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Soil Survey

of

Calvert County, Maryland

By

S. O. PERKINS
U. S. Department of Agriculture, in Charge
and
MERLE HERSHBERGER
Maryland Agricultural Experiment Station

Bureau of Chemistry and Soils
In cooperation with the Maryland Geological Survey
and the Maryland Agricultural Experiment Station

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SOIL SURVEY OF CALVERT COUNTY, MARYLAND

By S. O. PERKINS, U. S. Department of Agriculture, in Charge, and MERLE HERSHBERGER, Maryland Agricultural Experiment Station

COUNTY SURVEYED

Calvert County is in southern Maryland, in the section known as the Western Shore, and constitutes a tongue or peninsula between Chesapeake Bay and Patuxent River. (Fig. 1.) Prince Frederick, the county seat, is 55 miles south of Baltimore and 35 miles southeast of Washington. This is the smallest county in the State. Its extreme length from northwest to southeast is about 35 miles and its average width is 9 miles. The land area of the county is 218 square miles, or 139,520 acres.

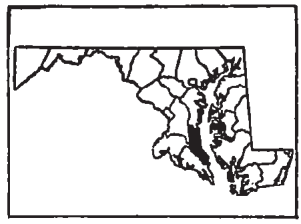

FIGURE 1.—Sketch map showing location of Calvert County, Md.

Calvert County as a whole is a thoroughly dissected upland plain with a narrow less dissected flat terrace bordering Patuxent River. The elevation of the greater part of the county is more than 120 feet above sea level. The general surface configuration of the upland comprises undulating or nearly level spots on the watersheds and extensive rolling or hilly areas on the slopes, resulting from the steep short fall of the watercourses which have cut through the unconsolidated material from which the soils have developed. The terrace along Patuxent River is flat. Hunting Creek, flowing into Patuxent River, and Fishing Creek, flowing into Chesapeake Bay, have almost cut the county in two parts; Battle Creek and Parker Creek have almost accomplished a similar dissection farther south; and St. Leonard Creek, rising within a half mile of Chesapeake Bay, flows across the county and empties into Patuxent River. As a result of this active stream cutting the greater part of the county consists of rolling and rather steep-sided slopes. A few small flat-topped areas in the upland remain as remnants of the original plain which dissection has not yet destroyed. These narrow interstream areas are very small and are gradually becoming smaller through erosion.

On the eastern side of the county the upland terminates in cliffs along Chesapeake Bay throughout most of the distance between Fishing Creek and Drum Point. The streams flowing into Chesapeake Bay cut deep ravines in this cliff line, so that at only two places, Dares Beach and North Beach, does any of the remnant of the old terrace remain between the general upland and the water's edge.

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The Patuxent River banks differ greatly from the shore line along Chesapeake Bay. The remaining parts of the upland extend toward the river as long narrow divides with flat or rounded tops. The slopes toward the river are fairly steep, and at only a few places do they extend to the water level. Along the greater part of Patuxent River the approach is a narrow almost level foreland or terrace, locally called bottom land, which reaches its widest development in the vicinity of Solomons Island and at the mouth of Hunting Creek. Its elevation above sea level ranges from about 10 feet to 40 feet. Between St. Leonard Creek and Sheridan Point the terrace, or bottom land, is narrower and more sloping, and from Sheridan Point to Deep Landing it is broad and flat. Above Deep Landing the terrace varies considerably in elevation and at Lyons Wharf attains a maximum elevation of 80 feet above sea level.

The Chesapeake Bay shore line of Calvert County is marked by a high cliff of clay, sand, and gravel, which rises about 150 feet from the water's edge. The larger streams have cut down through this cliff nearly to sea level and are still bringing down large quantities of sand and silt. The wave action of the water of the bay has thrown up a small bar of sand and shells in places along the shore, and the silt and clay is deposited near the mouths of the estuary streams as tidal marsh. Along the greater part of the Chesapeake Bay shore line the waves are cutting away the land area at a rate ranging from a few inches to several feet each year.

Drainage of the county is southward through Patuxent River, all the larger streams flowing into this river with the exception of Fishing and Parker Creeks which flow into the bay. The general presence of the foreland along Patuxent River and its absence along the bay gives evidence of long-continued wave action on the bay shore, which has resulted in the washing away of the former foreland, as well as the undermining and caving in of some of the upland.

The elevation of the county ranges from sea level to 181 feet above at Mount Harmony. The rise in elevation from Appeal in the southern part of the county to Mount Harmony in the northern part is about 60 feet, giving an average slope of the upland southward of about 2 feet to the mile; the slope, however, is not uniform.

The original forest vegetation of the county consisted almost entirely of deciduous trees, mainly white oak, post oak, red oak, black oak, chestnut oak, and poplar, together with some dogwood, hickory, and a few beech near the water. Practically all the original forest cover has been removed, and on areas where the land had been cultivated for a long time and then "turned out" the natural reforestation is mainly small pines, dominantly *Pinus virginiana*, which grow very thickly and furnish a large amount of pulp wood.

Calvert County was organized in 1774. The early settlers were immigrants from England, Spain, Germany, and France, and many of the present white population are direct descendants of those early settlers. About one-half the present population are negroes.

According to the 1930 census[1] the population of the county is 9,528, all classed as rural and averaging 43.7 persons to the square mile. The principal towns of the county are Prince Frederick, the

[1] Soil survey reports are dated as of the year in which the field work was completed. Later census figures are used whenever possible.

county seat, Solomons, North Beach, Chesapeake Beach, Owings, and Lower Marlboro. Many resorts along the bay have a large transient population during the summer, and other resorts are being opened up.

The summer resorts afford good markets for vegetables, chickens, eggs, melons, and fruits. Baltimore is the main outside market, especially for tobacco.

Most of the produce and passenger transportation in the county is by truck and automobile. The Chesapeake Beach Railway serves a small section in the northern part of the county, but as Baltimore is the principal market for this section of the State, all products can be taken by truck much more quickly than by rail. The bay and river afford water transportation for some points along the shores, but in recent years much steamboat service has been discontinued. The main highway extending through the central part of the county to Solomons Island, the extreme southern point, and the branch highway to North Beach are hard surfaced. The branch roads leading from the main highway to Lower Marlboro, Bowens, Broome Island, and Sollers are improved gravel roads. The county roads are maintained in fair condition.

Churches and schoolhouses are conveniently located, and telephone lines reach almost every section of the county.

CLIMATE

The climate of Calvert County is oceanic and is mild and healthful. Extended hot periods in summer and severe cold periods in winter are rare, the cold seldom causing any damage to cover crops or fruit trees. The United States Weather Bureau maintains two stations in the county, one at Solomons and one at Ferry Landing. The mean annual temperature, as recorded at Solomons, is 56.9° F., and at Ferry Landing, is 55.5°.

The average annual rainfall is reported as 36.30 inches at Solomons and 44.68 inches at Ferry Landing. The rainfall is well distributed throughout the year, and crops rarely suffer from drought or from too much rain, although some of the more rolling sandy areas suffer from short periods of summer drought.

The average date of the last killing frost at Solomons is April 8, and the first is November 7, giving an average frost-free season of 212 days. At this station the latest recorded date of killing frost is May 12, and the earliest recorded date is October 12. At Ferry Landing the average date of the last killing frost is April 18, and of the first is October 24, giving an average frost-free season of 188 days. The latest recorded date of killing frost is April 27 and the earliest is October 7. These records show that the average frost-free season at Solomons is 24 days longer than at Ferry Landing.

Tables 1 and 2 give the normal monthly, seasonal, and annual temperature and precipitation at Solomons in the extreme southern part of the county and at Ferry Landing in the northwestern part.

