subject to severe erosion, and in such places more or less of the top soil has been removed, leaving only a thin layer of soil or exposing the raw subsoil. Such places are extremely unproductive and in most cases are left uncultivated. A cover crop should be kept on the sloping areas as much of the time as possible, in order to prevent washing.

The use of commercial fertilizers in connection with this soil should be given special mention. Chemical analysis shows that glauconite, from which this soil is derived, is composed of potash, lime, magnesium, iron, and some phosphoric acid. The content of potash is high, and the analysis also shows that the soils from this mineral are relatively high in this constituent. For this reason fertilizers with a low percentage of potash can be profitably substituted for the grades often used. The great need of the Collington sandy loam is organic matter, and by using leguminous plants to supply this deficiency the nitrogen requirement may also be wholly or in part supplied.

The marl underlying this soil, being in some places comparatively rich in potash, phosphoric acid, and lime, has some value as a fertilizer and is used to a limited extent on the soils of the county. It seems to be especially beneficial when applied to heavy silty or clay soils. The use of deposits, which analyses show to be valuable, should be more extensive.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Collington sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
21452.....	Soil.....	1.7	15.8	22.7	42.4	2.9	7.5	6.6
21453.....	Subsoil.....	1.7	15.4	15.8	29.2	5.9	9.7	21.9

COLLINGTON SAND.

The Collington sand is found in small areas south of Annapolis around Spa and Back creeks and in the vicinity of Arundel-on-the-Bay. A few small areas were also found southwest of Annapolis, on each side of South River.

The surface soil, to a depth varying from 10 to 20 inches, is a yellowish or reddish gray medium sand resembling Sassafras sand in texture and containing usually a small amount of greensand, which gives it the Collington characteristic. The subsoil to a depth of 36 inches consists of a greenish-yellow loamy sand, quite sticky at 36 inches. Sometimes at 36 inches a rather stiff olive colored sandy loam to sandy clay identical with the subsoil of the Collington sandy loam is encountered.

The natural forest growth on this type is usually pine. The surface is for the most part quite flat, but the drainage is good on account of the loose, open nature of the soil proper and the depth to underlying clay, which is found uniformly at 36 to 40 inches. Crops on this type do not suffer to such an extent from drought as do those of the deeper sands of other series.

The Collington sand is an excellent truck soil and especially well suited for melons and cantaloupes. Small fruits also thrive and are of exceptionally fine flavor.

This soil is deficient in vegetable matter, but as it is underlain with clay it will admit of permanent improvement, and the plowing under of green crops with liberal applications of lime would be profitable.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Collington sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
21448.....	Soil.....	0.2	18.2	24.3	45.5	4.0	2.8	4.5
21449.....	Subsoil.....	.3	15.0	23.3	41.5	3.7	2.5	13.5

SASSAFRAS SILT LOAM.

The soil of the Sassafras silt loam is a light yellowish brown to buff silt loam, becoming darker immediately below the surface, usually changing to a dark-yellow or brown color. The subsoil to a depth of several feet is a compact yellow to reddish-yellow silty clay. Beds of fine gravel or fine mealy gray sand are sometimes found at a depth of 5 to 12 feet below the surface. In places where the drainage is deficient the soil is less friable and the color much lighter. Scattered throughout the whole soil mass are minute flakes of mica, which show very plainly on a broken surface of a piece of the soil.

The topography of the Sassafras silt loam is level or very nearly so. The silt content of the soil portion varies somewhat with the

character of the surface. Where the land is slightly rolling the silt content is lower, and where the topography is quite flat the content is much higher.

The soil works well when moist, but is troublesome to get into proper condition if allowed to become dry after plowing, especially where the organic-matter content is low. The soil should usually be harrowed immediately after it is plowed. If two teams are not available, then only as much surface should be broken as can be harrowed the same day. Such land should never be plowed when wet, as in such cases it sometimes takes several years to restore good structural condition. Good farmers are always careful about this. It will always pay to wait until the moisture content of the soil is just right before starting the plow, even though the crop may be planted a little late.

This type of soil is well distributed throughout the area, occupying the low flat terraces along the bay and estuary streams, the flat tops of hills, and the flat to undulating stream divides. If the topography is level or nearly so and the drainage good, the soil will be typical no matter what the elevation may be. There is a range in elevation from about 10 or 15 feet above tide level to something like 200 feet. The greatest development of the higher lying phase is found in the southern part of the county, where it occurs as broad uniform flat to undulating interstream divides. On the foreland section of the peninsula lying between the Severn and the Magothy rivers is quite a large area of the low-lying phase of the type, which will be described more in detail further on.

In agricultural value the two phases are not widely different. The most noticeable differences are the better drainage of the higher lying phase and the usually higher moisture content of the lower.

The type suffers perhaps less from drought than any other soil in the county and if kept well cultivated in dry seasons, so as to maintain a good surface mulch, there need be little fear of crop injury as a result of lack of moisture.