TABLE 1.—*Normal monthly, seasonal, and annual temperature and precipitation at Solomons, Md.*

[Elevation, 20 feet]

Month	Temperature			Precipitation			
	Mean	Absolute maximum	Absolute minimum	Mean	Total amount for the driest year (1913)	Total amount for the wettest year (1906)	Snow, average depth
	°F.	°F.	°F.	*Inches*	*Inches*	*Inches*	*Inches*
December	38.7	69	−1	2.70	1.43	2.48	3.4
January	35.6	73	−3	2.89	2.24	1.62	4.9
February	35.6	70	−5	2.96	1.15	3.68	5.0
Winter	36.6	73	−5	8.55	4.82	7.78	13.3
March	44.6	89	15	3.30	3.11	4.66	3.3
April	54.2	89	25	2.92	4.35	1.34	.5
May	65.0	100	40	3.01	2.85	1.89	(1)
Spring	54.6	100	15	9.23	10.31	7.89	3.8
June	73.5	99	48	3.24	1.00	5.78	0
July	78.1	100	53	4.27	.62	6.11	0
August	77.0	104	58	3.77	3.97	8.91	0
Summer	76.2	104	48	11.28	5.59	20.75	0
September	71.5	99	43	2.65	1.82	3.60	0
October	60.3	93	31	2.59	1.78	4.23	(1)
November	48.6	79	20	2.00	1.09	1.72	.4
Fall	60.1	99	20	7.24	4.69	9.55	.4
Year	56.9	104	−5	36.30	25.41	45.97	17.5

[1] Trace.

TABLE 2.—*Normal monthly, seasonal, and annual temperature and precipitation at Ferry Landing, Md.*

[Elevation, 45 feet]

Month	Temperature			Precipitation		
	Mean	Absolute maximum	Absolute minimum	Mean	Total amount for the driest year (1925)	Total amount for the wettest year (1919)
	°F.	°F.	°F.	*Inches*	*Inches*	*Inches*
December	37.4	70	−7	2.84	1.87	2.91
January	33.9	64	−2	3.25	5.57	4.08
February	37.0	67	−5	2.78	.80	2.43
Winter	36.1	70	−7	8.87	8.24	9.42
March	46.4	81	21	3.60	1.79	4.08
April	53.9	89	23	4.11	1.78	4.54
May	62.9	98	39	3.74	1.90	7.84
Spring	54.4	98	21	11.45	5.47	16.46
June	72.3	97	47	3.76	2.67	2.53
July	75.5	99	51	6.33	4.37	10.46
August	73.9	106	50	4.97	2.35	7.34
Summer	73.9	106	47	15.06	9.29	20.33
September	68.6	96	39	3.48	2.08	2.85
October	58.1	92	26	2.88	4.89	4.45
November	46.5	74	17	2.94	2.77	3.90
Fall	57.7	96	17	9.30	9.74	11.21
Year	55.5	106	−7	44.68	32.74	57.42

AGRICULTURE

Calvert County was settled about 300 years ago, and some of the soils have been continuously tilled for more than 200 years under varying conditions and with varying success. The early colonists began the cultivation of tobacco with the first clearing of the land, and by many it was grown to the exclusion of food crops so that it was necessary by an early enactment of the colonial legislature to provide that 2 acres of corn must be planted for each person in the colonist's family in order that they should have a grain crop for sustenance. Calvert County, in common with the other southern Maryland counties, has remained a tobacco-growing region for more than two centuries, and tobacco has been the principal money crop of the county since its settlement. Following the Civil War many plantations, which were admirably tilled before the war, speedily deteriorated, as the labor necessary for their cultivation became very scarce and at times could not be hired.

According to the United States census of 1880, corn was grown on 10,848 acres in 1879, which was almost double the acreage of any other crop. Tobacco was second, being grown on 6,848 acres, wheat was third, being grown on 6,581 acres, and oats were grown on 865 acres. The 1890 census reported the corn acreage reduced about one-third in 1889, tobacco and wheat reduced one-half, and the acreages of oats and hay increased. The census of 1900 reported about one-third more land in cultivation in 1899 than in 1889. Corn occupied 11,848 acres; tobacco, 10,137 acres; wheat, 3,181 acres; and oats, 458 acres. A considerable quantity of orchard fruits were reported by this census. The 1910 census reported corn grown on 10,368 acres in 1909; tobacco on 5,194 acres; wheat on 2,059 acres; and the combined acreage of hay and forage was 758 acres. The 1910 census reported 14,368 apple trees, 121,864 peach trees, 2,977 pear trees, and 3,216 grapevines.

The 1920 census reported corn grown on 10,377 acres, with a yield of 224,485 bushels; tobacco on 5,402 acres, with a yield of 2,474,200 pounds; and wheat on 2,384 acres, with a yield of 34,077 bushels. The combined acreage of hay and forage was nearly 6,000 acres. The 1920 census also reports 306 acres in rye, 46 acres in oats, 89 acres in potatoes, 36 acres in sweetpotatoes, 404 acres in other vegetables, and 7 acres in dry peas. Wheat and oats have shown a rather steady decrease in acreage, and a corresponding increase has taken place in the acreage of hay and forage crops and peas.

Table 3 gives the number and value of domestic animals on the farms of Calvert County on January 1, 1920.

TABLE 3.—*Number and value of domestic animals on the farms in Calvert County, Md., 1920*

Animals	Number	Value	Animals	Number	Value
Horses	2,702	$241,605	Goats	3	$45
Mules	181	20,412	Swine	5,803	45,653
Beef cattle	1,575	99,984	Chickens	33,489	51,959
Dairy cattle	2,414	104,962	Other poultry	5,682	
Sheep	1,717	13,211			

Table 4 gives the value of all agricultural products by classes in 1919.

TABLE 4.—*Value of all agricultural products by classes in Calvert County, Md., 1919*

Crop	Value	Livestock and livestock products	Value
Cereals	$427,867	All domestic animals	$525,872
Other grains and seed	1,660	Dairy products, excluding home use	30,630
Hay and forage	87,896	Poultry and eggs	108,570
Vegetables	112,080	Wool	3,110
Fruits and nuts	29,384		
All other crops	815,166	Total	668,182
		Total value	2,143,135
Total	1,474,053		

The 1925 farm census reports 19,811 acres of crop land in cultivation to all crops in 1924, of a total of 69,628 acres of improved land in the county. From these figures it will appear that 49,817 acres out of 69,628 acres were in fallow and in pasture, of which plowable pasture included 24,379 acres and fallow land 25,438 acres.

In a general way the farmers recognize the adaptability of the soils to different crops. The heavier soils on the smooth uplands and the terrace soils are generally recognized as being better adapted to wheat, corn, grasses, and clovers and the sandy upland soils as being better adapted to tobacco. However, most of the farmers plant some tobacco regardless of what kind of well-drained soil is included in the farm.

Tobacco is the one staple cash crop and is grown continuously because of the need for a cash crop and because many of the soils and the climatic conditions are suitable for its production. It is not a perishable crop, and the fairly steady demand allows it to be marketed at convenient times. It can also be transported to considerable distances by almost all methods of transportation. Many of the soils are suitable for the production of truck crops but these crops require quick and careful transportation, so that before good roads were built and automobile transportation became available there was no way of getting truck crops quickly to distant markets. Besides, competition with the truck crops of the Eastern Shore, where the soils are similar and climatic conditions just as favorable, if not more so, and transportation facilities better, is a factor which has militated against the development of the trucking industry in Calvert County.