The Sassafras silt loam is productive if carefully handled and responds readily to methods of soil improvement. Being quite heavy the subsoil will retain for a long time any additions in the way of stable manure or green crops plowed under. The soil is almost always deficient in organic matter, so that the incorporation of such material is especially profitable. Some of the farmers on this type say that the beneficial effects of a liberal application of barnyard manure are noticeable for many years. When such applications are occasionally given, or green crops plowed under with a liberal addition of lime, the soil, if worked properly and at the right time, is a loose tillable loam of splendid structure and especially when deeply plowed of high water-holding capacity.

The matter of deep plowing is of much importance on this type. The subsoil is of such a heavy resistant nature that plant roots can not penetrate deeper than the plow has gone. If it is plowed shallow, the crops grown will be shallow rooted, and therefore not nearly as resistant to drought as they should be. When any crop has only a shallow feeding ground a good yield can not be expected. In one case on this type unusually deep plowing resulted in a marked improvement in the corn crop and the yield of the wheat crop which followed was nearly double what it had been in other years. Subsoiling would doubtless be beneficial if carefully done.

Some farmers believe that the continued use of commercial fertilizers causes the soil to compact. Many farmers working this soil are convinced that methods of general soil improvement, particularly including the incorporation of vegetable manures, should be practiced rather than the constant use of commercial fertilizers.

The type is well adapted to the general farm crops. Wheat, corn, oats, rye, hay, and Irish potatoes are the crops which give the best returns. In localities near a cannery the growing of tomatoes is sometimes practiced and some fair yields are reported; but some of the lighter soils are better adapted to this crop. Tobacco is also occasionally grown on the Sassafras silt loam with fair returns as far as yield is concerned, but the quality is often not what the market demands.

The yield of the various crops grown on this soil is, on the average, fair, but with careful manipulation the yield of all crops should be increased. Twenty-five to 30 bushels of wheat per acre are often grown, but the average is somewhat below this. The average yield of corn is about 45 to 50 bushels per acre, with an occasional yield of 75 bushels.

Clover and timothy are the usual hay crops. It is sometimes difficult to secure a satisfactory stand of clover, very likely because the soil is often in need of lime. At least 30 bushels of lime per acre should be applied and thoroughly mixed with the soil before sowing the clover seed. It is needless to state that a perfect seed bed should be prepared for clover.

Irish potatoes are quite largely grown on this soil, but the seed bed is not deeply prepared and the tubers tend toward ill shape and sogginess. For potatoes the soil should be plowed deep and subsoiled if possible. Large quantities of barnyard manure should be applied to the preceding crop. If applied to the potato crop scabby tubers will usually result.

The oat plant requires just such a soil as the Sassafras silt loam, and oats should be more generally grown than at present. The land for this crop should be plowed instead of disked, as is the practice with some farmers, and it is considered best to plow the land in the fall.

Sassafras silt loam (poorly drained phase).—The poorly drained phase of the Sassafras silt loam is found only on the low forelands and is closely associated with the Elkton silt loam. To a depth of 5 to 10 inches the soil consists of a brownish-gray compact silt loam containing some fine sand. The subsoil is a light-brown or yellowish-brown heavy, compact silt loam to 36 inches, mottled with yellow or gray at the latter depth. The content of fine sand increases and in some places a pale-gray almost pure sand is found 4 to 6 feet below the surface.

The topography is very gently rolling to almost flat, and the natural drainage is sluggish. The mottled color of the subsoil is the result of this poor drainage and the lack of aeration. Where artificially drained by open ditches the soil becomes quite productive and some good crops of corn and tomatoes are grown, to which crops the type seems especially well adapted. Tomatoes grown on this soil, like those grown on the Elkton silt loam, are finer than those grown on the lighter soils and are highly prized for canning.

While this type is highly productive if properly tilled, it is not an important soil in this area because of its small extent, being mapped in only two places in the county, near St. Marguerites and in the vicinity of Churchton.

The following table gives the results of mechanical analyses of the typical Sassafras silt loam:

Mechanical analyses of Sassafras silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
21490.....	Soil.....	0.2	1.6	6.3	6.9	11.0	52.2	21.6
21491.....	Subsoil.....	.5	3.5	12.3	10.1	15.8	36.2	21.4

SASSAFRAS FINE SANDY LOAM.

The Sassafras fine sandy loam is of considerable importance on account of its large extent and its value as a general agricultural soil.

The surface soil, where typically developed, consists, to a depth of 8 to 10 inches, of a dull-brown medium to fine sandy loam, sometimes quite heavy and containing gravel. Some coarse sand is also usually present. In places, where the surface is only moderately rolling, considerable silt is present, giving the material a more loamy character and approaching more nearly the coarser more rolling phase of the Sassafras sandy loam. The subsoil consists of a deep yellow or yellowish brown heavy sandy loam, becoming lighter in texture as depth increases, until at 26 to 30 inches it passes into a sand or loamy

sand, varying in color from a light yellow to a reddish brown and containing in places considerable gravel and coarse sand.