At present, agriculture in Calvert County includes the growing of corn, wheat, hay, potatoes, tomatoes, and other vegetables as subsistence crops. As previously stated, corn occupies by far the largest acreage of any crop in the county, and most of the corn, wheat, and hay is used on the farms, furnishing food for the work animals and bread for the family. Some trucking is carried on and small quantities of the truck crops are sold in Baltimore and to the resorts and summer colonies along the beaches in the county.

On land that is cultivated every year the crop rotation in general use is corn, then wheat, followed either by grass or clover, or by grass and clover mixed. However, much of the crop land, especially the land on which tobacco is grown, is cultivated only every

third year, being allowed to "rest" or lie fallow for two years. Some farmers sow the land to rye after the tobacco crop has been harvested. The rye crop is allowed to ripen the second year, die down, and reseed itself, and the land is plowed the following spring and again planted to tobacco. Most of the land is plowed in the spring. Corn and tobacco are planted in checkrows, so that they can be cross cultivated.

In many sections of the county the partridge pea is indigenous to the soil, and much nitrogen is derived from this wild growth. Japan clover makes a volunteer growth in some places.

All the tobacco is air cured, the tobacco barns being built with small long openings on all sides, which are provided with doors that can be opened or closed as the climatic conditions warrant. Southern Maryland tobacco is said to have superior burning qualities and usually brings a good price. About 85 per cent of the tobacco is of the export type and goes to France, Germany, and other European countries.

Commercial fertilizers are in general use, and the tobacco crop receives the heaviest applications. According to the 1925 census report commercial fertilizers (including lime) were used on 1,141 farms, with a total expenditure of $47,014 or $41.20 a farm.

Many of the farmers have large comfortable homes, and nearly all have fair-sized tobacco barns, but most of the barns for livestock and for feed storage are small. Most of the hay and fodder are stacked in the field. Only a few farmers have sufficient storage room to house all their farm implements. None of the farmers uses tobacco transplanters or fertilizer distributors, consequently the fertilizer must be distributed and tobacco plants set out by hand. Most of the work animals are horses. Two-horse turning plows and one-horse cultivators are in general use, a few tractors are used for breaking the land, and improved binders are used for harvesting small grains. The more prosperous farmers either own or hire autotrucks for marketing their crops.

Farm labor is scarce and high. The laborers are all American born and are mostly negroes. The 1925 farm census reported an expenditure of $66,488 for labor on 458 farms reporting hired labor, or an average labor expense of $145.17 a farm. Day wages range from $1.50 to $3, the higher wages being paid for cutting tobacco, and monthly wages range from $35 to $50.

The farms, in general, range in size from 10 to 250 acres, with an average size of 91.3 acres, of which 55.4 acres is improved land. Five farms in the county contain more than 500 acres. According to the 1925 farm census 66.2 per cent of the farms were operated by owners, 32.9 per cent by tenants, and 0.9 per cent by managers.

The prevailing rental is a share system in which the owner furnishes the land and one-half of the fertilizer and receives one-half of the crops.

There are no important agricultural industries in Calvert County; that is, none of the crops grown is manufactured into other products or fed to livestock and these sold. Very little livestock raising, livestock feeding, or dairying is carried on. Most of the corn and hay is fed to work animals and used on the farm. The wheat is

used mainly for flour, only a small quantity being sold for cash. Tobacco is a special crop and is the principal money crop of the county. A few hogs, from one to three milk cows, and some chickens are kept on every good farm for supplying home needs, and the surplus products are sold. There is one tomato cannery operating in the county.

Land values have a wide range. The poorer and less desirable land, such as the steep phase and some of the mixed phase of Sassafras sandy loam, Norfolk coarse sand, and the Leonardtown and Elkton soils, sells for $8 an acre; land of the rolling phases of the Sassafras soils sells for $20, $25, or $30 an acre; and land of the more gently rolling and smoother Sassafras soils and of the Keyport soils commands from $50 to $75 an acre. Improved land near highways brings as high as $125 an acre. Along the water fronts on Chesapeake Bay and Patuxent River land brings a high price as sites for summer cottages. The average assessed value of land was reported as $25.09 an acre in 1925.

SOILS AND CROPS

At the time of the survey (1928) Calvert County, according to the best information obtainable, had about 20,000 acres of cultivable land in crops, 25,000 acres in fallow, and 25,000 acres in plowable pasture. This proportionate acreage varies somewhat from year to year, but has remained fairly constant for the last 30 years. The small acreage cropped is owing largely to the hilly and broken surface features of the land and to the fact that much of the land is cropped only every third year. Perhaps from 80 to 90 per cent of the land area of the county is rolling or hilly and in many places steep, and as the surface features seem to be the main controlling factor in the agriculture of the area, extensive areas are too hilly and broken for profitable cultivation under present economic conditions. All the well-drained level or nearly level terrace land along Patuxent River, the smoother upland areas, and even some of the more rolling and hilly upland are in cultivation. A large aggregate area comprising the steep and hilly land is suited only to forestry or to pasture.

Practically all the upland soils are well drained. Erosion has been very active over the greater part of the county, and leaching, or the washing out of the soluble plant constituents (the organic matter) and of the fine material from the surface soil, has and is still going on at an alarming rate. The surface soils range in texture from silt loam to sand, the greater part being sandy loams. They are dominantly light brown in color and contain but a small amount of organic matter. They range from slightly acid to strongly acid and are greatly benefited by the addition of lime.

From 85 to 90 per cent of the soils of Calvert County are included in the Sassafras series, and these soils occur on both the uplands and terraces. The Sassafras soils are the dominant agricultural soils of both the Eastern and Western Shores of Maryland in the coastal-plain region. Their surface soils are light brown or brown and the subsoils range from brown to reddish brown and from friable sandy clay or clay loam to sand. All the Sassafras soils are nat-

urally well drained, both on the surface and internally, owing to the friable character of both surface soil and subsoil and especially to the fact that the underlying material is in most places very loose and friable. The surface features range from almost level on the terraces and interstream areas to rolling or hilly throughout the greater part of the upland. These soils are low in organic matter except where manures have been added or green-manure crops have been turned under. The subsoils dominantly contain more plant food than the surface soils due to the fact that there is more clay and silt in the subsoils than in other parts of the soil profile. Nearly all of these soils are slightly acid or acid and respond readily to the application of lime. The soils are mellow, friable, and very easily tilled, and farm implements can be operated easily on the smoothest areas.

The Sassafras soils, occupying as they do, the greater part of the county, are well distributed in all parts and dominate the agriculture of the county. The types of this series mapped in Calvert County are the fine sandy loam, with a rolling phase, sandy loam, with a rolling phase, a steep phase, a mixed phase, and a light-colored phase, loam, silt loam, loamy sand, and gravelly sandy loam.

Sassafras fine sandy loam is developed in the northern end of the county on the high smooth interstream areas and on the terraces along Patuxent River. Sassafras fine sandy loam, rolling phase, covers the largest acreage of any soil in the county and is very extensive in the central and northern parts. Sassafras sandy loam occurs in small areas in the southern part of the county; its rolling phase dominantly in the southwestern part; its steep phase along Chesapeake Bay and as steep slopes along the streams in the southern end and to a greater or less extent in other parts of the county; its mixed phase is scattered here and there over the county; and its light-colored phase is mainly in the southern part, but small areas occur in the northern half of the county. Sassafras loam and Sassafras silt loam occur in small areas in the southern part of the county and on the terraces. Only a few small areas of Sassafras loamy sand are mapped. Sassafras gravelly sandy loam occurs in the southwestern part of the county.