In spots where poor drainage obtains both soil and subsoil are light in color and heavier, containing more silt than the more rolling areas. On steep slopes, especially near streams, the gravel content is often quite high. In places it exists in such proportions as to place this soil in the Sassafras gravelly loam type.

Both the surface and subdrainage of this soil is excellent. The loose, open character of the subsoil allows excessive moisture to pass readily through it, while at the same time the texture of the soil gives it a good water-holding capacity. Very little of this soil would be greatly benefited by artificial drainage.

This type will perhaps stand a greater range in seasonal conditions than any other in the area. It may be used for early or late crops without much danger of damage from drought or excessive rain. It is sufficiently sandy to permit being worked when quite wet and yet not so sandy as to cause crops to suffer from continued dry weather. When dry it does not become compact as do the heavier soils.

The material composing this type is a marine sediment washed down from the higher lands farther north. The particles are sharp and angular, indicating that the soil has not been waterworn to a great extent. The fine-sand content is noticeably large in some parts of this type.

The Sassafras fine sandy loam occurs principally in the southern and western parts of the county, but is found in small areas in other parts. It occupies the more gentle stream slopes and rolling areas in the stream divides. It is found at elevations ranging from 40 to 150 feet above tide, and is closely associated with the Sassafras silt loam.

The Sassafras fine sandy loam of this area is truly a general-purpose soil, since almost any crop grown in this climate may be profitably cultivated on it. It is used here, however, principally for the growing of general farm crops including corn, wheat, oats, rye, clover, tobacco, hay, and where near a cannery, for tomatoes. Watermelons, cantaloupes, beans, peas, and nearly all the vegetables may be successfully grown.

Peaches, apples, pears, plums, and cherries are grown to some extent and do well on this type, but the fruit industry has been greatly injured here by insect pests and fungous diseases. Small fruits are also well adapted to this soil, and it is an especially good soil for the production of strawberries.

This is one of the best tobacco soils in the county. On the lighter, more sandy phase the yield is good and the quality and color of the leaf is excellent. From 1,000 to 1,200 pounds is not an uncommon

yield. Those who grow heavy crops always fertilize heavily with stable manure and commercial fertilizers. The ordinary application of manure is about 4 tons to the acre with about 500 pounds of commercial fertilizer of rather high grade, the usual analysis being about 8-2-5. Some farmers in this county believe in growing tobacco on the same land continuously, as they say the quality of the leaf is better on old tobacco land and the yield, if the land is properly fertilized, will not decrease.

As a general thing the soil is quite deficient in vegetable matter, the ordinary application of barnyard manure not being sufficient to maintain a satisfactory content. Green crops should be plowed under or more live stock kept. An ideal way to enrich the land is to grow large amounts of forage and to keep a large number of domestic animals to consume it, applying the resulting manure to the soil. But not many farmers have sufficient stock to keep up the organic constituents of the soil in this way, and the next best thing to do is to plow under green crops.

The natural forest growth consists principally of pine, chestnut, tulip, beech, dogwood, maple, oak (several species), linden, black and sweet gum, hickory, locust, and persimmon, while a few ash, ironwood, aspen, and mulberry trees are found. Among the most prevalent small shrubs and bushes are sassafras, sumac, elder, blackberry, dewberry, raspberry, and wild plum.

The price of this type of farm land varies from \$20 to \$75 an acre, according to location, the average being about \$40 an acre. In the southern part the values are somewhat lower because of inadequate shipping facilities.

The following table gives the results of mechanical analyses of the soil and subsoil:

Mechanical analyses of Sassafras fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
21482.....	Soil.....	0.5	3.1	6.3	43.4	22.5	16.1	7.2
21483.....	Subsoil.....	.0	2.3	4.3	24.6	28.9	19.5	20.2

SASSAFRAS FINE SAND.

The Sassafras fine sand is found principally in the southern part of the county. It exists here either as a terrace formation or as areas capping the highest hills and ridges. Along the western side of the county it occupies low-lying terraces along the Patuxent River as far north as Priest Bridge. A few isolated areas are found farther north and also in the extreme western part of the county, in the vicinity of Laurel.

The surface soil to a depth of 8 to 10 inches is a slightly reddish-yellow or light-orange medium to fine rather loose angular sand. This is underlain to a depth of 3 feet by a somewhat darker reddish-yellow sand, which is usually coarser than the surface material. At 3 feet below the surface the material is always loamy and in places it is quite heavy. The higher lying or hilltop phase has generally a more shallow soil. In some places the terrace areas consist of a loose deep sand several feet in depth.

The loose, open character of the soil to a depth of at least 3 feet allows the moisture to pass rapidly down, thus making the type unfit for the growing of such crops as corn or small grains. Tobacco is grown in considerable quantities and the quality is said to be very fine, but the crop often suffers from the effects of continued drought. In places on the ridges where the subsoil is not so far below the surface an ample supply of moisture is ordinarily maintained throughout the growing season. A liberal supply of vegetable matter in the form of barnyard manure or green crops plowed under aids materially in increasing the moisture-holding capacity. Not much live stock is kept where this type is found, and for this reason stable manure is scarce, and the plowing under of such crops as cowpeas, crimson clover, velvet and soy beans is about the only practical method of increasing the organic matter content of this soil.

The Sassafras fine sand of this area is a typical truck soil, but it is little used for this purpose, because of situation in parts of the area where manure is difficult to secure, being too far from Baltimore, the principal source of supply, and also for the very important reason that markets and marketing facilities are not at hand. As soon as railroads penetrate the southern end of the county there is sure to be a marked development of the soil along several lines of special farming. Some fine crops of tomatoes are grown on this soil in localities near canneries.

The natural forest growth is principally pine, interspersed with several species of hardwoods.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Sassafras fine sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
21470.....	Soil.....	0.2	3.0	6.1	43.9	26.9	12.8	6.9
21471.....	Subsoil.....	.3	1.9	4.7	40.8	25.7	12.1	14.2

SASSAFRAS LOAM.

The surface material of the Sassafras loam, to a depth of 6 to 10 inches, consists of a light brownish gray or yellowish gray silty loam, containing considerable fine sand and occasionally some gravel. The subsoil is a deep yellow heavy loam, approaching a sandy clay in places. The type is considered a heavy soil in this area. The content of fine sand, silt, and clay seems to be about the same. The soil resembles both the Sassafras sandy loam and the Sassafras silt loam, and it is therefore sometimes difficult to identify it. The topography is the most distinguishing characteristic. The surface of the sandy loam of this series is quite rolling, while that of the silt loam is largely level, or nearly so. The topography of this type, the loam, is intermediate between the two and may properly be called billowy.

The type is not extensively developed in this area. The largest unbroken area occurs in the neighborhood of Millersville. It is rather a highland type, this area being at an elevation of something over 100 feet above tide. There are only a few other small isolated spots of the type in the county.

All crops common to the county are grown on this type with good results. At present much of the land is kept in grass as much of the time as possible. Corn, wheat, oats, potatoes, and truck thrive. Fruit seems to do especially well on this soil. Some very fine orchards of Kieffer pears and damson plums are situated near Millersville.

Some parts of the type are in need of drainage, but these are not usually large, the greater part of the land being sufficiently undulating and open to admit of good surface drainage and underdrainage.

The type is practically all under cultivation, the original timber growth having been removed. This is said to have comprised all of the species common to the moderately elevated and well-drained types.

Much of this type is owned by people of considerable wealth, and as the Washington, Baltimore and Annapolis Electric line runs through the principal area, few farms are for sale. The average price of land of this class is probably as high as \$60 an acre.

SUSQUEHANNA SANDY LOAM.

The Susquehanna sandy loam occupies some areas of more rolling topography in the northern and northwestern parts of the county.

The top soil, to a depth of about 8 inches, is a gray, medium to coarse light sandy loam, containing in some places considerable gravel. The subsoil becomes redder and heavier until at a depth of 15 to 25 inches it grades into the characteristic Susquehanna subsoil, which

is a red to deep reddish yellow or purple stiff impervious clay. In some small areas where the surface is nearly flat the top soil contains considerable silt and fine sand, giving it a distinctly loamy character. Scattered throughout the subsoil and occasionally on the surface are various sized fragments of iron-cemented conglomerate.

Much of this type is still covered with the original forest growth, which consists principally of pine, chestnut, oak, hickory, black gum, holly, and huckleberry.

The surface features are always rough and sometimes quite steep, so that where the forest is removed the soil is subject to severe erosion. In such cases the surface material has in many places been removed, giving rise to patches of typical Susquehanna clay too small to map.

On account of the impervious nature of the subsoil and the loamy character of the surface soil, the type has good moisture-holding capacity, and where properly cultivated good crops of wheat, grass, corn, and potatoes are grown. The appearance of the crops on this type indicates a strong, retentive soil capable of maintaining a constant supply of moisture throughout the growing season.

Some excellent orchards are found on this soil in the vicinity of Marley Station and Elvaton, on the Baltimore and Annapolis Short-line. Pears seem to be well suited to this soil. According to the testimony of some of the owners and to external indications, the fruit trees growing here are more healthy and more resistant to the attack of insects and diseases than on many of the other soils of the area.

Strawberries grown on this type are said to be sweeter and more highly colored than they are firmer and therefore less subject to injury from handling there is no doubt.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Susquehanna sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
21498.....	Soil.....	0.7	8.3	12.8	40.9	15.1	16.3	5.5
21499.....	Subsoil.....	1.6	12.3	15.0	26.8	14.1	19.0	11.0

NORFOLK SAND.