In addition to the Sassafras group of soils, small areas of Leonardtown silt loam, Keyport silt loam, Elkton silt loam, and Norfolk coarse sand occur in the county. These soils are much lighter in color, are more variable in respect to drainage conditions, and have wider variations in texture than the Sassafras soils. With the exception of Keyport silt loam only small acreages of these soils are under cultivation, owing to imperfect drainage. This is particularly true of Elkton silt loam and of the naturally unproductive Norfolk coarse sand.

Meadow, coastal beach, and tidal marsh represent miscellaneous classes of material and have very little agricultural value in the county.

In the following pages of this report the soils of Calvert County are described in detail and their agricultural importance is discussed; their distribution is shown on the accompanying soil map; and Table 5 gives their acreage and proportionate extent in the county.

TABLE 5.—*Acreage and proportionate extent of soils mapped in Calvert County, Md.*

Type of soil	Acres	Per cent	Type of soil	Acres	Per cent
Sassafras fine sandy loam	9,600	45.9	Sassafras gravelly sandy loam	1,728	1.2
Rolling phase	54,464		Keyport silt loam	4,800	3.5
Sassafras sandy loam	2,550		Leonardtown silt loam	1,664	1.2
Rolling phase	9,664		Elkton silt loam	1,152	.8
Mixed phase	11,264	33.2	Norfolk coarse sand	1,216	.9
Light-colored phase	7,104		Meadow	7,424	5.3
Steep phase	15,744		Coastal beach	384	.3
Sassafras loam	5,888	4.2	Tidal marsh	2,816	2.0
Sassafras silt loam	1,216	.9			
Sassafras loamy sand	832	.6	Total	139,520	

SASSAFRAS FINE SANDY LOAM

Sassafras fine sandy loam is one of the best agricultural soils in the county, but the acreage of the typical soil is much smaller than that of its rolling phase. The typical soil occurs on smooth relief on the higher interstream areas and on marine terraces, and all of the land is naturally well drained. The surface soil in cultivated fields consists of light-brown fine sandy loam to a depth ranging from 8 to 12 inches. The subsoil is brown or reddish-brown friable and crumbly fine sandy clay extending to a depth ranging from 30 to 40 inches, at which depth it is underlain by a much more friable material.

This soil works up to a good tilth, does not bake or become hard, and is easily penetrated by plant roots. It responds admirably to the addition of fertilizers or manures. The subsoil contains a sufficient quantity of silt and clay to take up a large amount of rainfall and retain this moisture for the use of plants. Areas of this soil on the marine terraces seem to contain a slightly larger percentage of fine material in both soil and subsoil, and in such places the soil is considered slightly stronger than the soil on the uplands.

Practically all the Sassafras fine sandy loam has been cleared, and the greater part of it is now farmed. About one-half of the farmed land is devoted to the production of corn, about 40 per cent to tobacco, and about 10 per cent to other crops. Most of the land is limed once in every five to eight years. Corn yields from 25 to 60 bushels an acre and is usually fertilized with from 300 to 400 pounds of a 3–8–3 or 2–8–2[2] mixture. Tobacco yields from 600 to 1,200 pounds an acre, averaging about 750 pounds, and is usually fertilized with from 500 to 1,000 pounds of a 5–8–5 or 4–8–10 mixture. Considerable hay is produced on this soil consisting of timothy, alsike clover, and redtop, the yields ranging from 1 to 1½ tons an acre. Wheat is grown to a small extent and acre yields range from 10 to 25 bushels. Soybeans and cowpeas do well, and some truck crops are grown with excellent results. This is a good soil for berries, watermelons, and cantaloupes, as well as all kinds of garden vegetables common to this climate.

Sassafras fine sandy loam, rolling phase.—Sassafras fine sandy loam, rolling phase, is the most extensive soil in Calvert County.

[2] Percentages, respectively, of nitrogen, phosphoric acid, and potash.

It differs essentially from the typical fine sandy loam in that it is developed on the rolling or slightly hilly areas. The depth of the surface soil is variable, as erosion has removed some of the material, and in places the entire fine sandy loam surface soil has been washed away exposing the reddish-brown friable fine sandy clay subsoil. At the bases of some slopes, the surface soil has been deepened by an accumulation of material washed from the higher-lying areas, and in such places the soil is dark brown.

About 75 per cent of this rolling phase of soil has been cleared, but probably not more than one-half of the cleared land is farmed each year. Improved machinery can not be used advantageously on the more rolling and hilly areas. The crops grown are mainly corn, tobacco, and wheat in about the same proportions as on the typical soil. Some tomatoes for canning are successfully produced. Crop yields are slightly less than on the typical fine sandy loam although the fertilizer applied and the methods of cultivation are about the same.

SASSAFRAS SANDY LOAM

Sassafras sandy loam differs essentially from Sassafras fine sandy loam in that it is coarser in texture and drains out a little more quickly. It is mellow, easy to till, responds readily to fertilization, and is one of the most desirable soils in the county. It is especially suited to tobacco but is not quite so good for wheat as Sassafras loam or Sassafras fine sandy loam.

About 95 per cent of Sassafras sandy loam has been cleared, and probably 70 per cent of the cleared land is farmed annually. Probably 50 per cent of the farmed land is devoted to tobacco, 40 per cent to corn, and the remainder to other crops and vegetables.

Sassafras sandy loam, rolling phase.—Sassafras sandy loam, rolling phase, is similar in texture and structure to the typical sandy loam but differs from that soil in its surface relief. Soil of this phase occupies rolling or hilly areas and is naturally well drained. The crops grown, yields, fertilizer treatment, and general methods of cultivation are identical with those on the rolling phase of Sassafras fine sandy loam.

Sassafras sandy loam, mixed phase.—The mixed phase of Sassafras sandy loam includes small areas and spots of all the Sassafras soils, Norfolk coarse sand, and Leonardtown silt loam so intricately associated that the different soil types could not be shown on a map of the scale used. Such a soil condition occurs mainly on the ridges or saddlelike parts of the dissected areas. The surface relief ranges from rather smooth to rolling, with low hills or knobs. Perhaps 60 per cent of this land is farmed, the main crops being tobacco, watermelons, cantaloupes, and vegetables. The yields depend largely on the dominant soil on the farm, the kind and quantity of fertilizer used, and the method of cultivation.

Sassafras sandy loam, light-colored phase.—This light-colored soil differs from the true Sassafras soils in that it is lighter in color, texture, and structure and contains less organic matter in the surface soil. The surface soil is light-gray or gray loamy sand to a depth of 10 or 12 inches, at which depth it grades into pale-yellow loamy sand. The subsoil, beginning between depths of 18 and 22 inches,

is brown or yellowish-brown friable crumbly sandy clay. Locally, reddish-brown iron crust or large quantities of quartz gravel are scattered over the surface or mixed with the soil. The gravelly areas are shown on the map by gravel symbols.

The surface relief of this soil is undulating or gently rolling, and the land is well drained. About 50 per cent of it is cleared, and probably one-half of the cleared land is farmed. Tobacco is the principal crop. Although the yields are low, averaging about 500 pounds an acre when heavily fertilized, the quality is high, as the leaf is light colored and usually sells at a higher price than the darker leaf. Some watermelons, cantaloupes, sweetpotatoes, and vegetables are grown, and a few peach orchards were observed. The soil needs organic matter. It warms up early in the spring and is easily cultivated. It is better suited to truck crops than to hay and grain crops.

Sassafras sandy loam, steep phase.—The steep phase of Sassafras sandy loam includes those areas of Sassafras sandy loam which occur on the steep broken slopes and are extremely hilly. Erosion has been so active on such areas that the surface soil is not uniform in depth or texture. Drainage is excessive, and gullying is disastrous except where the slopes are forested or kept in grass. Only very small areas of this soil can be cultivated, and these should be handled carefully. Most of this steep land should be devoted to forestry, with perhaps some of the less hilly and less steep areas used for pasture.

SASSAFRAS LOAM

Sassafras loam is one of the best corn, wheat, and hay soils in the county. It occurs in the southern part and on the marine terraces. The loam surface soil and the heavy clay loam subsoil hold moisture better than the more friable subsoils of the sandy loams. This is naturally a strong soil and is capable of being built up to and easily maintained in a high state of productivity. This soil contains more fine material than any soil previously described, but when worked under proper moisture conditions it is friable and crumbly and does not bake or clod badly even when dry.

Most of the Sassafras loam is under cultivation or in pasture, as its surface relief allows the use of modern machinery and the soil does not erode badly. Yields ranging from 30 to 60 bushels of corn and from 1 to 1½ tons of hay (timothy, redtop, and alsike clover) are obtained. The fertilizer treatment is about the same as on Sassafras fine sandy loam. Tobacco returns a high yield, and alfalfa, where the soil has been limed and manured, does well. Cowpeas and soybeans are successfully grown. Barnyard manure applied to this soil produces good yields.

SASSAFRAS SILT LOAM

Sassafras silt loam differs from Sassafras loam mainly in being finer in texture, that is, it contains a larger amount of silt which gives the surface soil a fine floury feel. It has a tendency to puddle and bake if not handled under favorable moisture conditions. The silt loam is lighter in color than any of the other Sassafras soils.

In places a mottled gray and brown layer occurs at a depth of about 32 inches, and the soil in such spots has characteristics somewhat similar to those of Leonardtown silt loam.

A large part of this soil is farmed. The same crops are grown, practically the same or slightly smaller yields are obtained, and similar fertilizer treatment and cultural methods are used as on Sassafras loam.

SASSAFRAS LOAMY SAND

Sassafras loamy sand occupies a very small acreage and is the lightest-textured, or most sandy, soil of the Sassafras series in Calvert County. It is uniformly brown loamy sand to a depth of 3 or 4 feet. It is well drained, lies favorably for farming operations, and is very easy to till. It is less productive than Sassafras sandy loam or Sassafras loam, but tobacco and alfalfa do fairly well where the land is heavily fertilized. Alfalfa does best on those areas near Patuxent River where shells are mixed with the soil. This is a good soil for early truck crops.

SASSAFRAS GRAVELLY SANDY LOAM

This soil is developed in the southern part of the county on the steep slopes and hillsides. The surface soil is not uniform in texture and the content of small rounded gravel ranges from a few scattered gravel to a high proportion both in the surface soil and in the subsoil, and in places a gravel stratum has formed. Very little of the land is under cultivation. It should remain in forest, or, perhaps, small patches could be used for fruit growing or pasture.

KEYPORT SILT LOAM

Keyport silt loam is an intermediate soil between Sassafrass silt loam and Elkton silt loam. It occurs on the marine terraces, in fair-sized areas in the extreme southern end of the county, and along the western side. The surface soil is gray, grayish-yellow, or very light-brown mellow silt loam to a depth of 6 or 8 inches. Below this is a yellow or brownish-yellow heavy silt loam layer ranging in thickness from 4 to 10 inches. The subsoil is mottled light-gray, yellow, and rust-brown heavy, and in places tough, clay which continues to a depth ranging from 30 to 40 inches and is underlain by lighter-colored and more friable material.

This is not quite so good an agricultural soil as Sassafras loam or Sassafras silt loam, and a smaller proportion of the land is under cultivation. Some woodland on this soil includes trees of the same species as those on Elkton silt loam. On account of the fine silty texture of Keyport silt loam it bakes and clods, but this condition can be largely overcome by turning under green-manure crops or by adding barnyard manure. Lime also is beneficial. Improved machinery can be advantageously used. Some areas would be benefited by drainage.

Keyport silt loam is used for the same crops, is fertilized in the same way, and the treatment given it is the same as for Sassafras silt loam.

LEONARDTOWN SILT LOAM

Leonardtown silt loam occurs in close association with the Sassafras soils. Only a few narrow strips and small areas remain in Calvert County, and these occur mainly on the western side and in the south-central part. The surface soil to a depth of 6 or 8 inches is pale-yellow or grayish-yellow mellow friable silt loam with a smooth floury feel. The material runs together and compacts slightly after heavy rains. The subsoil is yellowish-brown or brown friable silty clay loam extending to a depth ranging from 16 to 22 inches. Below this is the characteristic light-gray, mottled with brownish yellow, hardpan layer which consists of fine sand, silt, and clay. This layer is very hard and brittle. It is laminated in structure and is very difficult to penetrate with a soil auger. It prevents the downward movement of rain water and the upward movement of soil water. The surface is naturally well drained, but the hardpan prevents good internal drainage.

Very little Leonardtown silt loam is under cultivation. The soil naturally contains a small amount of organic matter and is low in fertility. The yields on this soil are lower than those obtained on the corresponding soil of the Sassafras series. The soil is difficult to build up and to maintain in a high state of productivity.

ELKTON SILT LOAM

Elkton silt loam occurs in small areas on the marine terraces in the extreme southern end, in the northeastern corner, and along the west side of the county. It is recognized by its poor natural drainage, low flat position, and generally wooded condition. The surface soil is light-gray, in places specked with rust brown, silt loam to a depth ranging from 6 to 10 inches. The subsoil is steel-gray, mottled with rust brown or yellow, heavy tough clay or heavy sandy clay extending to a depth ranging from 3 to 4 feet.

Practically none of this soil is under cultivation in Calvert County, although in Dorchester County on the Eastern Shore it is one of the general-purpose soils. When the soil is drained, limed, and organic matter added, good crops of tomatoes, soybeans, corn, and wheat may be obtained, but in its present condition it is best suited to pasture and forest.

NORFOLK COARSE SAND

Norfolk coarse sand is the most open, porous, and coarsest-textured soil in the county. The surface soil is light-gray or whitish-gray coarse sand to a depth ranging from 5 to 8 inches. It is underlain by a pale-yellow coarse sand subsoil which continues downward to a depth ranging from 34 to 50 inches, below which depth the material grades into brown coarse sandy clay or loamy sand. In places a considerable quantity of small rounded quartz gravel is on the surface and through the surface soil and subsoil. The soil is low in organic matter and in the elements of plant food, is droughty, and is of low agricultural value.

Areas of Norfolk coarse sand occur in the southwestern part of the county and in a few other places. The relief is undulating or

gently rolling on the interstream areas, or on the high plains where not badly dissected by erosion. Natural drainage is excellent, in fact, rain water moves through the soil rapidly, causing it to dry out quickly.

Only small areas of Norfolk coarse sand are farmed and these usually in connection with the adjoining soils. Some corn, vegetables, and rye are grown. Yields are low except where the land is heavily fertilized and moisture conditions are favorable. Most of this sandy soil supports a growth of small pine trees (*Pinus virginiana*) and chinquapin bushes.

MEADOW

Meadow occurs in narrow strips in first bottoms along the streams of the county, but the largest areas are along the longest creeks. The land is naturally poorly drained, part of it being wet throughout the year. Very little of it is used for cultivated crops, its principal use being for summer pasture. The soil material is so variable in color, texture, and structure that no type name could be given it. It represents material that has been washed from the adjoining uplands and deposited by the streams. If some of this land were drained and protected from overflow, good yields of corn and hay could be obtained.

COASTAL BEACH

Coastal beach represents the few narrow strips of beach sand occurring in places along Chesapeake Bay. These sand beaches are narrow and lie just a few feet above normal tide level, but they may be flooded during a high-wind tide. Most of the coastal beach consists of fine light-brown sand containing noticeable quantities of fine broken shells. It has no agricultural value.