The Norfolk sand occupies a considerable area in the northern part of the county. In an irregular way the type extends from about 2½ miles east of Jessup to the shore of the Chesapeake on Hog Neck. The most northern point of this area is near Shipley and it extends south to about 1 mile north of Severn Run. The area is

irregular in outline and is divided into two sections by Marley Creek.

The surface soil of this type, to a depth of 6 to 10 inches, is a gray or yellowish-gray medium sand, with a loose and incoherent structure. The subsoil, to a depth of 3 feet and more, is a light-yellow, loose medium sand, becoming slightly loamy at a depth of 25 to 36 inches. In some places there is a considerable percentage of fine quartz gravel scattered throughout soil and subsoil.

The topography is rolling, but not steep or rugged, except where streams have cut deep gullies. In the deeper cuts the profile shows streaks of orange-colored and brown sand. Often layers of very white sand are found in the deeper parts of the profile. In some places, at depths not less than 12 to 15 feet, material similar to that giving rise to the Susquehanna clay is encountered. The depth to this clay, however, is so great that it has no effect on the crop-producing power of the soil. Above this clay there is no material that can act as a water-retaining layer and the water-holding capacity of the soil is therefore very low. The sand is much cleaner and there is less coherence between the constituent particles than in case of the Sassafras sand. Crops must be planted early and harvested before dry weather sets in. Crops are often lost because dry weather comes before they are ready for gathering.

This type is in great demand for trucking purposes, and practically all of it is under cultivation. For the light early truck crops it is perhaps the best type in the area. The loose, light nature of the soil and the readiness with which it warms up in the spring favors very early maturity. Watermelons, cantaloupes, cucumbers, eggplants, and peas thrive. For all crops large quantities of manure and commercial fertilizer are used, as much as 25 to 30 tons of stable manure and 500 to 700 pounds of fertilizer being applied to the acre. This excessive feeding of the soil is necessary every year. No matter how liberal the application, the manure almost entirely disappears before the following season's crops are planted. Small fruits, particularly dewberries and blackberries do well. Peaches are grown with considerable success, but the trees are short lived on account of the severe droughty conditions to which they are often subjected.

The type is not well adapted to the general farm crops on account of its low water-holding power. In seasons of ample and well-distributed rainfall some fine crops of corn have been grown, but this is not common.

All of this soil is within easy hauling distance of Baltimore, and therefore highly prized. Practically all the truck from this type is taken to market in wagons, and large quantities of stable manure are brought back from the city.

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

Mechanical analyses of Norfolk sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
21458.....	Soil.....	1.3	22.7	26.6	33.2	6.4	4.1	5.2
21459.....	Subsoil.....	1.1	18.5	26.0	41.5	5.5	4.2	3.3

SASSAFRAS SAND.

The Sassafras sand is a soil which has been mapped under other names in some other areas. It was called Norfolk sand, but now it seems necessary to separate it from the Norfolk series on account of color, composition, and other important differences. This sand apparently has not been reworked to a sufficient extent to make it as pure and uniform a sand as the Norfolk. Its composition is more complex and the oxidation of its iron content is not so far advanced. Layers of very pure white sand are often found 18 to 20 feet below the surface. Such deposits are extensively mined near Whitneys Landing.

The surface material of this type to a depth of 6 to 10 inches is a grayish-yellow to brown sand, frequently of a somewhat loamy texture. The subsoil is a yellowish-red or brownish rather loamy sand, becoming redder as greater depths are reached. The lower subsoil is quite often close to a sandy loam in texture. There is a moderately high content of coarse sand and often considerable gravel in both soil and subsoil, and ironstone plates and iron-cemented conglomerates are found in varying quantities throughout the soil and subsoil to such an extent in places as to prevent its being used for farming purposes.

The topography is in part hilly, with the greater part ranging from billowy or undulating to rolling. Both surface and subdrainage are so thorough and rapid as to cause crops to suffer severely from the effects of continued drought.

The Sassafras sand is found principally in the central part of the county, extending from well down on the shores of the Magothy River westward to near the county line in the vicinity of Annapolis Junction. Other small areas are found in the extreme northern and western section.

In this county the Sassafras sand is a trucking soil of considerable importance, but it is not used for that purpose to such an extent as the Norfolk sand, largely for the reason that most of it is farther away from market. Much of it also has an uneven surface and is covered with loose fragments of conglomerate and ironstone to such an extent

that it will probably not be used for agricultural purposes until all the better-lying land free from stones has been brought under cultivation.

The highest development of this type as a trucking soil is found on the east shore of Marley Creek and in the region of Earleigh Heights, Pasadena, and Elvaton; also in the vicinity of Odenton and northward. In these localities the type is gently rolling, free from stone, easily cultivated, and sufficiently close to market, so that crops are easily produced and disposed of. On these more level areas trucking is carried on in its most intensive form. The loose, open nature of the type makes imperative the yearly application of large quantities of manure and commercial fertilizers. Profitable crops of cantaloupes, watermelons, tomatoes, eggplants, peas, beans, and strawberries are grown. Large quantities of tomatoes are packed at the cannery in Odenton and many are shipped or hauled to the Baltimore markets.

The Sassafras sand of this area is well adapted to the growing of fruit. Peaches, early apples, and pears do fairly well and this season (1909), although a very dry one, there is a good crop of some varieties of apples and of Kieffer pears on the trees.

The following table gives the results of mechanical analyses of fine-earth samples of soil and subsoil:

Mechanical analyses of Sassafras sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
21468.....	Soil.....	1.8	16.4	21.9	34.7	7.3	9.8	7.9
21469.....	Subsoil.....	1.6	12.9	18.5	36.5	8.1	11.2	11.3

SASSAFRAS LOAMY SAND.

The Sassafras loamy sand is closely associated with the Sassafras sand and is found included within the boundaries of the latter soil. It occupies the higher and more nearly level areas where the less active erosion has not removed so great a proportion of the finer constituents.

The surface soil is a reddish-yellow to brownish medium loamy sand to a depth of 12 inches, usually becoming somewhat lighter in color and more compact at the above-named depth. At 26 to 30 inches rock fragments are usually encountered, sometimes the proportion being so high as to prevent boring. Below this stony layer there is sometimes a layer of lighter-colored medium sand several feet in thickness. Occasionally the lower portion is a sandy loam.

The type is not of great importance in this area, being found only in a few small areas, principally near the headwaters of the Severn River north of Whitney's Landing. Another area of considerable size lies north of Burns Crossing, on the Washington, Baltimore and Annapolis Electric Line. The areas north of Whitney's Landing are not at present under cultivation.

On account of the loamy nature of the soil it is much more retentive of moisture than the Sassafras sand. Where under cultivation, it produces very satisfactory crops of truck as well as good yields of corn and hay. The principal hay crop on this type is made from crab grass.

The natural forest growth is practically the same as that on the Sassafras sand, and consists principally of pine, chestnut, oak, hickory, tulip, dogwood, and holly.

Below are given the results of mechanical analysis of a fine-earth sample of the soil:

Mechanical analysis of Sassafras loamy sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
21478.....	Soil.....	2.6	18.9	30.9	18.6	7.6	14.7	6.6

SUSQUEHANNA GRAVELLY LOAM.

The soil of the Susquehanna gravelly loam, to a depth of 6 to 8 inches, is a pale yellowish-gray medium sandy loam, containing a large percentage of well-rounded gravel. This is underlain in many places to a depth of several feet by almost pure gravel or sandy gravel. Below the gravel is uniformly found the characteristic clay, which underlies all the soils of the Susquehanna series. Scattered over the surface and throughout both soil and subsoil are large quantities of ironstone fragments and conglomerate. Except where the gravel is deep the clay comes to within 3 feet or less of the surface.

The type occupies the higher hills and steep valley slopes of the northwestern part of the county, the largest single area being in the vicinity of Ehrmansville. A short distance east of Laurel is another area of considerable size. Other small strips and spots are found in various parts of the northwest section of the county.

Agriculturally this type is of small importance. Much of it is too rough and steep to admit of cultivation, and where such is not the case the amount of loose rock fragments is so great as to make cultivation difficult and unprofitable. Very little of it is now under

cultivation, and the crop yields are low. It is a nonagricultural soil and should be left in forest.

Several extensive gravel pits are worked in this type in the county.

SUSQUEHANNA SAND.

The Susquehanna sand is a type which might be termed an intermediate soil between the Sassafras sand and the Susquehanna sandy loam. It has a subsoil of heavy clay sufficiently close to the surface to prevent its being called Sassafras sand, and yet at such a depth that it can not be called Susquehanna sandy loam. In some places the clay is quite deep, but the overlying sand is of such a bright red color as to throw it out of the Sassafras series.

The surface material to a depth of 6 to 8 inches is a pale reddish-yellow or pink, mealy, loose, medium sand. The subsoil is a light red, loose, mealy sand, usually becoming sticky and mottled somewhere between 20 and 36 inches beneath the surface. Stiff, mottled clay is encountered ordinarily at depths ranging from 24 inches to 4 or 5 feet.

The surface features vary from gently rolling to quite level. A few small areas form the summits of low hills. It is found only in the northeastern part of the county near the Patapsco River.

While on account of its small extent this is not an important soil in the county, it is, when properly handled, a good trucking and fruit-growing soil. One of the best peach crops in the county this year (1909) was produced on this type. The clay is in many places sufficiently near the surface to make the soil quite retentive of moisture, so that some long-season crops like corn and tobacco produce good yields, even in dry seasons. The roots of crops on this soil extend deep into the soil without difficulty, and for this reason crops are better able to resist the effects of continuous dry weather than on some of the heavier soils.