TIDAL MARSH

Several areas of tidal marsh occur along Patuxent River, Chesapeake Bay, and northwest of Cove Point. Tidal marsh consists of dark-gray or black silty or clayey material with which is mixed varying quantities of vegetable matter in all stages of decomposition. The land is permanently wet and in most places is covered by tidewater twice in every 24 hours. It supports a thick growth of water grasses and sedges, and in some places cattle can be pastured.

RECOMMENDATIONS FOR THE IMPROVEMENT AND MANAGEMENT OF CALVERT COUNTY SOILS

Some of the best farmers of Calvert County are growing leguminous crops and turning these under in order to improve the soils. This is one of the most effective ways of increasing the organic-matter content and of adding nitrogen to the soils, especially so, as a very small amount of barnyard manure is made to be applied to the land. All the soils are light colored and deficient in nitrogen.

The continuous cropping of Calvert County soils, with only slight attention having been given to the vital problems of maintenance of soil fertility, has given rise to a soil problem that will take the farmers of the county many years to overcome. Tobacco being the

most important crop, and one that does not require a highly productive soil, has probably been largely responsible for this neglect of the soils. The following recommendations embody the principal factors to be considered in the improvement of the soils of Calvert County: (1) Adopt a cropping system that includes legumes once in three years and increase livestock production, (2) employ more adequate methods in using green manure for tobacco, (3) have the soil tested for acidity and apply lime where needed, (4) make large applications of more carefully selected fertilizers, and (5) control erosion.

Farming systems.—Establishing a definite crop rotation and increasing livestock production are the first steps that must be taken in restoring fertility to Calvert County soils. In sections of the county where it is practical to grow wheat, a crop rotation consisting of corn, wheat, and pasture (clover or a mixture of grasses) is very good. If wheat is grown on tobacco land it can follow tobacco in a 3-year rotation including alsike or red clover. On farms where it is impractical to grow wheat, a greater use of winter cover crops should be practiced; vetch or crimson clover can usually be depended on as such crops. Rye seeded in the fall with Japan clover sown on the rye in the spring is a very practical means of obtaining a cover on the thinner soils. Cowpeas are good soil improvers which can be used to advantage on many farms both as a soil-improvement crop and as a hay crop. Combined with the improvement of the cropping system there should be an increase in livestock production. More sheep, cattle, hogs, and turkeys would mean greater prosperity and more fertile soils.

Green-manure crops.—The acreage of green-manure crops could be increased to great advantage on most Calvert County farms. Especially is this true in connection with the growing of tobacco. Too many of the tobacco fields produce a crop of tobacco and then remain bare or covered with weeds until the next tobacco crop is planted. Growing vetch or crimson clover on these fields would be very profitable. Whether tobacco is produced on these fields every year or once in two years, the practice of following tobacco in the fall with vetch would be most beneficial in maintaining the fertility of the soil and also prevent erosion.

Acid soils.—In view of the acid condition of most Calvert County soils it is apparent that the lime tonnage used in the county must be largely increased before maximum production can be expected. The influence of livestock production on building higher soil fertility can only increase in proportion to the feed crops produced. The practice of applying lime once in the rotation should be more widespread as it is a matter of slight expense and more accurate results can be obtained by having the individual fields tested for lime requirement.

Commercial fertilizers.—Most Calvert County soils are deficient in the primary plant-food elements for maximum crop production, and in order to obtain the greatest returns liberal applications of standard-analysis commercial fertilizers shoud be made to the soils. Especially is this true with the tobacco crop, as heavy applications of properly balanced fertilizers have been demonstrated to be profitable investments. Greater care, however, should be taken in the selection of commercial fertilizers to meet individual soil conditions.

When tobacco follows a heavy legume crop that has been turned under it is advisable to adjust the amount of nitrogen in the commercial fertilizer to meet this condition.

Erosion.—The rolling relief and bare fields that characterize many acres in Calvert County have afforded a too favorable condition for erosion and soil washing, which results in further disaster to the depleted soils of the county. A good grass sod on the fields and pine brush in the gullies would go far toward checking this condition.

SOILS AND THEIR INTERPRETATION

Calvert County, lying within a section known as the Western Shore of southern Maryland, is wholly within the Atlantic coastal-plain region and occupies a thoroughly dissected rolling upland plain and a comparatively narrow flat foreland or terrace bordering Patuxent River. The range in elevation in the county is from nearly sea level to a maximum of 181 feet above. About 90 per cent of the entire county is included in the rolling upland with very great drainage development, as only small marshes and alluvium along the smaller streams are permanently wet. The flat foreland and the small nearly level spots in the upland are the only tillable lands in the county that have not been subjected to serious erosion.

All the well-drained soils of the county have developed under a forest cover, therefore they are light in color. They belong in the region of brown or grayish-brown soils. There has been no chance for the accumulation of organic matter, as has been the case in the black prairie soils of the West, which have developed under a thick cover of grass. The soils of Calvert County in forested areas are covered by a thin dark layer of organic débris, consisting of partly decomposed leaves, roots, and twigs, and the upper inch or two of the surface soil is darkened by an admixture of this organic matter which is usually acid and soluble. When the soil is cultivated the dark color quickly disappears.

Owing to the rolling relief and the friability of the soil material, the soils of the greater part of the county are thoroughly leached. The leaching or washing out of the soluble soil material by percolating water probably accounts for the fact that the B horizon has a higher content of plant nutrients than the A horizon. (See analyses of Sassafras sandy loam and Leonardtown silt loam on p. 21.)

In this warm temperate climate leaching and surface wash go on throughout almost the entire year, except for very short periods in winter when the ground is frozen to a depth of a few inches. The soils are low in organic matter and lime content, and there is no free carbonate of lime in any of the soil layers, although a layer of shells and marly clay occurs in places at a considerable depth below the solum. This marl layer is seen on steep bluffs along Chesapeake Bay and in places is underlain by a layer of diatomaceous earth.

The soils of Calvert County are derived from unconsolidated sand and clay and beds of sandy material containing gravel of marine deposition. The materials have undergone many changes since this section of the country was uplifted from the sea. The principal agencies which were operative in the development of the soils were climate, forest cover, relief, drainage, erosion, oxidation, and aera-

tion, and the relative rate at which the soils of Calvert County were developed toward the normal profile of the region is due to the acceleration or retardation of the action of these agencies. Most of the soils of the county are not old but have developed a normal profile with A, B, and C horizons, although large areas have been more or less affected by erosion, and small areas of poorly drained soils are young and have not developed a normal profile, owing to a high water table.

More than 90 per cent of the soils of the county are sandy, consisting of fine sandy loam, sandy loam, and loamy sand, the surface soils being more nearly loamy fine sand or loamy sand than sandy loam. The soils of Calvert County, on the basis of their profiles, may be divided into three groups as follows: (1) The regional group, or those soils which have the normal profile development of the region; (2) the mutilated group, including mature soils which have had their normal profile development more or less destroyed by erosion; and (3) the immature, or young soils, which have not developed the 3-horizon profiles.

The soils of the first group, or the soils of the county which have a normally developed soil profile, belong to the Sassafras series and include the fine sandy loam, sandy loam, loam, and silt loam. These soils occupy a much smaller area than the rolling, steep, and mixed phases of the Sassafras soils which belong in the second group. The Sassafras soils, therefore, constitute the most mature or normally developed soils of Calvert County. They may be considered as the soils which express the normal characteristics of the climate, natural vegetation of the region, and the natural processes of weathering. They are characterized by an eluviated A horizon and an illuviated B horizon.