A few well-kept and profitable farms on this type in the vicinity of Nabbs and Cox creeks show the possibilities of this soil. The incorporation of organic matter, either in the form of green crops plowed under or stable manure, is of great importance.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Susquehanna sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
21494.....	Soil.....	0.3	10.2	19.4	29.8	14.5	18.0	7.3
21495.....	Subsoil.....	.0	10.7	22.2	35.5	11.0	10.9	9.6

SUSQUEHANNA CLAY LOAM.

To a depth of 5 to 8 inches the soil of the Susquehanna clay loam is a compact yellowish to light-red clay loam, becoming redder and much heavier in the lower part. The subsoil, beginning at from about 6 to 15 inches, is a stiff, plastic, deep-red or mottled, heavy, impervious clay. The mottlings are yellow, light gray, or purplish.

This type is found only in small patches scattered over the northern part of the area and is of almost no importance agriculturally. No attempt should be made to farm this soil.

The topography varies from steep, eroded slopes and gullies to nearly flat areas, the latter having a silty, chalklike top soil. On the steep slopes erosion has exposed the barren, raw clay.

The subsoil of this type is a good brick and tile clay and is used to some extent for this purpose.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Susquehanna clay loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
21500.....	Soil.....	0.4	16.7	15.0	15.1	7.3	28.8	17.2
21501.....	Subsoil.....	.4	7.3	6.6	6.2	3.1	44.9	31.3

ELKTON SILT LOAM.

The Elkton silt loam is found mainly on the flat foreland areas in the southern part of the county along the Chesapeake Bay, though a few small areas are mapped near the shore of the Chesapeake between the Severn and Magothy rivers.

The surface material of this type is a light pale-gray silty loam, slightly mottled with light yellow in the lower layers. This material extends to a depth of 5 to 7 inches, where it rests upon a light-gray silt loam, highly mottled and quite heavy, which extends to considerable depth. Below this in some places is found a soft glauconitic material.

The surface of this type is almost flat. This fact, coupled with the close, compact nature of the soil, is responsible for very poor drainage conditions.

Crops on this soil seem to suffer both in wet and dry seasons. When rains are in the least excessive the crops are flooded, and in dry seasons the plant roots are unable to draw sufficient moisture from the close, retentive soil, although the moisture supply is relatively large. These conditions are corrected to some extent by open

ditches. Subdrainage, however, is not successful on account of the impervious nature of the soil. Most of this land was at one time quite thoroughly drained with surface ditches and good crop yields were secured. It is said that thirty to forty years ago as much as 40 bushels of wheat per acre were produced on this soil in the neighborhood of Churchton. Tomatoes grown on the Elkton silt loam are firmer than on many of the other soils and therefore much better for shipping and canning. They bring a higher price than those produced on any other type in the area. Some fruit is produced. The soil is, however, a typical grass soil, and stock raising and dairying are branches of farming that could perhaps be most profitably developed upon it.

Farming on the Elkton silt loam has been very much neglected in the last twenty-five years because of the development of the oyster industry. At this business a man can earn from \$3 to \$15 a day from September to April, which is much more than the farmer of ordinary resources can realize from farming. Most of the people grow a few products for their own use and some have a small amount to sell. There are a few well-tilled farms in this section, but they are principally located on the slightly higher portions.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Elkton silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
21454.....	Soil.....	0.0	0.2	0.2	0.7	3.7	78.6	16.6
21455.....	Subsoil.....	.0	.0	.4	.8	7.6	65.7	25.9

SASSAFRAS SANDY LOAM.

The Sassafras sandy loam closely resembles the Sassafras fine sandy loam in every respect except texture and possibly agricultural value, although it is considered a very good soil for general farming purposes. It is doubtless a somewhat better tobacco soil than the type of finer texture.

The type occupies about the same position as regards elevation as the Sassafras fine sandy loam and is found only in the northern end of the county. It is a good farming soil, but is unimportant because of its small extent.

Good yields of wheat, corn, tobacco, cowpeas, and clover are grown. It is also an excellent soil for the kinds of fruit suited to the region, as it usually occupies an elevated position, thus reducing the danger from killing frosts.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Sassafras sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
21479.....	Soil.....	1.9	13.0	15.6	23.7	15.2	22.4	7.8
21480.....	Subsoil.....	1.6	1.3	14.2	33.7	9.8	27.7	11.6

SASSAFRAS GRAVELLY LOAM.

The Sassafras gravelly loam occupies much of the bottom land and terrace slopes along the Little Patuxent River and its tributaries. In the extreme northern part of the county, near Brooklyn and Curtis Bay, some extensive areas of this soil also occur. Other small areas exist in various parts of the northern half of the county. The steeper phase of the type is rough and not well suited to farming. The valley phase is quite level and is used extensively for agricultural purposes.

The surface soil to a depth of 6 to 10 inches is a dark-gray gravelly sandy loam, becoming lighter in color as the percentage of organic matter decreases with increase in depth. The subsoil to 36 inches and beyond is a light-yellow sandy gravel. In some places conveniently located this material is mined for concrete and road construction.

On the valley portions of the type good crops of corn, hay, cowpeas, tobacco, sweet potatoes, and fruit are grown. In the vicinity of Woodwardville some particularly well cultivated farms are found.

Although the subsoil is open and porous and crops often suffer from drought, the effects of dry weather are not noticeable on this type as quickly as on some others.

The reforestation of the steeper areas is recommended, on account of their low agricultural value. The natural forest growth consists of pine, chestnut, and oak.

COLLINGTON GRAVELLY SANDY LOAM.

The Collington gravelly sandy loam is not of great importance in this area, on account of its small extent and the uneven stony nature of its topography, which makes it difficult to cultivate.

The type exists as steep hillsides along the margin of the Collington sandy loam areas. On the south shore of the Magothy River this type occurs as low hills and terrace walls. In other places it occurs on steep, short slopes separating the higher lying Sassafras soils from the low-lying types along the water front.

The top soil, to a depth of 10 to 15 inches, is a medium sandy loam, grayish to reddish-brown in color, containing a large percentage of various sized quartz gravel and ironstone fragments. The subsoil consists of a greenish-yellow to reddish-yellow sandy loam or sandy clay, containing considerable gravel and ironstone and much green-sand which gives it the typical color of the Collington soils.

About the only use to which this soil is adapted is peach growing, and although the land is difficult to cultivate the trees thrive especially well and produce fruit of very fine flavor and color. The rough, stony character of the surface makes it difficult to keep the orchard free from weeds and grass—a condition which usually results in short life to the trees. However, peach growing on this soil has proved profitable.

MEADOW.

The soil mapped as Meadow is confined entirely to margins along streams, and to a few small areas in the lower portions of the fore-land near tide water. The areas along the stream courses are very narrow, except at points of confluence and at the heads of streams where there is a broadening of the areas.

The character of this land varies with that of the soil of the drainage basin of the stream. In sandy sections the Meadow areas are deposits of almost pure sand mixed with partially decayed organic débris. In the sections of the county with heavier soils the Meadow has somewhat the same heavy character as the surrounding types.

Almost all of this Meadow land is subject to occasional overflow, and it is therefore used only for grazing purposes. Much of it is covered with a dense growth of trees and underbrush, consisting principally of willow, birch, sweet gum, soft maple, sycamore, and water beech, with various weeds, vines, and coarse grasses.

If diked and drained this soil in many places would be very productive, and in case of some of the more extensive areas along the larger streams reclamation would no doubt be profitable.

TIDAL MARSH.

Tidal marsh comprises the low, flat, marshy areas along the Chesapeake Bay which are subject to daily inundation by tide water. There is only a very small area of the type; too inconsiderable to warrant the construction of dikes for its reclamation. It supports a dense growth of coarse salt-marsh grasses. There are occasional narrow strips too small to be shown on the map.

SUMMARY.

Anne Arundel has been an agricultural county since its first settlement. Tobacco and corn were grown by the Indians before the white man came. Owing to the splendid markets close at hand the

agriculture of the county has changed radically in the last twenty-five years from general farming to trucking. The Chesapeake and its tidal tributaries furnish excellent shipping facilities.

The southern part of the county has a variety of soils, some of which are well adapted to the growing of truck, but the poor railroad facilities of that section have hindered the development of the trucking industry. General crops are most largely grown there.

In the northern part the truck-growing business has had a remarkable development, due to the nearness of large markets to which products may be hauled by wagon, the adaptation of the soil to the purpose, and the unfailing supply of stable manure.

The climate is temperate. The rainfall is ample and usually well distributed throughout the growing season. Protracted droughts occasionally do some injury to crops, but destructive hail and wind storms seldom occur.

The soils of the county all belong to the Coastal Plain province. These are grouped in five series. The most important general farming types are the Sassafras fine sandy loam, the Sassafras silt loam, and the Collington sandy loam. The trucking soils of the county are the Norfolk sand and Sassafras sand. The Susquehanna sandy loam is a fairly good soil for general farming, and is a splendid soil for peaches, as well as for some varieties of apples, pears, and small fruits.

Practically all the soils of the area are deficient in organic matter. At present the greatest needs of the county are the more general practice of systematic crop rotation, the plowing under of more green crops, such as crimson clover and cowpeas, the more extensive use of improved farm machinery, and the keeping of more live stock in the general farming sections.

In the trucking sections too much money is being expended for commercial fertilizers and stable manure. This enormous expenditure might be greatly reduced by the growing and plowing under of more green crops.

The growing of peaches may well be extended and the growing of some varieties of apples, summer and fall sorts, pears, and small fruits can also be developed to advantage on suitable soils where market conditions are good. Modern methods of orcharding must be employed, however, to insure success.

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