The profile description of Sassafras fine sandy loam, at a point 3 miles east of Lower Marlboro, is taken to represent the well-developed Sassafras profile, and is as follows: The surface soil to a depth of 4 inches consists of medium-gray or grayish-brown fine sandy loam, and between depths of 4 and 14 inches is light-brown or brownish-yellow mellow fine sandy loam of single-grained structure low in content of organic matter. These two layers constitute the A horizon. The B horizon, or heavy layer, which lies between depths of 14 and 38 inches, is yellowish-brown or reddish-brown friable fine sandy clay which falls apart easily into irregular lumps or granules. When in a moist condition these lumps or breakage particles range in size from less than one-fourth inch to more than one-half inch in diameter, but when dry the material when handled breaks up into finer particles which range in size from single grains to coarse granules without any definite structure, and even under field conditions the material breaks up easily. The color on the outside of the particles is slightly darker brown than on the inside, and is yellowish brown when the particles are crushed. The B horizon contains oval insect casts and root cavities filled in with grayish-brown material, some of which is brought down from above by percolating soil water and some deposited by earth worms. Cylindrical holes one-eighth to one-fourth inch in diameter, the walls of which are rather smooth and dull brownish in color, occur throughout this horizon. The C horizon, or parent material, between depths of 38 and 60 inches, is yellowish-brown

fine sand or loamy fine sand consisting almost entirely of rounded fine quartz grains.

The B horizon of Sassafras sandy loam is a little more friable than that of Sassafras fine sandy loam, and the B horizons of the loam and silt loam are less friable and have a coarse-granular structure, but in none of the types is the B horizon hard, even when it is dry, and plant roots penetrate it easily.

The second group, or the mutilated soils, include all the rolling, mixed, steep, and light-colored phases of the Sassafras soils. Perhaps at one time these soils had a normally developed soil profile, but through the agencies of erosion the normal profile has in many places been destroyed. In places only the B and C horizons are found, and locally the C horizon, or parent material, comes near the surface or even outcrops. Considerable leaching and eluviation has taken place in the surface soil. Particularly is this true in areas of Sassafras sandy loam, light-colored phase. In such areas the surface soil to a depth ranging from 12 to 18 inches is badly leached and most of the fine material has been removed. The color is much lighter than is typical of the Sassafras soils, and its appearance in many places is much like a Norfolk soil with a Sassafras profile.

Leonardtown silt loam occurs on the smooth and almost level tops of the ridges and watersheds and at one time the areas were much larger than at present, but erosion has been so active that these flat ridges are gradually being narrowed by stream action and in the course of time, unless erosion is checked, the Leonardtown soil in Calvert County will disappear. Probably because the soil material has lain for a long period of time on a smooth surface, this soil has developed, through processes not yet fully understood, a compact layer in the lower part of the subsoil, in most places lying at a depth ranging from 20 to 30 inches. This layer consists of hard compact mottled brownish-yellow and light-gray laminated fine sandy clay and differs from the other layers in its compactness rather than in its heavy texture. Where this layer is well developed, it impedes the downward percolation of soil moisture and creates a condition of imperfect drainage in the B horizon. As this condition did not exist until the compact layer developed and as this seems to be a feature of late development in the soil, the imperfect drainage thus brought about has not produced the features of a water-logged subsoil. The soil profile, therefore, of the Leonardtown soil, differs from that of the normally mature soils (the Sassafras) of the region in the presence of the compacted zone in the illuviated horizon which in general is somewhat lighter than the normal color of the overlying layers.

The Elkton soils, occupying flat areas, lying at low elevations, and having poor drainage, show evidence that their profile development has been retarded or influenced by excessive moisture. In areas where surface drainage is imperfect and the soil has been subjected for considerable periods of time to the influence of excessive moisture and imperfect internal drainage during parts of the year and to conditions of deficient moisture during periods of dry weather, that is, to alternating wet and dry conditions, the surface soil is gray or nearly white. In a few forested areas there is an accumulation of vegetable matter on the surface. The main subsoil layer, or horizon

B, consists of heavier material mottled gray, yellow, and brown. This layer varies in thickness and in consistence, but in most places at a depth ranging from 28 to 34 inches it is underlain by material which is lighter in color and much more friable. The mottled color of the entire profile is evidence of incomplete oxidation.

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

In addition to the three groups of soils previously described, three classifications of material—meadow, coastal beach, and tidal marsh—occur in this county. Meadow applies to the various-textured poorly drained soils occurring in the first bottoms along the small streams. The material is so mixed in texture and color that no definite type name could be assigned to it. Coastal beach represents the narrow bars of beach sand lying along the bay. Tidal marsh is developed at the mouths of some of the streams and estuaries, is subject to tidal overflow, and is permanently wet.

No chemical analyses have been made of Calvert County soils, but the analyses in Tables 6, 7, and 8 are for Sassafras fine sandy loam as occurring in Stafford County, Va.; Sassafras sandy loam as occurring in Wicomico County, Md.; and Leonardtown silt loam as occurring in Prince Georges County, Md. These analyses represent fairly well the same types of soil as those in Calvert County.

TABLE 6.—*Chemical analyses of samples of Sassafras fine sandy loam in Stafford County, Va.*[1]

Description	Depth	Constituent												
		SiO_2	TiO_2	Fe_2O_3	Al_2O_3	MnO	CaO	MgO	K_2O	Na_2O	P_2O_5	SO_3	N	Ignition loss
	Inches	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Fine gray-brown sandy loam	0–6	78.70	3.26	4.03	7.70	0.05	0.50	0.43	1.53	0.65	0.11	0.12	0.05	2.67
Heavy mottled sandy loam	7–16	72.70	2.42	5.70	11.10	.04	.86	.57	1.82	.73	.10	.17	.04	3.57
Red sandy clay	16–36	63.30	3.55	10.70	13.50	.04	.48	.87	1.75	.62	.10	.11	.04	4.47
Brown sandy loam	0–8	80.00	3.48	3.88	6.27	.09	.87	.39	1.54	.55	.16	.11	.09	2.89
Do	9–15	83.30	3.00	4.03	5.07	.06	.44	.30	1.72	.38	.20	.08	.03	1.82
Red-brown clay loam	16–36	78.70	2.41	6.03	7.43	.03	.71	.53	1.85	.31	.10	.07	.03	1.78

[1] Reported to the Soil Survey May 21, 1930.

TABLE 7.—*Chemical analyses of three samples of Leonardtown silt loam, 2 miles northwest of Forestville, Md.*[1]

Depth, inches	Constituent								
	SiO_2	TiO_2	Fe_2O_3	Al_2O_3	MnO	CaO	MgO	K_2O	Na_2O
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
½ to 7	83.94	1.19	2.33	6.34	0.02	0.14	0.28	1.42	0.54
7 to 17	77.83	1.20	3.35	10.64	.01	.10	.56	1.58	.30
32 to 52[2]	75.16	1.21	3.87	13.17	.006	.12	.50	.57	.16

Depth, inches	Constituent—Continued							
	P_2O_5	SO_3	Ignition loss	Total	N	CO_2 from carbonates	Organic matter	H_2O at 110°
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*			*Per cent*
½ to 7	0.08	0.03	3.32	99.63	0.09	None.	----------	0.70
7 to 17	.06	.07	3.72	99.42	.03	None.	----------	1.90
32 to 52[2]	.06	.06	4.74	99.62	.02	None.	----------	2.75

[1] Analyst: G. J. Hough, Jan. 20, 1925.
[2] Below hardpan layer.

TABLE 8.—*Chemical analyses of four samples of Sassafras sandy loam from Maryland*[1]

Description	Depth	Constituent							
		SiO_2	TiO_2	Fe_2O_3	Al_2O_3	MnO	CaO	MgO	K_2O
	Inches	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Leaf mold[2]	----------	59.46	0.28	1.48	3.15	0.007	0.45	0.25	1.20
Gray sandy loam	0–2½	87.83	.34	1.76	3.92	.006	.24	.14	1.02
Yellow sandy loam	4–20	90.57	.29	1.11	4.77	.006	.16	.14	1.62
Do	30–60[3]	81.85	.65	1.44	10.46	.011	.20	.16	1.89

Description	Constituent—Continued								
	Na_2O	P_2O_5	SO_3	Ignition loss	Total	N	CO_2 from carbonates	Organic matter	H_2O at 110°
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*			*Per cent*
Leaf mold[2]	0.16	0.11	0.22	32.60	99.37	0.77	None.	----------	3.65
Gray sandy loam	.16	.03	.06	3.87	99.97	.08	----------	----------	.55
Yellow sandy loam	.09	.02	.05	1.45	100.27	.02	----------	----------	.25
Do	.14	.03	.04	3.22	100.09	.02	----------	----------	.80

[1] Analysts: G. J. Hough, S. Mattson, G. Edgington, I. A. Denison, Mar. 23, 1923.
[2] Cabin Creek, Md.
[3] Sassafras sandy loam, deep phase, 3½ miles northwest of Salisbury, Wicomico County, Md.

SUMMARY

Calvert County is on the Western Shore of southern Maryland. It occupies a peninsula lying between Chesapeake Bay and Patuxent River. The average width of the county is about 9 miles, and the extreme length is about 35 miles. It includes an area of 218 square miles. Prince Frederick, the county seat, is 35 miles southeast of Washington.

About 95 per cent of the county consists of rolling uplands, and the remainder of less rolling terrace land. The original plain has been thoroughly dissected, and drainage is excessive. The drainage of the entire county is into Chesapeake Bay, mainly through Patuxent River, but a few small streams flow directly into the bay.

Calvert County was organized in 1774. The earlier settlers were immigrants from England, Spain, Germany, and France, and the present white population are descendants of these earlier settlers. According to the 1930 census the total population is 9,528, all classed as rural. Several summer colonies are on Patuxent River and along the bay shore.

Transportation facilities are fair. The county roads range from fair to good. Baltimore is the main outside market. Labor is mostly negro and is scarce and high priced. Two-thirds of the farms are operated by their owners. Land values vary considerably, ranging from $8 an acre for steep and unimproved land to $100 an acre for well-improved land.

The winters are comparatively short and never severe, and the summers are rather long, but extended periods of excessively high temperatures are infrequent. As a whole the climate is desirable, especially along the river and bay. The rainfall is evenly distributed throughout the year, being heaviest during the growing season.

The principal crops are corn, wheat, and hay, as general farm crops, and tobacco as the special money crop.

Ten soil types and five phases of soils in addition to meadow, coastal beach, and tidal marsh, were identified in the county. All are well drained except meadow and tidal marsh. The soils that dominate the agriculture of the county are grouped in the Sassafras and Keyport series. Sassafras sandy loam, mixed phase, Sassafras sandy loam, light-colored phase, and Norfolk coarse sand are light-colored sandy soils which are not adapted to general farming. Sassafras gravelly sandy loam and Sassafras sandy loam, steep phase, are in forest. Leonardtown silt loam and Elkton silt loam in Calvert County are not cultivated.

[PUBLIC RESOLUTION—No. 9]

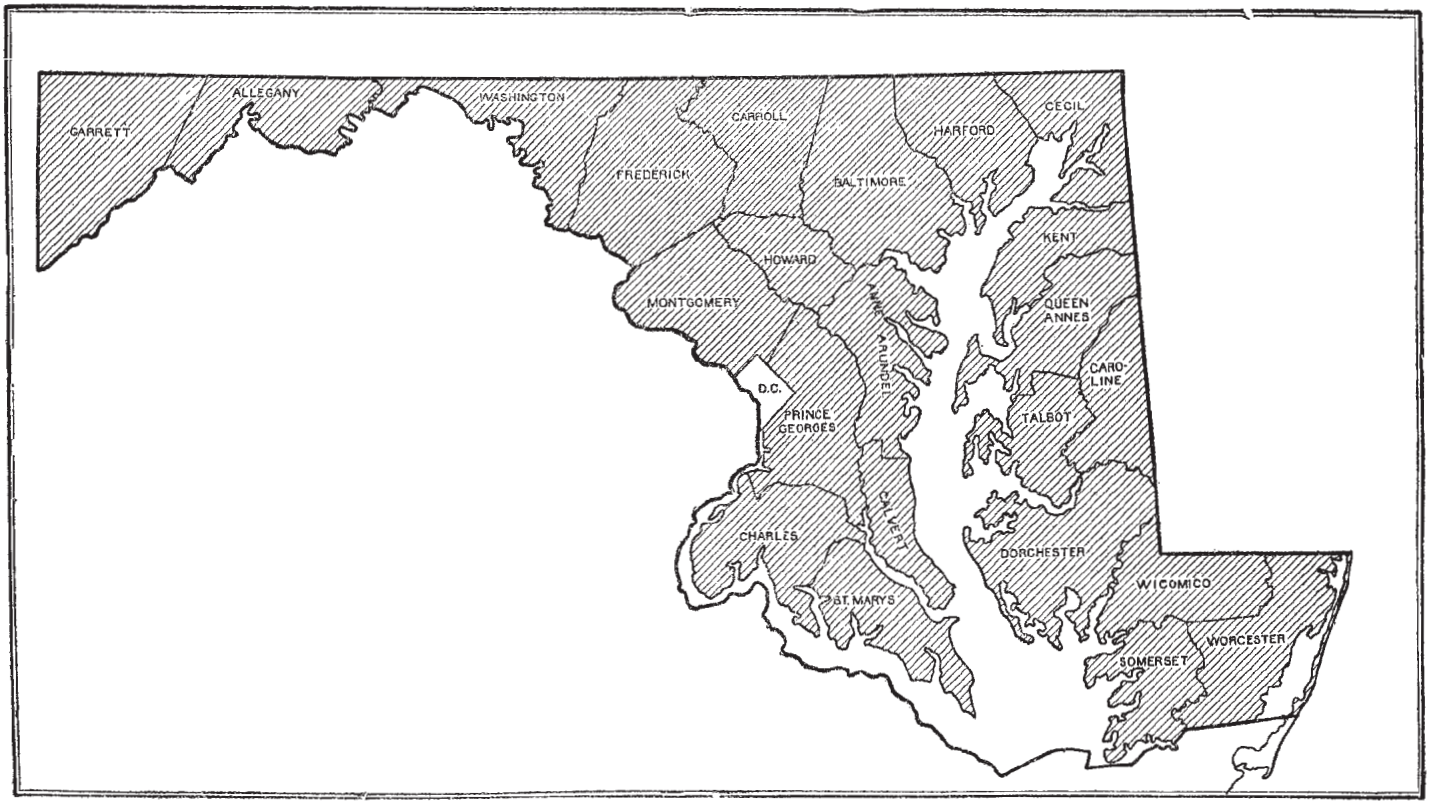
JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

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

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

Approved, March 14, 1904.

[On July 1, 1901, the Division of Soils was reorganized as the Bureau of Soils, and on July 1, 1927, the Bureau of Soils became a unit of the Bureau of Chemistry and Soils.]



Areas surveyed in Maryland, shown by shading

U. S. GOVERNMENT PRINTING OFFICE: 1931

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